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Garmin reveals Autoland feature

by Matt Thurber

For the past eight years, Garmin has secretly been working on a fascinating new capability, an autoland function that can rescue an airplane with an incapacitated pilot or save a pilot when weather conditions present no other safe option. Autoland should soon receive its first FAA approval, with certification expected shortly in the Piper M600, followed by the Cirrus Vision Jet.

The Garmin Autoland system is part of Garmin's Autonomi family of automation products, which includes Electronic Stability and Protection and Emergency Descent Mode. The Autoland system is designed to safely fly an airplane from cruising altitude to a suitable runway, then land the airplane, apply brakes, and stop the engine. Autoland can even switch on anti-/deicing systems if necessary.

Autoland is available for aircraft manufacturers to incorporate in their airplanes equipped with Garmin G3000 avionics and autothrottle. Piper Aircraft will make the system (branded Halo) standard in the new M600 SLS version of its single-engine turboprop. Cirrus is following suit with the Vision Jet, which will also offer Autoland (branded Safe Return).

The concept behind Autoland is to develop a system that can take control of a perfectly good airplane with a pilot who is no longer capable of flying, and then land the airplane safely.

More than 100 Garmin engineers worked on Autoland, including a team of human factors experts. They had to carefully design the system so that a non-flying passenger can not only switch it on, but also understand what is happening during an Autoland event.

To learn more about the genesis of Autoland and how it works, I visited Garmin's Olathe, Kansas, headquarters for a briefing and demo flight in the M600 with flight test pilot and engineer Eric Sargent.

The project began in 2011 with a Garmin engineer testing some algorithms that could make an autolanding possible, and in 2014 Garmin accomplished a first autolanding in a Columbia 400 piston single. In September 2015, Garmin got the FAA involved with the goal of certifying Autoland in production airplanes. So far, Garmin has flown more than 800 autolands in various airplanes, including about 200 in the M600, which made its first autolanding on September 10, 2018.

Emergencies Only

Sargent explained that Autoland is designed only for emergency use and not for pilots to use just because the weather is marginal or crosswinds too high or to prevent, say, a runway overrun for a pilot who isn't confident about accomplishing a safe landing. The idea is "bad pilot, good airplane," in other words, the pilot is no longer able to

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EYE ON TRAINING

Training pilots for today's complex aircraft is a labor-intensive process. CAE and FlightSafety International are both using new AI and big data analytics to help instructors target students' needs and make training more efficient.

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INSIDE this issue

GENERAL AVIATION

Icon Aircraft had a plan to attract new customers to GA: make a light sport aircraft new owners want to buy and fly. It is delivering on that as it boosts the efficiency of its production line.

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PRESIDENT - John Hartig
GROUP PUBLISHER – Dave Leach
ASSOCIATE PUBLISHER – Nancy O'Brien
ADVERTISING SALES
Georges France – Western Europe, +33 6 80 21 17 93
Melissa Murphy – Midwestern U.S., +1 (830) 608-9888
Nancy O'Brien – Western U.S./Western Canada/Asia Pacific, +1 (530) 241-3534
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U.S. HEADQUARTERS
214 Franklin Ave., Midland Park, NJ 07432, +1 (201) 444-5075
Advertising Inquiries: +1 (201) 345-0085
adsales@ainonline.com
Circulation Inquiries: +1 (201) 345-0085
subscriptions@ainonline.com
WASHINGTON, D.C. EDITORIAL OFFICE:
Kerry Lynch (business aviation)
klynch@ainonline.com
Tel: +1 (703) 969-9195
EUROPEAN EDITORIAL OFFICE:
Ian Sheppard; isheppard@ainonline.com
Hangar 9, Redhill Aerodrome, Surrey RH1 5JY, UK
Tel: +44 1737 821409, Mobile: +44 7759 455770

THE CONVENTION NEWS COMPANY, INC.
AIN PUBLICATIONS EXECUTIVE TEAM
Wilson Leach
Matt Thurber
Michele Hubert
Jennifer Leach English
Dave Leach
Nancy O'Brien

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As We Go To Press

ARGUS: U.S. BIZAV FLYING FLAT IN OCTOBER

Business aircraft activity was mostly flat in October with midsize and super-midsize fractional jets recording the lone double-digit gain for the month, according to data from Argus International's TrakPaq report. Overall activity edged up 0.5 percentage points in October 2019 compared with the same month last year. Activity among fractional midsize and super-midsize jets increased 10.8 percent, followed by Part 91 light jets, which was up 3.7 percent compared with October 2018. Also moving slightly higher for the month was Part 91 jet activity, which was higher by 2.1 percent, as well as Part 135 light- and large-jet activity that increased by 0.9 percentage points and 2 percent, respectively. The flight activity data is based on aircraft flight number specific arrival and departure information on all IFR flights in the U.S., the Caribbean, and Canada.

SHELL, SKYNRG COLLABORATE ON EUROPEAN SAF PLANT

Shell Aviation will support its long-term strategic partner SkyNRG in the development of the first dedicated sustainable aviation fuel (SAF) production plant in Europe. The fuel company will provide technical and commercial expertise to the DSL-01 project in Delfzijl, Netherlands, which is slated to be commissioned in 2022, and in doing so, will secure the option to purchase SAF produced at the facility. DSL-01 will utilize waste feedstocks such as used cooking oil and will be powered by locally sourced sustainable hydrogen. The plant will produce 100,000 tons of SAF a year, corresponding to a reduction of lifecycle CO_2 emissions of approximately 270,000 tons. Combined with the green production factors, the lifecycle carbon emissions for the fuel produced there will be around 85 percent lower than that for conventional jet fuel.

BIZJETS BECOME TARGET OF EXTINCTION REBELLION PROTEST

About 100 people gathered at Geneva Airport in Switzerland on November 16 to block private jet activity as part of an environmental demonstration, according to news reports. The group Extinction Rebellion, which "uses non-violent civil disobedience in an attempt to halt mass extinction," organized the event that lasted more than two hours, according to the news site SWI Swissinfo, which added that the group dispersed at the request of the cantonal police.

In response, business aviation organizations in Europe and the U.S. defended the business aviation community's environmental efforts, saying the industry has made an aggressive push toward sustainable aviation fuels that can reduce carbon lifecycle emissions by 80 percent and that business aviation accounts for a minuscule portion of total transportation emissions.

PREOWNED BIZJET SALES DROP SHARPLY

The inventory of preowned business jets for sale inched higher while the number of sales transactions fell sharply in the first nine months of 2019, according to data released last month by JetNet. Business jet sales transactions dropped 16.9 percent compared with the same period a year ago, the Utica, New York-based business aviation data company said. The percentage of the business jet fleet for sale—2,187 of 22,241 in-service aircraft—rose 0.9 percent, from 8.9 percent in the first nine months of 2018 to 9.8 percent in the current period. For business turboprops, the percentage of the fleet for sale—1,051 of 15,676 in-service turboprops—edged lower, to 6.7 percent in the first nine months of 2019 compared with 6.8 percent in the nine-month period of 2018.

EASA TO ADD HUMAN FACTORS TO ROTOR CERTIFICATION

An EASA notice of proposed amendment (NPA) adds provisions into small- and large-rotorcraft certification specifications to ensure that human factors are systematically taken into account during the design and approval processes of rotorcraft flight decks. Comments on the NPA are due on January 8. Additionally, new generations of rotorcraft are characterized by having a high level of integration of avionics, displays, controls, and automation. EASA estimated that "an improved crew workstation design that is optimized for human factors will contribute to reducing the crew's workload and increasing the crew's situational awareness" and could reduce the number of incidents and accidents by between 10 and 20 percent.

DUNCAN FORMALIZES MX TECH APPRENTICESHIP PROGRAM

Duncan Aviation officially rolled out a formalized airframe technician maintenance apprenticeship program during a ceremony last month at its Lincoln, Nebraska headquarters. The rollout included the awarding of a certificate marking the MRO provider's program as nationally registered by the U.S. Department of Labor and Department of Education. Twenty-four apprentices at Duncan are currently working full-time while learning and preparing for their airframe technician certification test. They have up to two years to earn their certification under the program.

Epic earns FAA TC for E1000

by Curt Epstein

Epic Aircraft has received FAA type certification for its E1000 turboprop. The announcement marks the conclusion of a rigorous, seven-year test program for the all-carbon-fiber, single-engine design. It is based on the company's experimental LT kit model, which was introduced in 2005 through an owner-assist build program at the company's headquarters.

"Transitioning that design into a certified version was the chance to offer a truly compelling product to the industry," said Doug King, CEO of the Bend, Oregon-based company, noting it has more than 80 confirmed orders for the E1000 from customers around the world. "We had some opportunities to speed things up along the way, to get certification earlier, but that would have required some tradeoffs that we weren't willing to make."

Powered by a 1,200-shp Pratt & Whitney PT6A-67A, the six-seat airplane has a climb rate of 3,000 feet per minute, a 34,000-foot authorized ceiling, a range of more than 1,650 nm (NBAA IFR), and a maximum cruise speed of 325 knots, making it one of the fastest aircraft in its class. The E1000 features the Garmin G1000 flight deck at a list price of approximately $3.25 million.

As it ramps up production, Epic has doubled its composite fabrication capacity, investing in more tooling, equipment, and curing ovens and has increased its schedule to two manufacturing shifts with the first seven E1000 customer aircraft under construction. Initial customer deliveries are scheduled to take place by year-end, with production certification slated for the first quarter of 2020.

"The FAA has a difficult job, overseeing a very challenging process, ultimately aimed at keeping us all safe," noted King. "They have been a great partner, collaborating with us throughout the program, and certainly contributing to the structural integrity and safety of the E1000." ■

Epic Aircraft has received FAA type certification for its speedy E1000 single-engine turboprop, a certified version of its LT experimental kit aircraft that was introduced in 2005.

AIN expands editorial team with John Hartig and Charles Alcock

AIN Publications has expanded its staff and product line with the addition of seasoned publishing executive John Hartig as president and the return of former **AIN** editor-in-chief Charles Alcock to head up FutureFlight.aero, **AIN**'s new premium content on emerging aviation technologies and business models.

Hartig, who reports directly to **AIN**-co-founder and managing director Wilson S. Leach, is working with the senior leadership team on growing AIN's core legacy products and developing new revenue streams. He brings a deep background in building media and publishing businesses, most recently spending nine years as CEO of the Sports Information Group/Daily Racing Form, a leading publication in the horse racing industry. There, Hartig led the successful transformation of a 125-year-old franchise to a premium content, data, events, and online wagering franchise in the horse racing industry and the broader sports sector.

He also has held senior roles with Hearst, as senior vice president of consumer marketing and development, as well as with Time Inc. as president and CEO of The Parenting Group and director of consumer marketing and development for People and In Style.

Alcock, meanwhile, rejoins **AIN** after spending two years as communications director for HeliOffshore. He had previously spent five years as editor-in-chief of **AIN** and has spent more than 27 years with the company.

Accepting pre-registrations before a rollout in December, FutureFlight will provide in-depth coverage, analysis, and data on emerging aerospace technologies, including urban air mobility and eVTOL programs. The site will include daily news and commentary, in-depth reports on trends, a database tracking new aircraft programs with links to company information, a weekly newsletter, and a subscriber-only community that includes prospective customers, investors, and partners. **AIN STAFF**

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PRE-OWNEDIRECT

Boosted by deliveries of its new G500 and G600, Gulfstream saw a more than 36 percent increase year-over-year in its large-cabin offerings. That contributed to the business jet industry's 16 percent rise in billings through the first three quarters of 2019.

Deliveries a mixed bag in third quarter: bizjets, pistons up; t-props, helos down

by Curt Epstein

Private aircraft deliveries were a mixed bag in the third quarter according to statistics released mid-November by the General Aviation Manufacturers Association (GAMA). Through the first nine months of the year, business jet deliveries were up by 15.4 percent over the same period in 2018, with OEMs handing over 69 additional aircraft, buoying the total airplane billings to $14.8 billion, a 16 percent rise over the previous year.

All of the business jet airframers saw increases over 2018. **Gulfstream** had a 31 percent rise, boosted by deliveries of its new G500 and G600 large-cabin twinjets. In that segment alone, the Savannah OEM increased its output by more than 36 percent.

As it ramps up production of its flagship Global 7500, **Bombardier** saw a 12-unit overall improvement, adding eight more Challengers models, for a year-over-year delivery increase of more than 15 percent.

Embraer also saw a positive swing of nearly 15 percent, mainly attributed to eight deliveries of the new Praetor 600 which commenced in the second quarter of 2019.

Cessna continued to boost its production of Latitudes, handing over five more in the first nine months of this year than it did last year. Overall the Wichita OEM improved its production by 10 jets, good for an 8 percent increase.

After finally reopening its order book for the versatile PC-24 earlier this year, **Pilatus** tripled its deliveries of the light jet from 9 to 27 over the first three quarters of 2018.

Honda Aircraft added four additional HondaJets to its delivery total during the first nine months of this year, for a total of 25 of the over-wing-engined light jets.

Dassault was not counted in this quarter as the French airframer reports its deliveries only at mid-year and year-end.

Among the bizliner class aircraft, **Airbus** handed over three ACJs thus far in 2019, an improvement of two, while **Boeing**, which delivered five BBJs during the first three-quarters of 2018, has only delivered a lone BBJ 787-9 this year.

Turboprop Market Softens

In the turboprop sector results were down by 11.6 percent overall, while high-end pressurized turboprop deliveries were off by more than 8 percent year-over-year.

Beechcraft delivered seven fewer of its top-end King Air 350i/ER models, but that was offset by increases in its C90GTx and 250s, leaving the Textron brand with a 3.4 percent increase year-over-year. **Pilatus** remained static in its PC-12 deliveries, with 51 in the first nine months of both years, while **Daher**, **Piaggio**, and **Piper** all saw declines thus far in 2019, the latter off by 34 percent as its M600 deliveries declined from 24 to 7 through the first three quarters of the year. At the lower end of the scale, piston-powered aircraft deliveries increased by 12.3 percent during the first nine months of 2019.

Helicopters Lagging

The rotorcraft sector continues to experience headwinds, with overall deliveries down more than 22 percent year-over-year. Turbine helicopters were off by 15.4 percent through September of 2019, moving from 513 handed over to customers in the first nine months of 2018 to 434 reported thus far this year, with all manufacturers showing declines. Total billings for the rotorcraft industry declined by 17.3 percent year-over-year, moving from $2.7 billion in the first three quarters of 2018 to $2.2 billion over the same span this year.

Handing over four fewer super-medium twin H175's so far in 2019 than it did in the three quarters of last year, **Airbus Helicopters** tallied a 3.6 percent slide. **Bell** saw erosion in its 505 totals, handing over 26 fewer of the light single in the first nine months of 2019 than it did over the same period last year, figuring in the Textron subsidiary's 14.4 decrease.

Leonardo experienced a more than 21 percent fall off from its pace last year. The Italian OEM saw erosion among its light helicopters, delivering 11 fewer year-over-year as well as its medium twin AW189/AW149, which moved from 13 deliveries in the first three quarters of 2018, to four in the following year.

Robinson Helicopter reported a nearly 32 percent dip in deliveries of its flagship R66, while **Enstrom** handed over one of its 480B-Gs after delivering five over the first nine months of 2018. **Sikorsky** made no deliveries in the first nine months of 2019.

"Despite these mixed results, our manufacturers continue their investments in advanced factory machinery, design software, and associated processes that keep product development cycles robust and in-turn bring advances in fuel efficiency, capability, and safety to the global fleet," said GAMA president and CEO Pete Bunce. ■

News Briefs

FlightSafety Offers EASA-qualified G500 Training

FlightSafety International has begun offering European Union Aviation Safety Agency (EASA)-qualified initial and recurrent training on the Gulfstream G500 at its Savannah, Georgia learning center. "We are committed to providing Gulfstream G500 operators around the world with comprehensive training programs that meet their specific regulatory requirements," FlightSafety senior v-p of operations Dann Runik said. Equipment used to provide the training includes two FlightSafety FS1000 full-motion simulators, three new advanced graphical flight-deck simulators that have been qualified by EASA as Level 1 flight training devices (FTD), and classrooms that feature an interactive Matrix cockpit.

UPS Drones Making Pharmacy Deliveries

UPS Flight Forward (UPSFF) in late October made its first commercial residential drone deliveries using a Matternet M2 drone in cooperation with CVS Pharmacies. The initial deliveries were made from a CVS pharmacy in Cary, North Carolina, and delivered to customers' homes. The drones flew autonomously but were monitored by a remote operator who could intervene if necessary. The drone hovered about 20 feet over the properties and slowly lowered the packages by a cable and a winch to the ground. UPSFF was awarded a Part 135 certificate by the FAA in September.

Analyst: U.S. on Path for Bizjet Fleet Cleanup

The business jet market is headed toward a "big fleet cleanup" with the looming ADS-B Out installation deadline and other changes ahead, industry analyst Rolland Vincent said last month at the 2019 NATA Aviation Leadership Conference. Vincent, president of industry consultancy Rolland Vincent Associates, told attendees that 25 percent of the fleet is on a path to miss the Jan. 1, 2020 ADS-B deadline in the U.S., and some might just be retired. Further playing into such a cleanup is the potential overcapacity of as many as 3,900 business jets in the U.S. Cycles have not quite returned to the nearly 5 million logged a decade ago when the business jet fleet was at 8,000 aircraft. Now it numbers 14,000.

Study: Encroaching Drones Usually Not Seen by Pilots

Pilots approaching a runway usually can't see small unmanned aircraft systems (sUAS) encroaching on their airspace, and they virtually never detect motionless drones, according to a study done by researchers at Oklahoma State University and Embry-Riddle Aeronautical University. Dutring their an airborne experiment, pilots in a Cessna 172S failed to see a common type of quadcopter in motion during 28 of 40 close encounters. Only three out of 22 motionless drones were spotted.

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Russia shows its SSBJ in the Middle East

by Vladimir Karnozov

During Russian President Vladimir Putin's tour of the Gulf countries earlier this autumn, Moscow made efforts to lure wealthy Arabs into ambitious aviation projects, most notably the next-gen supersonic business jet (SSBJ). Such an aircraft would accommodate 16 to 19 travelers and cruise at speeds of 1,090 to 1,620 knots.

The Russian president touched on the theme when talking to the King Salman of Saudi Arabia and Crown Prince Mohammed of Abu Dhabi while letting ministers discuss the matter in detail during sessions of inter-government commissions that were held in his presence.

During the Russo-Emirati inter-government commission in October, Russian President Vladimir Putin personally appealed to members of Gulf monarchies for cooperation in promoting his country's proposed 16- to 19-passenger supersonic business jet.

Gulf Region Potential

Talking to journalists after the ninth session of the Russo-Emirati inter-government commission held on October 15 in Abu Dhabi, Denis Manturov, the Russian minister for industry and trade, said, "Russia is interested in cooperation with the Gulf monarchies on the supersonic passenger jet...since they are pre-positioned to be customers for such an aircraft." Earlier, Russian officials said the focus of a sales campaign on the future supersonic jet would be placed on Southeast Asia and the Middle East, the two geographic areas "where the factors of time, distances, and traffic intensity allow for supersonic travel."

"As for the potential market, this geographic area [the Gulf] looks like among the main ones that we are interested in," Manturov said. During a question and answer session, he added: "As per investments, yes, they can help us materialize such a project." His ministry has already injected Rouble 1.4 billion ($21.8 million) into the research and development effort headed by TsAGI (the Russian Central Aerohydrodynamic Institute, near Moscow) in cooperation with six other scientific research establishments.

Local Contributions

Advanced technology is the key to this project, the minister stressed. Without that, the SSBJ would be very costly, "much more than existing subsonic jets." Rough estimates render a deliverable SSBJ to be twice as expensive as subsonic business jets of similar seating capacity. Last year, the aforementioned ministry forecast projected that, at a unit cost between $100- and $120 million, the solvent demand for next-gen supersonic transports would come to 30 in the inner market, and "many more" outside the country.

Answering further questions on the SSBJ, Manturov said that "a demonstrator" shall be ready in 2023, so as to enable the creation of "a real aircraft" in 2027. The technology demonstrator will be smaller, serving to test key technologies and design solutions developed for a full-size supersonic transport.

The minister further said that Moscow is ready to render assistance to Emirati companies in developing their own competencies in the aerospace domain. "Do we need [foreign] investments? Yes, we do! In turn, we can help them [in the UAE] develop their competence. This is not going to be a kind of global competence that would enable them to offer a turn-key solution worldwide...And yet, it might enable them to move forward."

One of the areas where the Emirates can provide an industrial contribution to the future SSBJ and the MC-21 next-gen narrowbody jetliner is airframe parts made of advanced materials, since "they already have a superb plant for composites," said Manturov.

A wide application of polymeric composites and metal-composite structures promises to reduce the SSBJ's structural weight, and thus reduce the intensity of the sonic boom. Russian designers are set to use modern heat-resistant materials, including polymerics with carbon threads. These are lighter than aluminum, yet stiffer than steel. ■

Jet Aviation's Heinz Aebi retires

Heinz Aebi, Jet Aviation's affable and long-serving vice president of group marketing and communications, is calling it a career after 29 years with the Zürich-based company. During his tenure, company ownership moved from a closely-held family business to private equity management firm Permira Advisers, and through its purchase by General Dynamics in 2008.

BARRY AMBROSE

Heinz Aebi, Jet Aviation's v-p of group marketing and communications

He joined the then-Hirschmann family-owned company in November 1990 as marketing manager, following stints as the club secretary of one of Zurich's most famous soccer teams and as an aide to the mayor of Zürich. When Jet Aviation temporarily relocated its headquarters to Palm Beach, Florida, he moved to the U.S., as well, and came home when it returned to Switzerland in the mid-2000s.

He shepherded the company's communications division through the dawn of the internet age, recalling how it was one of the first in the industry with its own website. That was a novelty at the time and drew many queries from his peers and competitors. Jet Aviation also introduced now-ubiquitous email. Along the way, Aebi attended 28 of NBAA's annual conferences and numerous other industry events such as EBACE and regional forums, managing the company's marketing presence.

Aebi, who made his last public appearance with the company at NBAA '19 in Las Vegas, will officially retire at the beginning of January. He previously handed over the department reins to Elouisa Dalli, who succeeds him as vice president.

"You always look forward, and then when comes the moment when you look back, you can't believe how fast it went," Aebi told **AIN** in October. **C.E.**

News Briefs

CAE Seals Deal To Buy 50% of Simcom from DAC

CAE on November 5 finalized its 50 percent acquisition of Simcom from Directional Aviation Capital (DAC), some two months after the deal was announced. Under the $85 million deal, for the next 15 years CAE will also be the exclusive training services provider to six DAC-owned business aircraft operators: Flexjet, Flight Options, Flairjet, Sirio, Nextant Aerospace, and Corporate Wings. Combined, these operators have a fleet of 175 business aircraft. The agreement also calls for Simcom to purchase equipment from Montreal, Canada-based CAE, including five full-flight simulators and five flight training devices for the Gulfstream G650, Bombardier Challenger 350, and Embraer Phenom 300 and Legacy 500. Simcom plans to install these FFSs and FTDs in a new training center that is under development in Lake Nona, Florida.

Charter Provider Offers New Carbon Offset Tool

Paramount Business Jets (PBJ) has introduced what it claims is the private jet charter industry's first open-source carbon emissions calculator. Available through its website, the Easy Private Jet Carbon Offset Calculator allows anyone to enter their trip origin, destination, and business aircraft model. The calculator will then determine total flight time and emissions, as well as offer a list of international carbon offset providers the client can choose to pay for carbon credits on the flight. According to PBJ CEO Richard Zaher, frustration over trying to determine the carbon footprints of his client's charter flights led him to develop the calculator. Zaher added he will provide the source code for the calculator, along with fuel burn data for private jets, notes, and instructions free to any company wishing to post it on their own website.

Soloy Gets New Ownership Structure

Washington-based fixed- and rotary-wing conversion specialist Soloy Aviation Solutions is now under a new ownership structure at Fifty-Ten Yankee. Dave Stauffer, the managing member of Fifty-Ten Yankee who has previously held leadership roles with Soloy, reached an agreement to acquire all of Soloy's assets. Soloy will continue to support nearly all of its numerous STCs for aircraft, and engines, with the exception of its AS350 Honeywell LTS, AS350 AllStar Rolls-Royce C30, and Bell 206 C20R engine conversions. Airwork is supporting that work under an agreement announced in October. Fifty-Ten-Yankee has also acquired all intellectual property and production lines for the twin-engine/single-propeller Soloy Dual Pac, the Soloy Pathfinder 21 modification, Soloy Enaer T35 Turbine conversion, and inlet design and tooling for the Williams FJ44 turbofan.

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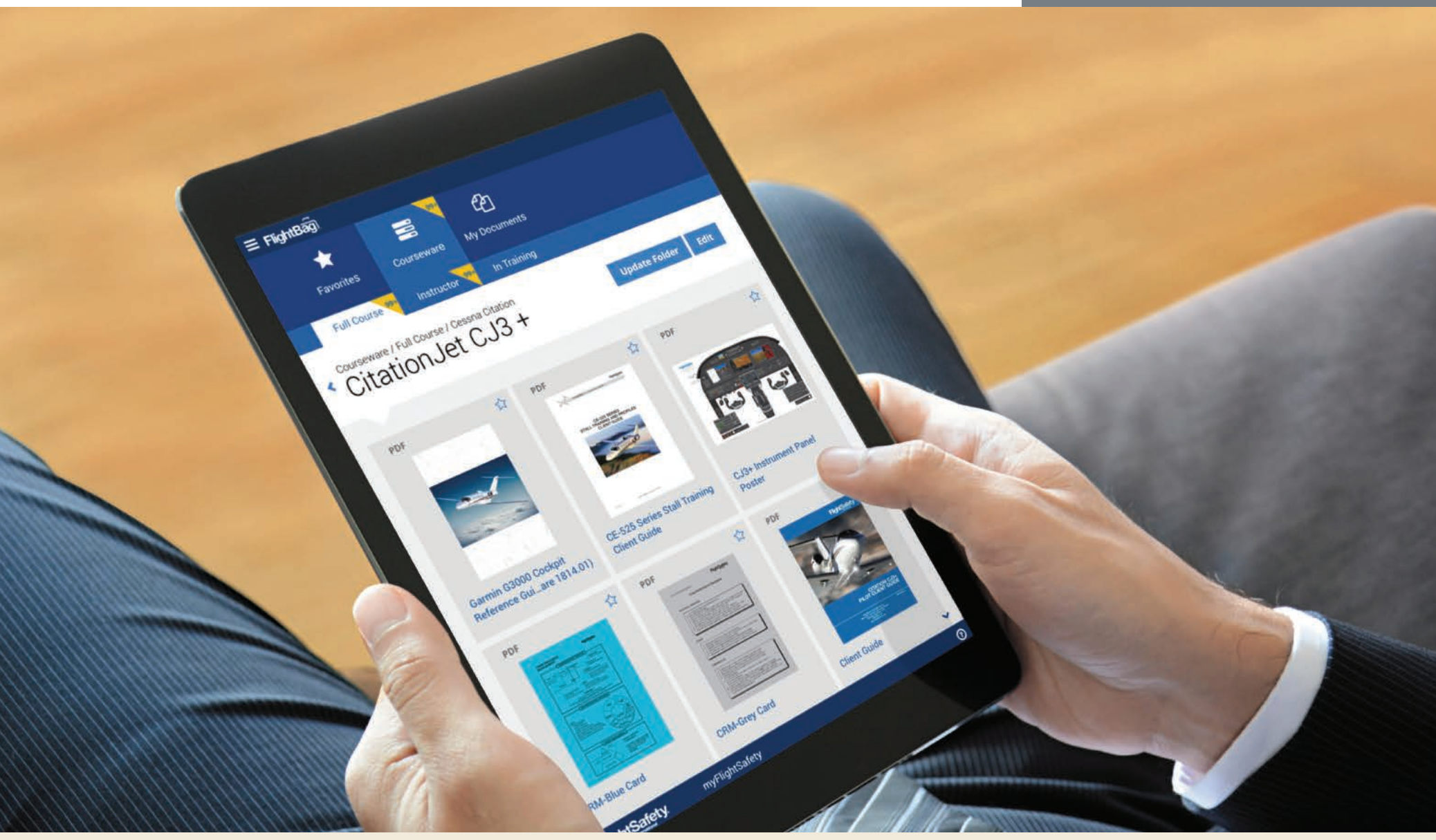

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UK Labour call for ban on bizjets draws industry fire

by Kerry Lynch

Business aviation leaders are decrying a call by certain UK political leaders to ban business jets from UK airports and encourage electric technologies as a means to address climate concerns.

Andy McDonald, shadow transport secretary for the British Labour Party, last month backed such restrictions in a statement asking, "Why is the government enabling billionaires to trash the climate when it's the rest of us who will suffer the consequences?" and then adding, "Climate targets cannot be met without curbing pollution from air travel, and a passenger on a private jet produces 10 times the emissions of someone on a regular flight. This simply cannot be ignored."

McDonald added that electric advancements will be possible in a few years' time—as long as governments put in the proper "incentives"—and also said the Labour Party would examine proposals closely and consult with industry on a phaseout of the use of fossil fuels.

In a joint statement, NBAA and the International Business Aviation Council (IBAC) charged such proposals disproportionately target a single transportation segment, even as the industry has made an aggressive push toward sustainable aviation fuels that can reduce carbon lifecycle emissions by 80 percent.

"Even though business aviation accounts for only a minuscule portion of transportation emissions, the industry is pressing ahead on SAF," said IBAC director general Kurt Edwards. "Instead of singling out business aviation for prohibitive restrictions on airport access, UK leaders should focus on efforts to make SAF more widely available in the UK through positive incentive policies to encourage production and use of SAF in greater quantities."

"Business aviation has continually led the way in promoting products, procedures, and policies to reduce aircraft emissions, with proven results," added NBAA president and CEO Ed Bolen. "We urge leaders in the UK and elsewhere to set aside punitive proposals like this one, and work with us to build upon the significant progress made to date."

The business aviation leaders pointed to decades of investment in technologies to improve the environmental footprint, such as the use of composites, winglets, and satellite-based avionics. Over the course of four decades, business aviation carbon emissions have been reduced by 40 percent, they said.

Business aviation further has committed to continue this path, cutting overall emissions over 2005 levels by 50 percent by the year 2050, they added.

"At a time when leadership is needed on sustainability, the proposed ban lacks meaningful value. It will have a de minimis impact on emissions overall while denying connectivity for London and hindering competitiveness for companies of all sizes in the region and beyond," Edwards said.

The European Business Aviation Association (EBAA) also objected to the proposals, agreeing that they would do little to curb climate change. EBAA added in a statement, "Air traffic is an international business, meaning unilateral, isolated solutions make little sense."

EBAA instead called for a more achievable and holistic approach. "Business aviation serves a legitimate, and important, societal purpose: we connect communities, enable secure travel, improve business productivity and opportunities, and link markets in an increasingly globalized world when time matters most and no alternative is available," the association said. "Nonetheless, these benefits come with an environmental cost, and business aviation must balance them with a responsibility to mitigate climate change."

The association reiterated the business aviation community's commitment to sustainability efforts, saying they complement the first global climate mitigation scheme—CORSIA. Further, European governments should focus on more concrete actions to support European operators and sustainability efforts, including the delivery of the Single European Sky and the development of policies to support the production and delivery of sustainable aviation fuels.

The Labour Party's focus on business jet use follows the attention recently given to one of Britain's most famous couples—Prince Harry and Meghan Markle—for their private jet use. ■

MATT THURBER

The Halo Safety System brings new capabilities to Piper's M600 single-engine turboprop, including Garmin's new Autoland.

Piper unveils next-gen M600 SLS

Piper Aircraft is adding to its model lineup a new version of the M600 turboprop single dubbed the M600 SLS (for enhancing safety, luxury, and support). A key feature for the M600 SLS is the Halo Safety System, which will be the first certification of Garmin's new Autoland capability. The M600 SLS replaces the original M600, according to Piper.

Autoland/Halo is enabled by Garmin's G3000 avionics and the M600's new Garmin autothrottle. In a situation where a pilot becomes incapacitated, Halo either automatically or by a passenger pushing a button engages and finds a nearby suitable airport, flies an approach to that airport, lowers landing gear and flaps, lands, stops, then shuts down the engine.

The M600 SLS's Halo Safety System comprises Autoland, the autothrottle (required for Autoland), Garmin Emergency Descent Mode and Enhanced Stability and Protection, Surface Watch, Safe Taxi, and Flight Stream wireless gateway.

New interior features include Piper's EXP interior with a selection of materials, stitching patterns, and contrasting threads, as well as optional two-tone leather seats and Alacantra fabric. M600 SLS buyers also receive a new "exclusive service program" for the first five years called the Ultimate Care Program. This includes coverage for all scheduled maintenance and hourly and calendar-based inspections.

Certification of the $2.994 million M600 SLS is expected shortly, with deliveries expected to begin this quarter. **M.T.**

News Briefs

Piaggio Aerospace Touts Turnaround

With a balance sheet reflecting $930 million in orders and commitments, Italy's Piaggio Aerospace has announced the impending launch of a public tender for the insolvent company, a new agreement for the sale of at least 10 Avanti Evo turboprop twins, and plans to introduce two corporate shuttle versions of the aircraft. That figure represents close to $300 million in contracts from its engine and customer-support units, and new aircraft and other contracts anticipated by year-end to total some $630 million, the latter includes 10 Evos from Saudi Arabia's Al Saif Aviation. The public tender offer was pending at press time and any deal will require board approval.

CAN Raises $510k at Annual Fund an Angel Event

More than $510,000 was raised through sponsorships, donations, and auction items at Corporate Angel Network's (CAN) annual Fund an Angel cocktail reception during NBAA-BACE 2019. These funds will support CAN's mission of providing air transportation for cancer patients undergoing treatment. CAN coordinates more than 250 patient flights a month and has flown more than 60,000 patients to treatment since its founding in 1981.

NATA Says 'No' on Hangar Foam

Before the window on public and industry comments for the revision of the National Fire Protection Association's (NFPA) standard for aircraft hangars—NFPA 409—closed last month, NATA petitioned the safety organization to remove the requirements for foam fire suppression systems for most business and business aviation hangars, excluding those that house inherently hazardous operations. "Research and our members' experience indicate that foam fire suppression systems are unnecessary in most general aviation hangars," said NATA director of regulatory affairs Megan Eisenstein.

Lufthansa Looks To Improve Actuator Mx, Life

In a bid to improve the maintenance of and extend the life of primary hydraulic flight control actuators, Lufthansa Technik AG and Politecnico di Torino—the polytechnic university of Turin, Italy—are partnering on the hydraulic diagnostics, or HyDiag, project, to develop an automated, noninvasive diagnostic procedure for initial examination of the actuators. Using automated processes and highly sensitive measuring devices, the team has been able to identify damage on actuators that was previously undetectable by human inspection and testing. The project is scheduled to run through 2020 and expected to lead to an improved process that will result in more precise troubleshooting and quicker repair of the safety-critical actuators while at the same time increasing their lifespan.

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NBAA-BACE 2019

Textron plans SkyCourier first flight in early 2020

by Jerry Siebenmark

Textron Aviation is making progress on the development of its new high-wing, twin-turboprop Cessna SkyCourier 408 but now expects the utility airplane to make its first flight early next year, officials of the Wichita airframer announced on October 21. The program, unveiled in 2017, has progressed considerably over the course of the last few months with the development of the prototype and an additional five flight and ground test articles, the company said. Wingmate of the prototype is rapidly approaching, it added.

FedEx is the launch customer for the SkyCourier, with 50 firm orders for the airplane and options for 50 more. Configurable for both cargo and commuter operations, it is designed to carry a payload of up to 6,000 pounds with an 87-inch cargo door, a flat floor, and a nearly 70-inch tall and wide cabin to accept three standard LD3 air cargo containers. In a passenger configuration, it will have seating for up to 19 passengers, with a netted rear cabin area for luggage and equipment. Capable of flying 200 ktas, the aircraft is powered by two, 1,100-shp Pratt & Whitney Canada PT6A-65SC turboprop engines and two, new 110-inch McCauley propellers.

Textron Aviation is preparing to mate the prototype SkyCourier's wing, with first flight planned in early 2020, a schedule that has slipped slightly to the right.

Rob Scholl, Textron's senior v-p of sales and marketing, told **AIN** even with a cargo operator as its launch customer, he thinks there's a "real possibility" that small commuter airlines will have a strong interest in the airplane that has a 5,000-pound maximum passenger payload and 900-nm range. "I think the place that's getting the most attention, at least here in the U.S., is Essential Air Service," he explained. "And so we're already having discussions with the Department of Transportation on that because we want this obviously to have a role in the Essential Air Service program, but also internationally, especially the Asia-Pacific region, where you're doing a lot of island hopping."

Scholl added there's customer interest in the SkyCourier as a combination passenger/cargo aircraft. "That's getting a lot of attention as well," he said.

Like Textron's new Denali single-engine turboprop, the SkyCourier will be certified as a Part 23 airplane. Given the different certification paths as well as lessons learned from the prolonged type certification of the Part 25 Citation Longitude, Textron Aviation CEO Ron Draper told **AIN** he expects it to be a smoother process for the SkyCourier. "I'm pretty sure it won't be as extensive as the Part 25 airplane, and we'll be smarter from it," Draper said. ■

Rolls-Royce unveils Pearl 700 engine

Rolls-Royce unveiled the new Pearl 700 engine at NBAA-BACE 2019. The 18,250-pound-thrust engine will power the ultra-long-range Gulfstream G700. The Pearl 700 combines the company's Advance2 engine core technology, a new low-pressure system, and various design and material changes to deliver 8 percent more takeoff thrust, a 12 percent better thrust to weight ratio (8 percent more thrust and 4 percent less weight), 3.5 percent less fuel burn, and 5 percent greater efficiency compared to the company's BR725 engine on the current-production G650.

The new engine will meet or exceed Stage 5 noise standards and have nitrous oxide emissions that are projected to be 35 percent below the CAEP/6 standard. It is being developed at Rolls-Royce's Center for Business Aviation Engines in Dahlewitz, Germany.

The Pearl 700 features a 10-stage, high-pressure axial compressor; improved gearbox breather exhaust; new Safran-Aircelle nacelle; 24-blade, 51.8-inch blisked fan; bypass ratio in the 5:1 range; high-pressure compression ratio of 24:1 (compared to 16:1 on the BR725); six blisked stages; low-emission combustor; two-stage shroudless high-pressure turbine; and an enhanced four-stage low pressure turbine. The improved thrust comes from the larger fan combined with the more powerful core.

Significant weight savings come from the stronger and lighter nacelle, blisked fan, and the lighter, more powerful engine core. Compared with the BR725, the shape of the blades are different to optimize the fan to increase thrust, reduce noise, and limit resonance excitations to reduce fan flutter, according to Dirk Geisinger, chairman of Rolls-Royce Deutschland. The Pearl 700 uses the same nacelle line as that on the BR725 while accommodating a fan that is 1.8 inches larger. Geisinger said Rolls-Royce engineers were tackling 250 technical issues regarding changes between the BR725 and the Pearl 700.

MARIANO ROSALES

Dirk Geisinger, chairman of Rolls-Royce Deutschland

Other advanced technologies Rolls-Royce is looking at for the Pearl 700 include using 3D printing to manufacture ceramic tiles inside the combustor to limit heat and noise and ceramic nozzles to simplify manufacturing and reduce weight.

The Pearl 700 is backed by the Rolls-Royce CorporateCare Enhanced hourly maintenance program and features a new engine health monitoring unit with advanced vibration monitoring, bidirectional communications, and the ability to remotely reconfigure engine-monitoring features from the ground. It feeds data into a system of cloud-based analytics, smart algorithms, and artificial intelligence.

Its health monitoring system detects all vibrations coming from the engines and identifies likely sources such as fuel pumps. Altogether, the system identifies more than 10,000 parameters, filters and livestreams data, and predicts to enable the timely replacement of line replaceable units. The engine will be maintained on condition with a goal of 10,000 hours before it has to be taken off-wing. Geisinger said the goal for the new engine is a 100 percent dispatch rate.

Rolls-Royce executive v-p for business aviation Scott Shannon said the hourly rates for CorporateCare Enhanced—which adds to CorporateCare by adding items such as nacelles and corrosion—on the Pearl 700 would be similar to those on the BR725. **M.H.**

News Briefs

Honeywell Designs APU for Small Jets, T-props

Honeywell Aerospace has launched an auxiliary power unit (APU) for turboprops, light business jets, and helicopters with space limitations. Its new micro power unit (MPU) will provide enough power to operate air conditioning, charge batteries, and assist with main engine start. When used as a primary power source instead of from the main engines, it can reduce fuel burn by up to 80 percent on the ground, according to Honeywell. Measuring 12 inches by 13 inches by 24 inches, the MPU weighs 75 pounds and is rated at 10kW and 400 amps. Honeywell hasn't yet disclosed a price for the MPU.

Ampaire, Ikhana Team on Electrified Twin Otter

Ampaire, a developer of hybrid electric aircraft propulsion, has teamed with Ikhana Aircraft Services to explore modifying Twin Otter airframes to fly with that technology. The two companies have launched a NASA-funded study to explore the "electrification" of the Twin Otter. Under NASA's Electric Aircraft Propulsion program, they will evaluate various options and produce plans to assess the cost, schedule, and risk mitigation for the planned development. The partners' goal is to be able to put a hybrid-electric version of Ikhana's 19-seat RWMI DHC-6 300HG Twin Otter. The 1,500 hp/1 MW power specifications of the current aircraft's Pratt & Whitney Canada PT6 engines meet the criteria for the NASA program.

eVTOL Startup EHang Prepares for Nasdaq IPO

Electric vertical takeoff and landing (eVTOL) aircraft manufacturer EHang on October 31 filed papers with the U.S. Securities and Exchange Commission (SEC) to prepare the way for an anticipated $100 million initial public offering (IPO) on Nasdaq. The China-based group made an SEC F1 filing for the Cayman Islands-registered EHang Holdings Limited, giving notice of its intention to offer Class A ordinary shares before year-end. The IPO would make EHang the first privately owned eVTOL startup to go public.

Sustainable Aviation Fuels Summit Announced

As NBAA and GAMA look to accelerate availability and use of sustainable aviation fuels (SAF), the associations are looking to continue that push with a Business Aviation Global Sustainability Summit in March 2020 in Washington, D.C. "Business aviation has long made sustainability a priority, and we have made tangible progress," said NBAA president and CEO Ed Bolen. "Over the past decade we have redoubled our commitment to reducing the industry's already-small carbon footprint, and key to that has been the development and use of sustainable fuels."

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Talk to aircraft brokers and transaction professionals, and you soon realize that while technical specifications, interior configurations, and price obviously all matter, aircraft deals happen when buyers and sellers put their trust in a broker. Trust, in fact, is as important to fueling aircraft transactions as jet-A is to powering turbine engines.

> "It's not an aircraft business, IT'S A PEOPLE BUSINESS."
>
> **Jay Mesinger**
> founder and CEO of Mesinger Jet Sales in Boulder, Colorado

Buyers trust the agent to identify and properly price the best aircraft for their mission, and sellers trust the agent to optimally set its value. Finding a representative that warrants that trust couldn't be more important than it is today, when a shortage of late-model and clean legacy airframes confronts buyers, even as residual values stabilize, recalibrating the market on the sell side—and anyone, regardless of qualifications, can set up a website and offer representation.

"Twenty years ago, there were 200 to 300 actual brokers," said Steve Gade, v-p of aircraft sales and marketing communications at Duncan Aviation, headquartered in Lincoln, Nebraska. "Today, that number is probably well over 1,000, and many of them have limited experience, knowledge, or financial and technical resources to resolve errors and omissions."

But what are the foundations, the standards of integrity, and capabilities that warrant a customer's trust? We spoke with Mesinger and Gade—whose firms have decades-long histories of success and reputations for rectitude—to discuss how they conduct business. Their comments shed light on the practices that buyers and sellers should look for when seeking a broker worthy of their trust.

MINING THE INVENTORY FOR HIDDEN GEMS

On the buy side, aircraft sourcing is a fundamental skill, especially given the current dearth of the most desirable, in-demand airframes. Among top brokers, sourcing seems elevated from a fundamental skill to a consuming dedication.

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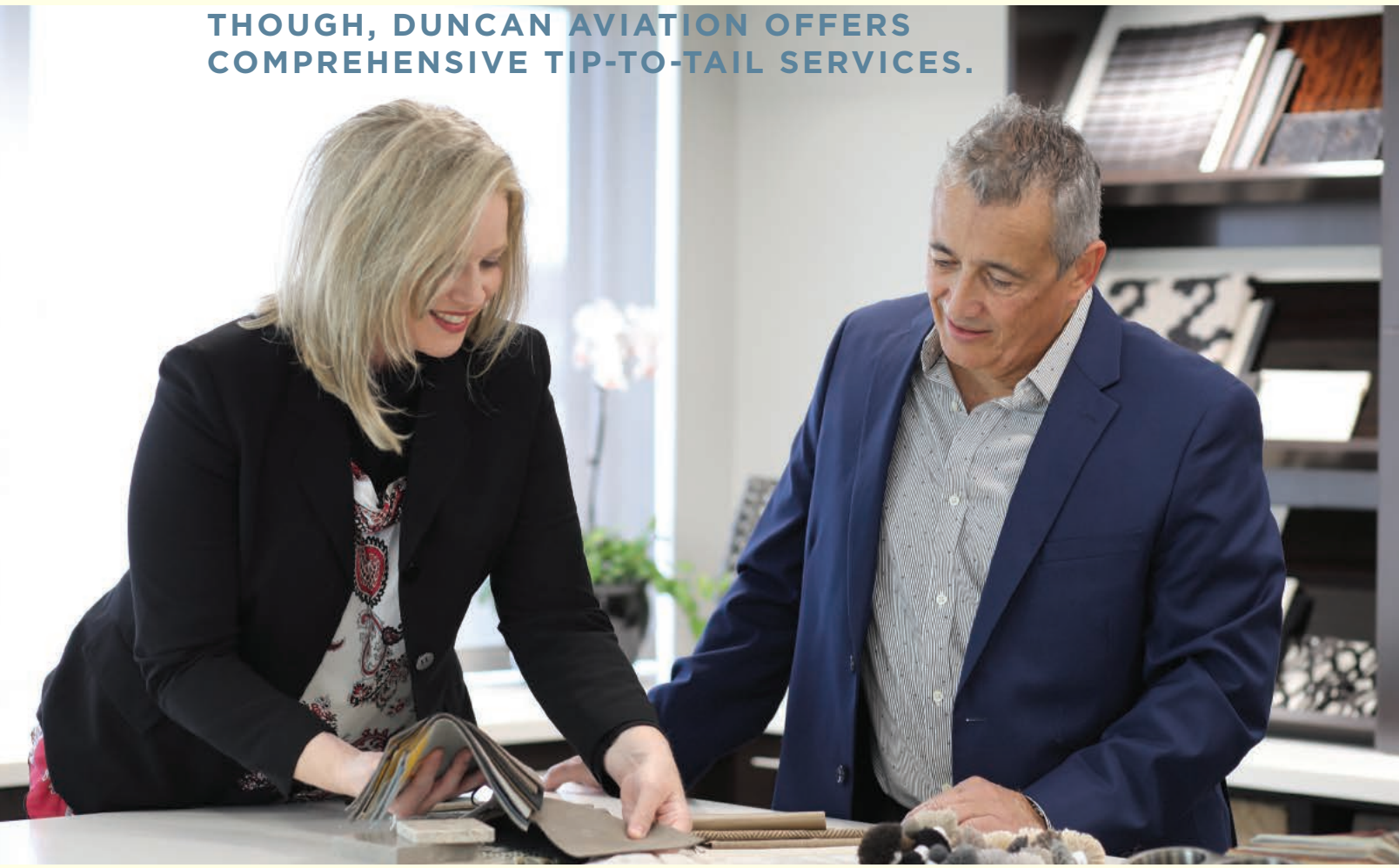

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> **“Gems are harder to find but THEY ARE OUT THERE.”**
>
> **Steve Gade**
> v-p of aircraft sales and marketing communications at Duncan Aviation, headquartered in Lincoln, Nebraska

“Gems are harder to find but they are out there,” said Gade.

Agreed Mesinger, “You want to find that gem that checks all or most of the criteria boxes you set—the pedigree, the maintenance history, ownership, location, the records—and be able to declare you found the needle in the haystack.”

Well-earned trust makes that success possible. “The better those of us doing this for a living are, the more willing we are to wait and keep clients motivated to wait with us,” Mesinger said.

Such sourcing capabilities mandate global reach and transactional expertise, as “high-value opportunities may be overseas,” said Gade, citing as an example the recent acquisition of a Middle East-based Falcon 2000LX—a time-critical transaction. “It was key that we had resources available and that those resources shared our sense of urgency,” he said. “We sent one of our Falcon tech reps to evaluate the aircraft and relied on our international compliance officer to assist with proper import and export.”

As the example suggests, successful transactions have many moving parts, and the representative must not only have them accessible but marshal and lead them.

“We think of ourselves as conductors in a symphony,” said Mesinger. “We don’t play every instrument, but we make sure the music flows and goes together in the right key and ends on the right note for the customer.”

Members of the transactional ensemble, whether in-house or outsourced allies, include budget modelers and mission profilers, type-specific maintenance experts, appraisers, title companies, escrow agents, and the client’s legal team and aviation attorney.

First-time buyers typically also need guidance on post-purchase aircraft ownership, while seasoned purchasers may need help transitioning to a larger airframe. Such services are standard with quality brokerages and begin with identifying the aircraft best suited for the intended mission.

As part of its research, Mesinger analyzes buyers’ needs and desires, runs sample flight plans, and compares capital, fixed, and variable costs.

Gade noted that when clients come in with firm ideas about the aircraft they intend to purchase, Duncan Aviation’s research finds a superior alternative that causes them to reconsider their choice in about 30 percent of cases. “Either way,” he said, “100 percent of the time after that process they are all in without any second thoughts, which significantly speeds up the process.” Trust strikes again.

OPTIMIZING VALUE AND REDUCING SALES TIME

Gaining the trust of sellers may be more challenging than earning a buyer's faith. "Many sellers think or hope, their aircraft is worth more than it is," said Gade. "A well-researched market value analysis takes the emotion out of it." Quality brokers go beyond data found in publicly available valuation guides to accurately price aircraft—on either side of the transaction.

Mesinger's research includes daily calls to track market-specific inventory levels, aircraft-specific details and histories, and actual prices paid and factors influencing the sale. Such data is "a crucial differentiator made possible through trusted global relationships with our industry peers," said Mesinger.

Proper pricing is critical to reducing time on market, the most crucial element of selling an airplane, without undervaluing the asset. Each day an aircraft remains unsold costs money and reduces value, Mesinger noted. "From 2017 to 2019, our average days on the market, from listing to an accepted LOI, has been 56 days."

The technical expertise that quality brokerages leverage on the buy side can be crucial for sellers as well. Duncan Aviation, long known for its MRO services, recently represented a Citation owner during a transaction in which the prepurchase inspection was performed at the prospective buyer's facility of choice, as is customary.

"After the acceptance flight, there were squawks that the repair station troubleshot but could not resolve," Gade recalled. "Rather than throw parts and labor at the problem, we called our technical team. They walked the repair station representatives through the system and within 15 minutes the cause was identified, saving our client tens of thousands of dollars in possible repair costs—and the possibility that the buyer would walk out on the deal," Gade concluded. "The closing took place the very next day.

Among the good news for sellers are signs of pricing stability. But misrepresentation of information may be a bigger problem for some sellers than residual-value issues, according to Mesinger. "It's usually not malicious—they don't know what they have to sell," he said. "They

ETHICS AND TRANSPARENCY

Steve Gade

v-p of aircraft sales and marketing communications, Duncan Aviation

Q: We're seeing a renewed focus on ethics and transparency in the aircraft brokerage community. What are your views on this issue, and what does your company do about it?

A: *Ethics are critical. It gets back to trust. We're a family business and we have a long-term view of things. We see second- and third-generation customers. We won't jeopardize a long-term relationship for a short-term gain. We understand how important our brand and reputation are, not only on the aircraft sales side, but on everything we do. We have a code of ethics, and every one of our 2,400 employees goes through retraining on an annual basis. That's something we live by.*

Jay Mesinger

founder and CEO,
Mesinger Jet Sales

Q: We're seeing a renewed focus on ethics and transparency in the aircraft brokerage community. What are your views on this issue, and what does your company do about it?

A: *Ethics should mean everything—to the customer and the broker. I often say brokerage is the most unsophisticated sophisticated business, because people spend huge amounts of money, but they don't seem to care about vetting their broker, and not all brokerages live up to the high ethical standards they talk about. Mesinger has a code of ethics, and we include it in the actual contract with our clients—it's a contractual obligation. You can fire me if I betray any one of those principles.*

never updated the spec sheet. It wasn't right when they bought it five years ago, so when they go to sell it," they use the same, possibly incorrect information they relied upon. A quality broker will quickly discover the discrepancy and regard it as a red flag, calling all other facts presented into question, slowing if not derailing the deal in the process.

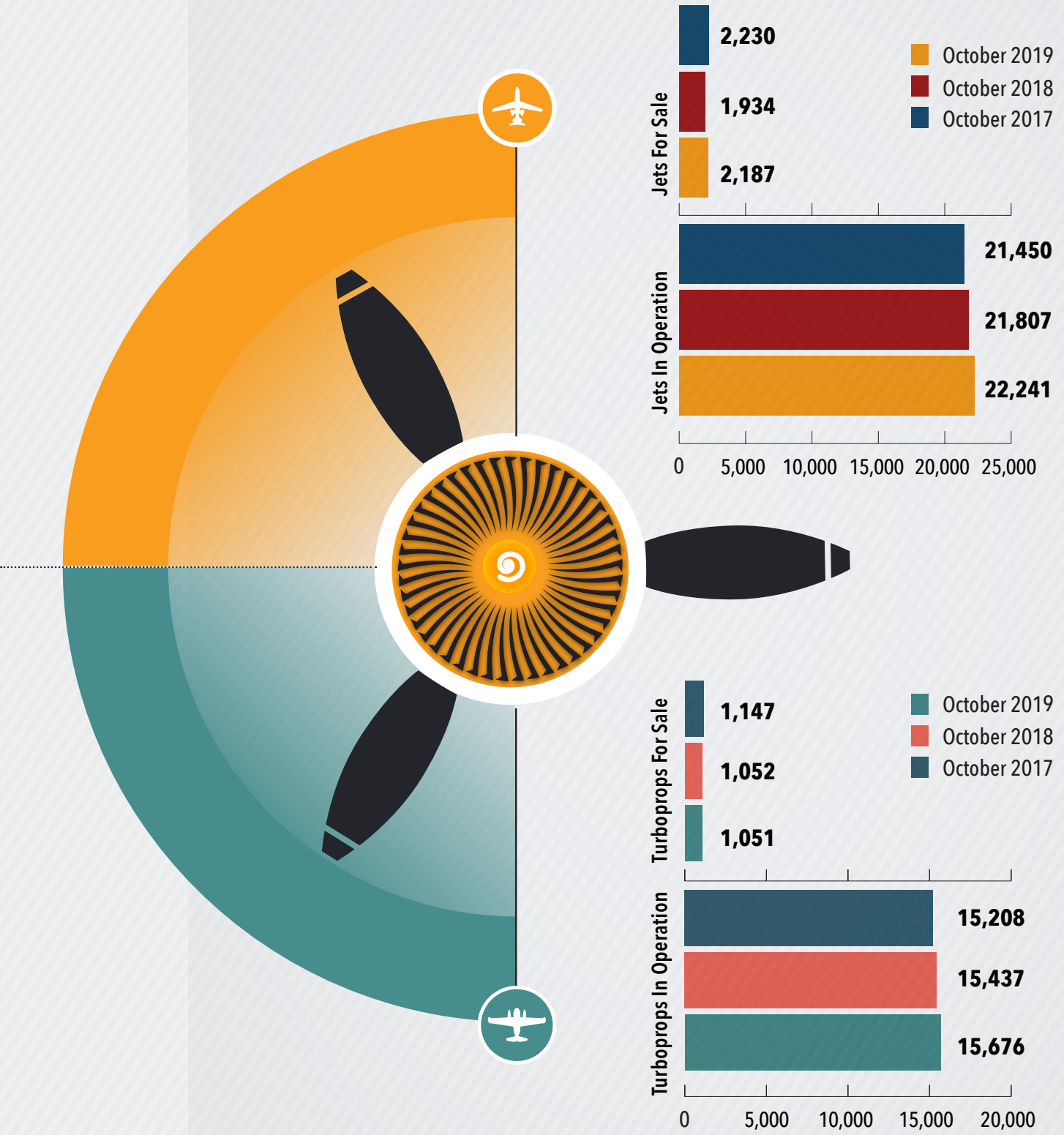
EYING THE MARKET AHEAD

Heading into 2019's fourth-quarter stretch, the world's largest-volume brokerages—Duncan Aviation and Mesinger among them—reported strong to record sales, though preowned transactions were down overall. But brokers can cite simple logic as one reason for their belief in the market. Along with the trust that drives transactions is the ever-powerful desire to upgrade and the realization that it can make good economic sense.

When the time to upgrade comes and you're looking for a broker you can trust, suggested Gade, "ask them for a list of references of clients that they have done multiple deals with, and ask those clients, 'Why?'."

Choose wisely and "you will be rewarded as a seller, minimizing the days on market," said Mesinger, "and buyers can find the airplane they need, pay the price deserved, and have a reasonable retention rate on the residual value."

After reaching a low in 2018, inventories of jets for sale have been climbing, while turboprop inventory has held more steady, according to JetNet LLC.



Source: JetNet - Current Market Summary Report

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GlobalJet executives: Safety tied to work culture

by Kerry Lynch

Improving an organization's culture directly relates to improved safety, two leading training specials say, adding it also can provide a boost to efficiency. During Bombardier's Safety Standdown last month, JD McHenry and Rich Bean, the respective CEO and president of business aviation maintenance training provider GlobalJet Services, emphasized the importance of the "human side" of culture, particularly how leaders and managers interact with their teams.

"We work really hard on the technical skills, but I think it's time we really focus on our soft skills" to build a positive culture, McHenry said.

"If you want to enhance your safety culture, if you want to enhance...the people who work around you and yourself, you have to be a leader," Bean added.

The trouble is, many skilled professionals are rewarded by being promoted into a leadership role, but they aren't given proper training for it, McHenry said, and they are not prepared for that role.

McHenry and Bean stressed that leadership and management have two very different definitions. Leadership "comes from the heart," providing vision, inspiration, and motivation; while management "comes from the mind," and is focused on process and project completion.

Both skills are important for everyone and should be used both at work and at home. "If you are happy at your home, you are going to be happy at work," Bean said.

With that in mind, he said GlobalJet does what it can to foster that on both sides. Also, GlobalJet discovered flexibility has helped tremendously with efficiency. The company adopted core hours when everyone must be at work: 9:30 a.m. to 2 p.m. To fulfill a full day, employees can choose to come in earlier or leave later. In addition, the company put early leave on Fridays in place. Since adopting those policies, the company saw an 85 percent increase in efficiency in various departments. "If you take care of people, they will take care of the business for you."

They noted that despite the assumption that money motivates work, appreciation for a job well done goes a long way. A simple thank you "in my opinion is the number one motivator," McHenry said.

Also, empowering the employees, bringing them in, and making them feel included in the conversation, will give them a stake in the success of an organization.

Bean advised attendees to tap into their own emotional intelligence and learn how to be empathic and listen to others. "This is the direction we are going in this industry.

"When you want to create a safety culture, you want to enhance safety, and you want to do things better. You have to be more synergetic...that's the direction we need to go as an industry," Bean said. ■

In face of growing automation, pilots must strive to adapt

Despite rapidly changing technology, pilots remain the most important factor in the flying environment and they must continue to strive to improve and adapt, a leading safety expert cautions.

Speaking during the 23rd annual Bombardier Safety Standdown last month, Convergent Performance's Chris Lutat acknowledged that the advances that have occurred in the flight deck in the past few years have fundamentally changed how aircraft are operated, particularly at lower altitudes. Lutat said this has caused him to learn new technologies and procedures in his own flying, changing the way he looks at the environment.

Younger pilots have a better command of the increase in technology, he added. But, arguably, "what has [diminished] is the connection of that to the big picture of operating a large aircraft in a constantly changing [environment]."

Lutat further contended, "A completely automated future is more science fiction than science" reciting a quote, "We tend to overestimate technology in short term and underestimate technology in the long term."

Considerable attention has been given to autonomous transportation, but, he said, that technology is not yet ready. "The science is elusive and progress is less present than we thought it might be," Lutat said. And despite the thousands of hours of research that has gone into AI, he said, "the human brain is the best organized, most capable, most flexible, and most adaptable three pounds of matter."

While there are limited applications of automation technology, "we [pilots are] still are the most important component in this whole equation."

As such, he challenged the pilot audience that they must look at a better "future self," continuously learn, and adapt to evolving technology. He pointed to accidents such as the 2013 crash of Asiana Flight 214, in which the investigation report found that the pilot flying may have had an "inaccurate understanding of some aspects of the airplane's autopilot system."

Lutat said there are a number of suggestions to help keep up to date with the changing technology: find out one thing new about the aircraft every time you fly; read FAA advisory circulars on PBN and RNP; put the aircraft FMS manual somewhere visible and readily accessible; write a training lecture on the autoflight control system; recite the company's stabilized approach criteria as part of every approach briefing; rehearse go-around strategy; and hand-fly the first and last 10,000 feet of altitude.

These will provide precision inside the routine, he added. **K.L.**

New ground school goes beyond pilot training

by Jerry Siebenmark

Kirby and Teresa Ortega have combined their more than 50 years of experience with business aircraft maintenance programs and pilot training to establish Ortega Aviation Services (OAS), a flight training, testing and consulting company. It's not a traditional flight school because OAS focuses on ground school and preparing private pilot students to pass the FAA knowledge test as well as the oral portion of their practical flight tests.

OAS managing partner Teresa Ortega said with a pilot shortage and the rise of accelerated and online ground school programs, she thinks there's an opportunity to offer students a ground school that provides for a lot of give-and-take with instructors—i.e. asking and answering questions—that such programs might miss, and that some students need more than others. "[It] in my mind leaves room for a lot of unsafe pilots," she told **AIN**. "I want them to learn how to fly an airplane safely."

Located at Wichita Eisenhower National Airport (ICT), OAS operates from a nearly 3,000-sq-ft building that includes two classrooms equipped with smartboards and other electronic teaching devices as well as a room equipped with two flight simulators for transition training and other programs, including an aviation course for high school STEM teachers.

OAS's other training services include checkride preparation; G1000 transition; flight review; instrument proficiency check; 6158 single-pilot certification; commercial pilot license; certified flight instructor; and Part 107 remote pilot (drone) license. Students have access to airplanes and flight instructors through OAS's 11 contract instructors as well as relationships the company has with various flight schools and aviation businesses.

JERRY SIEBENMARK

Teresa Ortega is managing partner of Ortega Aviation Services, a new Wichita-based pilot training, testing, and maintenance consulting business.

Kirby Ortega serves as the company's chief instructor. An FAA designated pilot examiner for 30 years, Ortega was named the FAA's National Flight Instructor of the Year in 2002. In 2014 he was inducted into the National Flight Instructors Hall of Fame. Before starting OAS, he retired after 29 years at Cessna Aircraft where he was chief pilot for single-engine operations.

Besides training and testing, OAS provides consulting on maintenance programs and pre-purchase inspections, which is where Teresa Ortega's experience lies. In addition to her qualifications as a commercial pilot with multi-engine and instrument ratings, she previously worked at Textron Aviation for 25 years, including her most recent role there as a maintenance program sales director. ■

Full-throttle opinion from former NTSB member John Goglia

When do whistleblower protections apply?

With all this talk about whistleblowers these days, it seems like an appropriate time to review what protections are out there for aviation employees, who is covered, and how to ensure receipt of those protections in the event circumstances force you to become a whistleblower. I've known and read about a number of whistleblowers over the years and I can assure you, no one ever goes to work to become a whistleblower. It usually ends up being an awful experience, even when the whistleblower knows he or she is doing the right thing for aviation safety. Most start out as employees trying to raise safety concerns to their companies or agencies. When they see their complaints going nowhere, they then may decide to blow the whistle, through established processes, to Congress, or the media.

Of course, the national headlines have been filled with *the* whistleblower—the one from the CIA. But aviation news has also had its own headlines lately, specifically related to the crashes of the Boeing 737 Max in Indonesia and Ethiopia. Crashes, in my experience, have a way of bringing whistleblowers forward. And that has held true for these recent major accidents. It seems that a number of whistleblowers from Boeing have come forward since the crashes, and their allegations are being investigated by, among others, the DOT Office of Inspector General and the Department of Justice.

On top of the Boeing news, the Office of Special Counsel recently issued letters to the President and Congress alerting them that "numerous Federal Aviation Administration (FAA) safety inspectors were not sufficiently trained to certify pilots." The OSC found that FAA responses to Congressional inquiries regarding these allegations "appear to have been misleading." The allegations of improper inspector training were disclosed to the Special Counsel by an FAA aviation safety inspector.

This Office of Special Counsel is an independent federal agency whose main mission is protecting "federal employees and applicants from prohibited personnel practices, especially reprisal for whistleblowing." FAA employees can file complaints with OSC but they are not required to. The FAA maintains an employee hotline for reporting violations of its regulations, conduct that poses a "high level of risk to aviation safety" and "gross misconduct" by agency employees involving aviation safety. Both the OSC and FAA provide for confidentiality if requested. Not all complaints are entitled to whistleblower protections, so it's important to do some research before filing a complaint. The DOT Office of Inspector General's website has an overview of whistleblower protections applicable to DOT employees and its contractors. Complaints can also be filed via the DOT OIG's hotline.

Employee Protections

In addition to protections afforded federal employees and federal contractors, some aviation employees are also entitled to protections under federal law. (Some states may also have protection laws, but those protections will vary from state to state.) Employees entitled to federal protections under the Wendell H. Ford Aviation Investment and Reform Act for the 21st Century—more succinctly referred to as AIR21—are employees of U.S. air carriers, their contractors and subcontractors who report air carrier safety issues. Contractors are defined in AIR21 as a company

"...a number of whistleblowers from Boeing have come forward since the crashes, and their allegations are being investigated..."

that performs safety-sensitive functions by contract for an air carrier. This means that not all air-carrier contractor employees are covered by the protections of this law. Subcontractors are not defined in the law but it would seem to me that, logically, they would have to be performing some safety-sensitive function for their employees to be covered. But the law isn't always logical and, of course, I'm not a lawyer.

AIR21 protects covered employees from retaliation, discharge, or otherwise being discriminated against for providing information relating to air safety violations to their employer or the federal government. Complaints regarding retaliation or discrimination are made to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA). According to OSHA's handy desk reference on AIR21, this includes "testifying or assisting in a proceeding against the employer relating to a violation or alleged violation of any order, regulation, or standards of the Federal Aviation Administration or any other Federal law relating to air carrier safety." Anyone considering filing a complaint under AIR21 should review OSHA's desk reference, as it provides information not readily apparent on either the FAA's or OSHA's website. For example, according to OSHA, an employee of an uncertificated air carrier would be covered by the protections of AIR21. Also, according to OSHA's interpretation, a contractor or a subcontractor could be a foreign corporation, as opposed to the requirement for the air carrier to be a U.S. citizen.

It's very important that an employee filing a claim with OSHA alleging discrimination or retaliation for reporting a safety issue comply with the statutory time limits of 90 days after the alleged adverse conduct occurred. Of course, any employee who believes he or she has been retaliated against would do well to consult an attorney familiar with whistleblower protection laws, both federal and state. Under AIR21, successful claimants can receive back pay, future pay, compensatory damages for emotional distress caused by the retaliatory conduct, and reasonable attorney fees.

While becoming a whistleblower is not something an employee should take lightly, it is imperative to the safety of the aviation system that employees report safety issues that they become aware of. Today, many aviation entities have Aviation Safety Action Programs—especially the major air carriers and large repair stations—that employees should take advantage of to report safety issues without fear of negative action by the FAA or their employer. Not all reported events are covered by ASAP, so it's important to know what is and is not covered. For example, if a mechanic reported improperly filling out a maintenance record and the FAA and air carrier determined that it constituted falsification of a record, the mechanic's certificate could be revoked and his/her employment terminated.

Employees at aviation entities without an ASAP should consider using internal company or external government hotlines—even if done anonymously—to report safety issues.

If you do not fall within one of these employee categories, you can still report unsafe practices via the FAA's hotline or the OIG's, but you will not be entitled to the protections from discrimination or retaliation afforded by AIR21. ■

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

John Goglia is a safety consultant.
He welcomes your emails at:
gogliaj@yahoo.com

Bombardier deal gives Spirit Aero more Airbus work

Spirit AeroSystems, a Tier I supplier to Airbus and Boeing, will acquire for just more than $1 billion select assets of Bombardier's aerostructures and aftermarket services business. The deal will give Spirit more manufacturing content on Airbus aircraft as well as on regional and business jets, the Wichita-based company announced on October 31. Financial terms of the deal call for Spirit to pay $500 million in cash and assume $300 million in net pension liabilities and $290 million of government grant repayment obligations.

"The acquisition of the Bombardier assets is a transformative deal for Spirit, aligning perfectly with our stated strategic goals of capturing more Airbus business, expanding our low-cost country footprint, and scaling our aftermarket business," Spirit president and CEO Tom Gentile said on a third-quarter earnings call.

The acquisition includes operations at three sites—Belfast, Northern Ireland (Short Brothers); Casablanca, Morocco; and Dallas—employing 4,000 people and encompassing 3.4 million sq ft. Combined, those operations produce composite and metallic wing components, nacelles, fuselages, and tail assemblies as well as "high-value" mechanical assemblies made of aluminum, titanium, and steel.

Of particular note is Belfast's production of the Airbus A220 composite wing—the backlog of which stands at 435 units—and Bombardier business and regional jet work, including that on Global, Challenger, Learjet, and CRJ models. "We think [the A220 work] will give us a great head start in terms of future wing programs with Airbus," Gentile said.

He also noted the Belfast site recently won new work on the thrust reversers for A320neos equipped with the Pratt & Whitney PW1100G geared turbofan. Meanwhile, significant MRO capabilities in Belfast and Dallas with "tremendous" relationships with airlines globally will more than double Spirit's aftermarket business. "This is really one of the hidden gems of the acquisition," Gentile added.

The parties expect the deal to close in the first half of 2020, following regulatory approval. Spirit expects revenue from the Bombardier operations it has agreed to acquire to total $1 billion in 2019. **J.S.**

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FlightSafety debuts a smart new way to train

by Matt Thurber

FlightSafety International has formally launched an effort called FlightSmart that uses artificial intelligence (AI) to elevate aviation training quality. What the FlightSmart team has done is figure out a way to use modern technology, including IBM's Watson AI tool, to help its instructors and training centers improve a student's experience.

"The product, through the collaboration with IBM, is utilizing advanced algorithms, machine learning, artificial intelligence—all of those cognitive technologies—to provide the objective evidence or objective evaluation of the student's performance," said Matt Littrell, FlightSafety product director of AI and adaptive learning.

Ultimately, FlightSafety sees FlightSmart as helping students learn faster by mastering tasks more quickly, while at the same time giving instructors better information about the students' performance so they can act as "learning managers" and provide better feedback to improve the training process. The goal of FlightSmart is to help pilots master their skills and become more proficient. An ancillary benefit is that the system also will increase training efficiency, thus bringing more pilots into the workforce and lowering the burden on instructors, for which there is also a shortage.

"The primary focus is to help the student pilots become better and faster and master tasks that are challenging," said senior product manager Chris Starr.

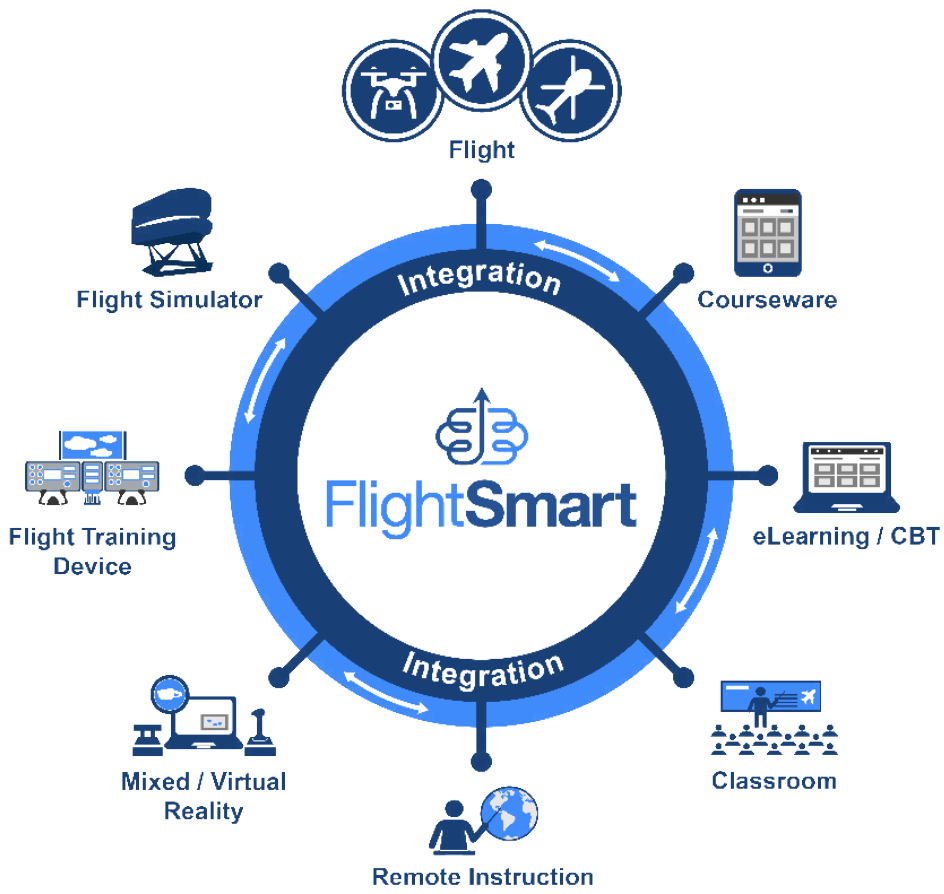
FlightSmart isn't just for simulator training, but will also be helpful for task training on avionics and operating flight management systems; use of automation; standard operating procedures; crew resource management; and other areas besides flying—such as maintenance and operating unmanned systems. "It has tremendous potential throughout many avenues and markets," Littrell said.

The first formal FlightSmart implementation is with the U.S. Air Force for the T-6A pilot training program. For FlightSafety's business aviation customers, Littrell said, "We have implemented FlightSmart in a limited capacity on one of our business jet programs for developmental and evaluation purposes only. We are currently evaluating the best strategy for a broader implementation within our learning centers."

When and Why

There are three use cases that FlightSafety customers have flagged and that FlightSmart is designed to satisfy, according to Littrell.

The first is to identify problems and address them much earlier in the training process, which improves efficiency because this can eliminate the need for additional remedial training. An extra day of full-flight simulator training adds thousands of dollars to the training cost, takes more valuable time, and adds complexity to the logistics of running an extremely complex training process.



FlightSafety International is evaluating how to implement its artificial intelligence (AI)-based FlightSmart effort into business aircraft simulator training. FlightSmart aims to help FlightSafety instructors and training centers improve a student's experience via algorithms, machine learning, and AI.

To address this first use case, FlightSmart can automatically identify training tasks, instead of the instructor having to look away from observing the student and selecting the tasks. An example might be a steep turn, and FlightSmart is programmed with start-stop times, maneuver criteria, and other elements that identify and record the task so the instructor doesn't have to make notes or try to remember the task and the student's performance.

This automation helps the instructor give the student a more comprehensive evaluation because now the simulator is recording everything the student does and, more importantly, records parameters that the instructor cannot perceive.

"The problem is the instructor can't see everything the pilot is doing," said Starr. "He doesn't know how much force [the student] is putting on the column or how much he's moving the throttles. FlightSmart takes the data out of the simulator, all the forces that are being applied, all the movements that are happening, how soon a student is selecting a switch or pushing a button."

The instructor usually can't see all of these elements because his or her workload is already high, but with the information from FlightSmart, the instructor can help the student improve. He explained, "The instructor has objective data to say, 'You had too much force on the pedals during that rejected takeoff. [Or] this showed that you shouldn't have been on the toe brakes. Or, you did it perfectly. You're within the top 5 percent of everyone that does this maneuver."

Starr gave two examples of where this information can help the student. In training for a particular aircraft, FlightSmart identified that pilots were riding the brakes during takeoffs and landings, and this not only lowers brake life but could cause directional control and performance problems. But those problems weren't the sole benefit of sussing out that information. The information lends itself to root-cause analysis: is the design of the rudder pedals and brakes less than optimal?, for example. "It opens the door for that investigation and re-education," he said.

The second example was a pilot who struggled with V1 cuts (engine failures at a critical time during takeoff), then suddenly improved toward the end of training and passed the checkride. A review of the data later showed that the pilot-not-flying began stepping on the correct rudder pedal during the V1 cut. "The copilot, in essence, was helping him push on that rudder pedal," said Starr, "which is what he had been struggling with all along. We passed that on to the examiner, and he commented, 'I was wondering why all of a sudden he did so much better.' Those are the types of things that the instructor physically cannot see, but through the data, we can gain visibility into those and provide that insight to the instructor."

Another use case is to help an operator adapt the training style to the characteristics of a pilot job applicant. An airline looking to hire pilots typically sees two types of applicants: one is fresh out of school with strong theoretical and avionics knowledge, but weak stick-and-rudder skills. The other hasn't been flying for a while, perhaps because they gave up on aviation during the 2008 Great Recession, and their flying skills are strong but they are way behind on current technology and processes.

"The challenge they face is those two different types of applicants require two different styles of training," Littrell said. "They're looking to FlightSmart to identify what's the best method of training these two different types and tailor the training to those needs so they're not forced to run everybody through the singular canned training profile."

While the canned training profile serves some applicants, others end up needing significant amounts of additional training, which is expensive and time-consuming.

For the third use case, FlightSmart can help an operator screen pilot candidates. "It knows, in essence, what makes a good pilot, or the traits and the style of flying that have the greatest chance of success in the training, as well as beyond," he said.

For military flying, although military forces are very good at weeding out pilots who aren't going to succeed, there is still an enormous cost associated with putting a pilot through a lot of initial training then finding out toward the end that it isn't going to work. If it costs, say, $1 million to train a pilot and the attrition rate is 10 to 15 percent, that's a lot of money. "That's where we have shown them with FlightSmart, we can advance them earlier, we can [help identify failing candidates], and that saves them a lot of money when you look at their attrition rate," said Starr.

FlightSafety has discussed with customers the issue of what happens when FlightSmart identifies a student who shouldn't be flying, according to Littrell, but that isn't FlightSafety's role. "We're not the deciding factor of whether a pilot should continue on or not," he explained. FlightSmart uses computers and AI tools to provide information to the customer. "That's where FlightSmart comes in. We're providing the objective evidence, then it's up to them to decide the criteria they ultimately use to determine when a pilot should continue flying or not."

How FlightSmart Works

The goal of the FlightSmart program, which got underway two years ago but was formally launched a year ago, was to

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RISE essentially provides another set of 'eyes' for the busy instructor, using data collected by "simulators and aircraft to perform objective data analysis to improve the overall training program."

CAE on the 'RISE' with digital intelligence

by Matt Thurber

Training provider CAE is much more than a manufacturer of full-flight simulators and training devices, although that is at the core of its business. The company was founded in 1947 as Canadian Aviation Electronics and in 1952 began manufacturing simulators. Since then, CAE has grown into a diversified training services company, servicing civil aviation, defense and security, and healthcare.

On the civil aviation side, CAE manufacturers more than 100 full-flight simulators per year, graduates 1,500 new pilots trained "ab initio" (from the beginning) to airlines all over the world, and trains 135,000 pilots in its own simulator training facilities at more than 50 locations.

"We always talk about our mission as being the partner of choice," said Nick Leontidis, group president, Civil Aviation Training Solutions. "Historically, the company built a business for selling simulators and through that created a lot of relationships with customers. We leveraged the relationships that we had to launch the training business. And a lot of our subsequent growth in the training business has been by partnering with airlines and being flexible with their needs."

With so much experience in pilot training, both in airplanes for ab initio and in simulators for new and experienced pilots, CAE was a pioneer in using data gathered from simulators to analyze and refine the training process, using a process called simulator operational quality assurance or SOQA. In 2011, CAE implemented SOQA, which compares simulator-derived data with flight operational quality assurance data gathered from recording devices on aircraft, to provide evidence-based training tools as a new product.

In early 2018, CAE carried this concept further into the formal launch of its new RISE offering (real-time insights and standardized evaluations), which uses data collected by "simulators and aircraft to perform objective data analysis to improve the overall training program," according to CAE. The first customer to sign up in 2018 was airline AirAsia, and CAE is now offering RISE to military customers for pilot training programs.

Nick Leontidis, CAE group president for Civil Aviation Training Solutions

"We always talk about our mission as being the partner of choice."

RISE is one of the products resulting from CAE's Project Digital Intelligence, which has deployed a team of 130 talented personnel in a digital accelerator at CAE's Montreal headquarters to come up with ways to improve the company's training products and services.

Rising Above

The Digital Intelligence team isn't just refining existing products but is tasked with digging deeply into the entire training process to figure out how modern digital tools and analytics can improve flight crew training, as well as training for other CAE customers in the defense and healthcare markets, all part of the RISE effort.

"We looked at the entire journey that pilots go through," said Erica Laurendeau-Walker, a journey owner on the team and also an experienced former regional airline pilot.

"We're listening to pilots and learning what they need for better training and [throughout] their career," added product manager and team member Mathieu Amyot.

One of the team's projects was to help develop various tools that work with the RISE ecosystem. These include an iPad app consolidating all the course material and scheduling information needed during a training event and an E-grading app, which incorporates the pilot's company standard operating practices to ensure that practice during the training event is to the standards that apply to that particular pilot. A Debrief app takes data gathered during training and helps create much more standardized debriefings based on objective data from the simulator and aircraft, not just the instructor's limited ability to assess exactly what the student was doing moment to moment. "This is the bread and butter of RISE," said Laurendeau-Walker. "It makes it easier to help them improve."

All of the student data is kept in a secure and encrypted Records Manager, and customers can view the data on their own dashboards. "Having data accessible is powerful," she said. But CAE is also mindful of the various laws that govern its customers and makes sure the data is protected and only shared as allowed by the regulator and, if applicable, worker unions.

Historically, pilot skills were measured just by hours in their logbooks," Leontidis explained. "Evidence has shown that that's not necessarily a good measure. It is one of the measures, but not necessarily the only measure of how good a pilot is against his competencies. So RISE is an attempt to measure objectively pilot performance, regardless of your hours of stick time. We have deployed these systems to measure the performance of the pilot in a specific set of competencies that are effectively the training objectives of the curriculum."

The tools developed by the Digital Intelligence team are also helpful for instructors, he added, and RISE also benefits instructors "because everybody's using standardized assessment criteria. The basic premise is that we want to be able to measure the performance of the pilot. The value to the airline is that we can show data for them and for us to deal with weaknesses that we might see, or it gives them an assurance that they have good pilots."

The way weaknesses are addressed is through adaptive training, which focuses on what the data show the pilot needs to be working on. "I can adapt your training to deal with those weaknesses," Leontidis said. It's helpful, for example, for an airline to know that one student barely passed an exam while another scored a nearly perfect score. The one who barely passed may just need some focused training on the weak areas to bring their performance to a higher level. "Ultimately it's not meant to fail you, it's meant to improve you," he said.

Having begun training its pilots using RISE more than a year ago, AirAsia now has pilots in the program coming back for recurrent training. While CAE can't discuss the outcomes of a specific customer, Leontidis said that training materials are being adapted to the RISE-based analysis of these pilots. "It's adapted to areas that we think they may need some extra training," he said.

CAE's Training Ecosystem

With strong demand for pilots all over the world, CAE is unique in its approach to helping customers with both ab initio training as well as initial and ongoing recurrent simulator training as pilots progress in their careers. Teaching cadets with zero experience or background not only to fly but to become useful crewmembers in a commercial operation is a challenging task and in many ways more complex than operating simulators.

"CAE got into the ab initio pilot training business because big companies were shying away from that," Leontidis said. "It's not been one of the more attractive aspects of this business. It's logistically hard. It's challenging. It's very risky. Airplanes are expensive to operate and maintain. But it seems to be working for CAE, and CAE is expanding that training."

There is no other choice, he explained, but to start with new cadets and teach them to fly in airplanes; and also in a way that matches the needs of the airline customers that are paying for the training. The once-traditional method of a pilot learning to fly then trying to gain experience by logging thousands of hours of flight time over a long period just isn't sustainable if airlines want to continue operating and grow.

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Falcon 8X shows mettle on short-field landing demo

by Matt Thurber

MATT THURBER

The view from the Falcon 8X flight deck on departure from the short runway at Les Eplatures Airport in Switzerland en route to Gstaad Saanen Airport, hemmed in by the steep Alps.

To prepare for a unique experience—a real short-field landing in the Falcon 8X, albeit on a long runway—I started at the FlightSafety Le Bourget learning center near Paris for a practice session.

The plan was to fly two days later from Le Bourget to Vatry Airport in Chalons, France, where I would fly the 8X in the traffic pattern and try out my short-field landing skills in the real airplane. We would then fly to Les Eplatures Airport in Neuchatel, Switzerland, where a Dassault pilot would demonstrate the 8X's short-field capability on the airport's 3,576-foot runway.

Olivier Perriaud, chief pilot of the Falcon operational pilot group, helped get me refamiliarized with the 8X in the FlightSafety simulator. I've flown the 8X a few times already, but not on a regular basis.

After some airwork and a touch-and-go and full-stop landing at simulated Charles de Gaulle Airport, Perriaud repositioned the simulator for La Mole Airport, which is the go-to for visitors to St. Tropez and has an unusual arrival, not to mention a 3,514-foot runway (landing distance) surrounded by mountains. Pilots flying to La Mole are required to have undergone training within the past two months or have flown into the airport as PIC within the past 12 months.

Landing at La Mole is only on Runway 24, and the approach requires flying from the coastline, then descending at specific points while flying a heading of 234 degrees, 11 degrees off the runway magnetic heading of 243 degrees, and following the 4-degree PAPI to avoid noise-sensitive areas. The final turn to line up with the runway starts at 400 feet msl (about 350 feet agl), and it isn't until about 200 feet msl that the airplane will be lined up with the runway centerline, making for an interesting final approach. Operations are allowed only during daytime.

For the first arrival, I did a go-around to see how that procedure worked to keep us clear of the mountains. Subsequently, Perriaud had me practice touching down and stopping hard, including reverse thrust on the center engine and full braking. The goal is to get stopped before Taxiway C, roughly two-thirds of the available landing length of Runway 24.

I landed five times at simulated La Mole; on the first landing, I stopped at Taxiway C, and on the next four landings, I managed to stop well short of the taxiway. I didn't feel like I was hammering the 8X too hard, and I would later see and feel that there is more performance available from this capable airplane.

It was enormously fun trying to fly the required arrival procedure toward the airport, make the turn to the centerline at low altitude, chopping the power, then touching down and standing on the brakes. I took off each time from Runway 6 after turning around, and followed the prescribed procedure for departure. The simulated mountains and airport felt all too real, and it was a terrific practice session. To top off the training regime, we repositioned near Geneva, where I did another short-field landing at Annecy Airport on the French side of the border.

For the flight in the real 8X two days later, Perriaud and Dassault test pilot Fabrice Dougnac flew the 8X to Vatry. After shutdown, I climbed into the left seat with Dougnac in the right seat and Perriaud in the jumpseat.

The weather was perfect with hardly any wind, a balmy summer day in France and a nearly empty airport, with only another Falcon practicing takeoffs and landings.

I took off on Vatry's Runway 10 and stayed in the traffic pattern, climbing to 2,000 feet and turning left. On downwind, Dougnac set slats/flaps 1 (SF1), then gear down, followed by SF2 abeam the runway numbers and once on final, SF3.

This was just like the simulator, with a go-around my first task. The second time around ended with a full-stop normal landing, and it was pleasantly familiar after the simulator session. The 8X handles well at slow speeds, and the fly-by-wire flight controls give the pilot precise control and well-harmonized responsiveness, especially for such a large airplane.

We taxied back for the third takeoff, and after flying around the pattern and getting configured on final, I proceeded to the short-field landing. After touching down, I pushed the sidestick forward to get the nosewheel onto the runway then pulled the thrust reverser on and stepped hard on the brakes. The touchdown was not at a significantly high rate of descent, and I probably used up some runway unnecessarily by not touching down a bit more aggressively. But overall, it was a satisfactory performance and completely underscored the benefits of the training. I'm pretty sure I could have landed and stopped safely at La Mole.

For the next leg, Dougnac switched to the left seat and Perriaud took the right, while I sat in the cabin with our other passengers for the flight to Les Eplatures. This was to be Dougnac's first real 8X short-field landing on a short runway, and Dassault had arranged for a helicopter and cameraman to shoot video of the landing at Les Eplatures.

The airport sits in a shallow valley on the edge of Neuchatel, Switzerland, at an elevation of 3,366 feet. We approached from the southwest to land on Runway 6, and Dougnac brought the 8X in at a relatively shallow angle but with a higher rate of descent than during my landing. The 8X plonked onto the runway at what must have been a few hundred feet per minute, and Daugnac swiftly brought the big jet to a halt, using about 500 meters or about half the available runway. The helicopter camera crew was positioned perfectly to capture the landing.

What Dassault was demonstrating was not just the 8X's ability to land short, but also to carry enough fuel to fly from a short runway to other destinations. From Les Eplatures, we flew to Gstaad Saanen Airport, a Swiss airport hemmed in by the steep Alps. We took our time to allow the helicopter to get there to film our arrival, which was a dramatic swoop close to the mountains as we turned 180 degrees to line up with Runway 26. ■

MATT THURBER

Preparing for traffic pattern work in the Falcon 8X at Vatry Airport in France.

VADIM FELDZER

The author (left) and Olivier Perriaud, chief pilot of the Falcon operational pilot group, practicing short-field landings at La Mole Airport near St Tropez, France, in the Falcon 8X simulator at FlightSafety's Le Bourget learning center.

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CAE on the 'RISE'

Airlines around the world (not in the U.S. because regulations don't allow airline pilots to fly as first officers with fewer than 1,500 hours or less with an acceptable college degree or military background) depend on the ICAO-developed multi-crew pilot license (MPL) process. MPL graduates can gain the necessary licensing and experience requirements to fly as a first officer in airline operations with less than 300 hours of flight time, which includes simulator flying.

"This is what the airlines need," he said. "They can't wait for four or five years of time building and [say] flying up in the North in Canada to build enough hours to qualify."

Leontidis realizes that one company, even one as large as CAE, can't fill the pilot needs of all the airlines, business aviation operators, and military services worldwide. After all, the world's flight schools have produced just 1,000 MPL graduates so far, and CAE perhaps a few hundred of those. "We're never going be a big enough ab initio school to cover the numbers," he said. "But we want to be big enough that we can serve all [our] customers." And these customers come back for other CAE products and services, including simulators or pilot cadet recruitment and selection, for example.

It should be noted that CAE does offer traditional commercial pilot license (CPL) training along with MPL for customers that can hire MPL graduates, and this is the case at its Phoenix operation in Arizona. Most of CAE's cadets already have a job waiting for them when they graduate, although CAE also trains pilots who will need to find a job. But with today's shortage, 95 percent do so by the time they graduate.

Despite some criticism of pilot quality involving the two Boeing 737 Max accidents and others, MPL graduates are doing well in the field, and some of those who trained with CAE are now flying as captains. "MPL programs are designed to train people around specific competencies," Leontidis said. "Those are the competencies that ICAO has well documented as being the ones that make a good pilot. We don't think that the two are connected at all [to] what's happened on the Max.

"I think the knock with MPL is just that it's a little new," he said. "Our industry is quite conservative." For those who believe the only solution is to hire pilots with vast experience, they are, said Leontidis, "not thinking straight, because, in our view, you've got an industry problem. The practical and positive thing is to say, 'How do I train someone to become proficient without having to wait 5,000 hours?' The whole industry can't afford to wait 5,000 hours because there aren't enough pilots.

"We happily take young people who come from all walks of life. They have to demonstrate the right competencies and the right skills, but assuming they do, they can come from China, Vietnam, India, Japan and we can make very good pilots out of them. I think the system works. And the industry needs that system to work because there's no other way for the industry to support the growth that it is currently trying to achieve." ■

Aussie avgas switch tied to Robinson engine issues

by Mark Huber

A change in the formulation of avgas delivered to Northern Australia is suspected of causing widespread and significant engine maintenance events in the fleet of hundreds of Lycoming-powered Robinson helicopters based there, according to a study published the Australia Helicopter Industry Association (AHIA). The problem is being linked to the failure of more than 2,000 engine cylinder barrels on Australia-based Robinson R22s and R44s since 2013. Some cylinders failed within the first 100 hours in service.

The AHIA determined that significant changes were made in avgas delivered to the region from 2012 to 2018 after the region's terminal supplier was switched. Specifically, the lead content was more than halved while the aromatics content was increased to preserve octane levels. Increasing aromatics slows and significantly increases the exhaust gas temperature (EGT) during the burn process. The result was significant damage to engine cylinders, pistons, and valves. The AHIA study also found that "fuels containing a greater proportion of aromatic hydrocarbons have also been shown to have a greater soot and deposit-forming tendency."

Trouble usually appeared during cylinder compression checks as part of routine maintenance. According to the AHIA, "Data from the Civil Aviation Safety Authority's Defect Reporting Service (DRS) database showed compression loss was attributable to inlet or exhaust valve degradation and sealing loss. Follow-up investigation by the engine manufacturer showed related mechanisms of failure—both attributable to extended periods of high-temperature exposure and accelerated valve guide wear."

Compounding the damage was how R22s and R44s are used in the region, typically for agricultural application or livestock mustering, often at low altitudes with high power settings during high ambient temperatures. And unlike fixed-wing piston aircraft, which use the aircraft's propeller and cowling intakes for cooling, piston Robinsons utilize a rear cooling fan connected to the engine's driveshaft to move air over the cylinders and the oil cooler and direct exhaust downward.

Temperature Warnings

In February, Robinson amended the Pilot's Operating Handbook (POH), reinforcing the need to observe proper engine cooldown procedures and providing for an extended cooldown period when ambient temperatures top 100 degrees F.

Recognizing the problem, earlier this year Australia's Civil Aviation Safety Authority (CASA) issued Airworthiness Bulletins AWB-85-024 and AWB-85-025 and issued warnings about the unreliability of cylinder head temperature (CHT) as an indicator of valve temperatures, counseling, "Even a cylinder displaying a moderate CHT can be suffering accelerated wear. Be mindful that a single probe CHT will not necessarily be indicative of all cylinders, nor represent even and consistent cooling of the entire cylinder assembly." CASA also reminded pilots that, "The risk to the integrity of avgas in relation to being fit for purpose can occur at any point in the supply chain from the point of manufacture to final delivery to the aircraft, thus creating the potential to adversely affect aircraft systems and components. Fuel suppliers need to verify that all product supplied to the market complies with Defence Standard 91-090 avgas and has been manufactured, stored and handled in compliance with Energy Institute 1530 aviation fuel quality system compliant supply chains to control contamination risks."

In its study, the AHIA recommends that: authorities access historical data to determine composition characteristics of fuel delivered to the terminal servicing the region (Vopak); further study the performance of avgas containing moderate levels of aromatic compounds; consider potential airworthiness implications for piston aircraft operating in high ambient temperatures with fuel with increased levels of aromatics; and prepare and circulate relevant advisory materials to operators flying in high ambient temperatures using fuels with moderate levels of aromatics. Helicopter operators and maintainers are counseled to remain vigilant with regard to the issue. ■

The new Community Air Mobility Initiative (CAMI) will assist in developing the emerging urban air mobility (UAM) industry, as well as aid cities with the integration of such systems. UAM involves not just airspace concerns but also infrastructure-related issues such as where to locate landing ports for eVTOLS and how the distribution of those ports would affect various modes of a city's ground transportation system. (Photo: Signature Flight Support)

Urban air mobility group hopes to help shape policy

by Jerry Siebenmark

The Community Air Mobility Initiative (CAMI) has been formed around the emerging urban air mobility (UAM) industry and will assist in its development, as well as help cities integrate such systems, the Seattle-based nonprofit organization announced recently. "New technologies and new aircraft promise to make flight accessible and practical on a daily basis for more people than ever before," said CAMI co-executive director Anna Dietrich. "With that promise comes the responsibility to integrate those aircraft into our communities safely, responsibly, and equitably. We created CAMI as the industry's commitment to our neighbors and the decision-makers who support them to work to ensure that happens."

On a conference call with reporters, Dietrich said CAMI's charge is to work with state and local officials on integrating UAM in their communities through public education and helping to shape policies governing and regulating UAM in local jurisdictions. Dietrich noted there already exists a patchwork of state regulations and laws regarding small unmanned aerial systems.

"This is a fairly time-sensitive project that we've undertaken," she said. "We do need to get ahead of potential issues with awareness and education now while the policies are first being considered. After we have policy and legislation and requirements on the books, it will be much harder to recover from that and change that, as opposed to working with these decision-makers from the beginning."

Those decision-makers not only include state and local elected officials, but also transportation departments, urban planners, real estate developers, and business owners since UAM involves not just airspace concerns but also infrastructure-related issues such as where to locate landing ports for eVTOLS and how the distribution of those ports would affect various modes of a city's ground transportation system.

"When we talk about the vision that we have for urban air mobility, we're asking aviation to intimately integrate into an existing urban transportation system," Dietrich's counterpart, CAMI co-executive director Yolanka Wulff, said. "This is no longer a segregated system. It's an integrated system, and in fact that is what makes urban air mobility both so valuable and interesting, but also challenging."

Early backers of CAMI include trade groups such as NBAA, General Aviation Manufacturers Association, and the Vertical Flight Society; OEMs Bell and Raytheon; and fledgling eVTOL manufacturers Karem Aircraft, Joby Aviation, and Jump Aero. CAMI has a total of 13 founding member companies and organizations. ■

Wynbrandt honored with NBAA award

AIN contributing editor James Wynbrandt won the NBAA 2019 Gold Wing award at a ceremony at NBAA-BACE. Wynbrandt was recognized for his in-depth article about sustainable aviation fuel (SAF) in the August/September 2018 issue of AIN's Business Jet Traveler magazine.

According to NBAA, "His article…not only explains the science and economics of SAF in plain English; it also makes clear that SAF is a drop-in fuel—available today—and it is safe and approved for every engine that runs on jet-A. This author did extensive research and made clear that SAF is truly sustainable, reducing overall carbon lifecycle emissions by 50 to 80 percent."

Wynbrandt is a pilot and aircraft owner and has been writing for **AIN** for many years on a variety of subjects, including green technology; charter and fractional operations; completions; avionics; and more. He is also the author of the popular books *A Brief History Of Saudi Arabia*; *Dan Quayle Diktionary*; *Flying High*; and *The Excruciating History Of Dentistry*. **M.T.**

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PHOTOS: MATT THURBER

Icon A5s at the company headquarters at Nut Tree Airport in Vacaville, California.

Icon Aircraft: Flying into the future

by Matt Thurber

Icon Aircraft has a relatively short history in the general aviation industry. The company launched, as many aircraft manufacturers do, with promises of low-cost innovation that later bowed to the realities of high certification and production costs. Contrary to the predictions of many naysayers, however, the company is still in business, it is producing airplanes—the Icon A5 amphibious light sport aircraft—and it is focused on extracting maximum efficiency from its production lines while still producing a high-quality recreational aircraft that people want to buy.

Quality costs money, however, and it was likely with some reluctance two years ago that Icon raised the price of the fully equipped A5 to $389,000, a number that probably seemed shocking to those who have followed the program from the beginning.

Icon's mission has been consistent since the company was founded in 2006 by Kirk Hawkins and Steen Strand: to encourage more people to become pilots in aircraft that are much more fun to fly and more modern and safe compared to traditional general aviation airplanes. Or as Icon puts it: "to accelerate the democratization of personal flight and 3-D mobility. Icon creates consumer-friendly, safe, technologically advanced aircraft that make the adventure of flying more accessible to mainstream consumers." The founding came shortly after the FAA instituted new regulations for Light Sport Aircraft (LSA), which involve a consensus-standard certification process, weight and speed restrictions, and lower pilot certification requirements.

It is interesting to view an early video where Hawkins explains the Icon design philosophy and compares that to the resulting airplane. Engineering, especially in aviation, is all about managing constraints, and there were many that Icon faced as the project progressed, including the need to seek an exemption from the LSA regulations on maximum takeoff weight; the A5's mtow is 1,510 pounds, 80 pounds more than the current regulatory limit for amphibians, although still less than the 1,680 pounds allowed by the exemption. Another constraint was money; some may think that designing and building an LSA is easy because of the consensus standards that replace Part 23 certification. But a complex machine with foldable wings that is going to fly through the air, land on water and runways, and help keep its occupants safe is no small design matter. In Icon's case, the design itself had to be about more than just putting wings and an engine on a boat hull. In an early FORA.tv video of a presentation given at design firm Ideo, where Strand worked before founding Icon, Hawkins outlined the Icon philosophy.

"We believe that aviation and what it represents is innate in many of us, and humans have been dreaming about flying for a long time," he explained. "It's a fascination that we have with freedom, with fun, and with adventure." Unfortunately, he added, aviation and its regulators turned flying into a pure transportation function. "You can see we're moving away from the fundamental human aspiration of flying," he said. Pointing to a picture of a Cessna 172, he added, "It's all about transportation. It's a secure, gated airport environment that's very restrictive. This airplane is a 30-year-old aluminum can designed for transportation, which is effective, but is hardly inspirational to anybody who wants to dream of aviation."

At the same time, Icon's goal was to make flying safer, and this became a fundamental aspect of the A5, its spin-resistant design. While the A5 does stall, the design goal dictates what happens to make it safer prior to and in a stall: first is that it be resistant to spinning, second that it be controllable while in a stall, and third that it have a slow descent rate during a power-off full stall that would still allow a survivable crash.

Icon Aircraft president Thomas Wieners took on the challenge of building a modern and efficient aircraft manufacturing system when he joined the company in 2015. Below: Employees receive training for six months to a year to learn how to build carbon-fiber composite parts at the Icon Composites Technology in Tijuana, Mexico.

Early Promise

At its public unveiling June 11, 2008, the A5's projected price was $139,000, and Icon promised that deliveries would begin in 2011. By 2015, when deliveries finally began, the price had climbed to $247,000 for the fully equipped version (the only version that has ever been available) with a ballistic parachute, removable side windows, LED lights, and other premium features.

As it turns out, designing and manufacturing a relatively sophisticated amphibious LSA would end up being far more complex and costly than the founders had anticipated.

The first production Icon A5 was delivered at the EAA AirVenture show in 2015, shortly after the model passed its FAA audit. At the time, Icon had a backlog of more than 2,000 orders, likely spurred by a low deposit amount of $5,000, which occasionally dropped lower as an incentive to sign up more buyers.

Icon's current president Thomas Wieners joined the company late in the summer of 2015 as vice president of manufacturing. While Icon had hired engineers and consultants with experience in high-volume composite manufacturing, the original design was not optimized for manufacture, according to Wieners. Icon had recently moved into its new headquarters in Vacaville, California, adjacent to Nut Tree Airport, and it was time to begin filling those many orders.

"The mandate was, 'We've developed a strong airplane," Wieners, who is now Icon's president, explained. "'They're prototypes, and now it's time to bring it into serial production. Can you help us do it?' That's the role I was hired for. The big challenge is how to get from a stunning aircraft to state of the art manufacturing. We had to build the machine to build the machine. It was more challenging than I thought it would be."

One of Icon's key moves was to manufacture composite parts and components at a new factory in Mexico. Icon had contracted with Cirrus Aircraft and two other suppliers to build its first airframe

structural components, but this proved too costly, given the complexity of manufacturing the A5.

"We realized there are so many labor hours involved that we were never going to be able to afford building these parts in the U.S.," he said. "We wanted to own that core competency. We believe that carbon-fiber manufacturing is something we should do in-house; we believe it's the soul of the airplane."

Mexico Manufacturing

The 300,000-sq-ft Icon Composite Technologies center of excellence for serial carbon-fiber manufacturing opened in Tijuana in late 2016. The advantage of Tijuana, compared to other aerospace-manufacturing centers in Mexico, is that it is close to San Diego, simplifying transportation of finished materials to the U.S. It is also easier to attract talent, such as engineers who are U.S. citizens and want to live in the San Diego area and commute to Tijuana.

The Tijuana facility is now running a mature quality management system, according to Wieners, with lean manufacturing methodologies employed both in the work done by highly trained Mexican employees and sophisticated machinery to aid composites layout and production. This includes five-axis CNC routers, Virtek laser-alignment machines, FaroArm 3D measurement and inspection systems, two 65-foot-long gas-fired ovens, an autoclave, and more. The process is called the Icon Production System. "We focus on lean, high-quality efficiency," he said.

Employees receive above-average benefits, and the working conditions are far better than typical Tijuana-area jobs, with a clean, air-conditioned workspace, free transportation and hot lunch, and comprehensive training, including cross-training for different tasks.

During a visit to the Tijuana center in September, accompanied by vice president of manufacturing Veronica Rubio, **AIN** saw parts being cured for A5 Serial Number 136. The Tijuana composites experts build the 378 individual parts that make an A5 and put them together into 70 subassemblies that are shipped to Vacaville for final assembly. Much of the work is hand-layup of precision-cut composite materials; the wing spar alone has 120 plies.

To help employees understand what they are building, a production A5 in a corner of the factory highlights the company's current product. During family days, visitors get to climb into the A5's cockpit, and there is always a long line waiting for the opportunity. "They're proud and excited about what they're doing," said Wieners.

The original plan for the Vacaville facility was to manufacture composites in one of the two buildings that Icon constructed, but now just one building is in use for final assembly, paint, and maintenance, while the other one is leased out.

All arriving components are carefully inspected before going into inventory, where they quickly move to the final assembly line or subassembly stations. Work instructions are available on iPads at each station, and Icon's enterprise resource planning software keeps the instructions up to date. There are 190 operations done at Vacaville, and each is followed by a quality control inspection. All movement of parts and use of materials is tracked automatically so refills can be timed appropriately.

Above, Icon A5s being prepared for delivery to their new owners at the company's Vacaville, California, headquarters. Below: a production A5 sits in a corner of the Icon Composites Technology facility in Tijuana, Mexico, so employees can see what they are manufacturing.

This system is far more sophisticated than what Wieners and his team faced when he took over manufacturing. At the time, there were no work instructions nor specified tools, just a booklet of engineering drawings. Wieners admitted that although he was attracted by Icon's vision of bringing more people into aviation with the exciting A5, "I knew that it was going to be tough and that manufacturability was not priority number one, but instead, the flight characteristics and the aesthetic stuff [were the focus]." Although he did plenty of due diligence before accepting the job, he said, "I underestimated how complicated it was going to be to bring this airplane into serial production. There have been a few changes, but basically it's the airplane as-developed, which means that we didn't bring manufacturability into this plane. We found a way how to manufacture it."

Rightsizing

More recently, Wieners had to make some tough decisions about sizing the company to match the actual demand for the A5 at its new $389,000 price tag. The backlog is likely not the peak of 2,000-plus airplanes, but now Icon isn't giving a precise number, after having built its first 100 airplanes (as of July 22). "What we're trying to do is match the production schedule with the demand side," he said. "A healthy backlog for us is three to six months." This year, he expects to produce 50 A5s and next year around 100, although production could increase if demand grows.

"Those are less aggressive numbers than we might have disclosed in the past," he acknowledged. "The issue with us being that aggressive is some of the attitude I want to change. I don't want to say, 'There is [demand for] 500 in two years' because I don't think there is. And if there is, it's a good problem to have. That doesn't mean we don't want it. For me, that moment of truth is we've got to use that opportunity to accept the reality check and stop over-promising and under-delivering, but instead surprise with performance, with quality, and with matching the realistic assumptions and environment. We understood a lot better how much it cost us to build this airplane. Ignoring these facts and still keeping everything as big as we had set it up and dreamed would be irresponsible."

For Icon and Wieners, the tough decision to match the employee ranks to the reality of the market resulted in a layoff of 38 percent of the personnel, reducing the headcount to 400 from 650, both in Vacaville and Tijuana. "Accepting that reality check is allowing us to reset the base and find a path to profitability," Wieners said. "It was very well thought through. We looked at the data very carefully." Customers, investors, and even employees were supportive of the move, he said.

It was important to Wieners that Icon retain key management, manufacturing, engineering, and service talent and not just rest on the laurels of the A5. "It's too early to talk about the details, but we're still pushing our innovative skills and keep innovating new stuff that we believe is going to be important for us in the future," he said. Near-term, there is strong demand for an A5 with a more powerful engine than the current 100-hp Rotax 912 as well as more useful load. Because Icon didn't use the full amount of the weight exemption, it has some margin to increase the A5's maximum takeoff weight to add useful load, given more power. Longer-term, Icon is exploring new aircraft that fit its mission, but perhaps not focused so much on recreation. And with any new design, manufacturability will obviously be considered from early on.

In fact, Wieners believes that Icon is in a unique position, having learned a great deal about what it takes to build a composite airframe in high volume. Icon's investors, some of which are in China, have the same long-term view. "There is a big belief on their side in future flying worlds," he said. "There's strong pride in the manufacturing environment and capability that we have set up, especially on the carbon fiber-carbon side."

The nascent urban air mobility market, which promises to fill the sky with untold numbers of electric-powered eVTOL aircraft or long-range lightweight commuter-style airplanes, could learn some lessons from Icon, he believes. "Those flying cars, call it what you want, but none of them have the support they would need on a manufacturing environment that would allow them to go anywhere close to volume production. This has bought us an advance towards whatever it is that is coming, because we went that rocky road and got bloody noses creating that manufacturing environment." ■

This fuselage assembly is nearly ready to be shipped from Mexico to Vacaville, California, for final assembly.

Despite Hong Kong tensions, bizav traffic remains stable

by Curt Epstein

While economic tides wrack the region, the hangars and ramp at the Hong Kong Business Aviation Centre are still seeing plenty of business, according to the company.

Even with the protests in Hong Kong that have garnered headlines since June, business aviation travel there has not been drastically affected, according to the Hong Kong Business Aviation Centre (HKBAC), the lone FBO on the field, which has seen only minimal erosion.

"Surprisingly, our movements haven't changed much, and I can say it's business as usual," said Minnie Kan, the company's head of business development. She told **AIN** that the facility saw double-digit growth last year over 2017, and that this past August, during the height of the unrest, which saw the airport actually shut down for a day due to protests, business aviation traffic (which makes up better-than 90 percent of HKBAC's clientele) was up year-over-year for the month. "We found that the government and airport authority found ways to maintain the smooth operation of the airport and indeed they keep in very close communication with the stakeholders," said Kan.

She attributes an overall decline in the region's business aviation traffic to economic worries. "It dropped a lot in some Chinese cities because of the overall economic downturn or the China-U.S. trade war tensions, but still in Hong Kong, we maintained the level of 2018," Kan said. "The demand is still there, and they still try to get the slots that they want."

She added that discussions and coordination between the government, the airport, and Hong Kong's Civil Aviation Department have resulted in additional slot allocations for business aviation flights. They can be requested through HKBAC Connect, the FBO's online ordering system where customers can place their flight handling requests, including desired fuel uplift. An enhanced application, which will debut next year, will provide customers with instant flight status information, such as the arrival of crew and passengers to the terminal, as well as their baggage. Such information would be of use to operators and executives' personal assistants. "Instead of passively waiting for our stakeholders or clients to call in, we would like to be more proactive to provide this information to them," said Charise Shek, HKBAC's head of customer service.

While aircraft parking had been a long-standing problem at the airport, that has largely been resolved, according to Shek, HKBAC's head of customer service. She noted that with the recent opening of the midfield parking area, the airport now has approximately 70 stands for business aviation, with parking permitted for up to 14 days, one of the longest periods allowed at an Asian airport. The FBO itself, which celebrated its 20th anniversary last year, has more than 12 acres of ramp space that can accommodate 30 aircraft, and more than 107,000 sq ft of hangar space able to handle up to ACJ/BBJ-class aircraft.

HKBAC averages 20 to 25 movements a day and provides fueling from the airport's Shell-supplied tank farm. It operates three tankers with a combined capacity of 12,680 gallons, but due to demand from more and larger aircraft, the two hydrant ports that were installed on its ramp in 2017 are seeing increased usage. They are proving very useful in periods of peak demand when the trip to refill trucks at the fuel farm could take upwards of half an hour.

Among the advances, this past August saw the first trial flight of a civil helicopter between Hong Kong International and Zhuhai Airport on the mainland. While the planning for the event involved many permit-related "hiccups," it could someday pave the way for regular rotorcraft service around China's Greater Bay Area. "For the entrepreneurs within Shenzhen, the demand is there," Kan said. "They want to extend to Hong Kong to connect both cities with so many global companies to facilitate their business."

With the development of land bridges connecting Hong Kong to the mainland, road travel linking Hong Kong with destinations such as Macau, Zhuhai, and Shenzhen has become much easier, and business aviation now has more choices when it comes to suitable airports in the area, giving HKBAC more competition than it has faced in its two decades.

"A couple of years ago they did not have these choices, either because of the lack of the road transport or the [aviation] facilities were not up to standard as well," said Kan. "In time, they have also grown up a lot, so that's why we say we have to maintain our competitiveness. We're not a monopoly, indeed, if we look at the bigger circle." ■

NBAA-BACE 2019

Cessna Denali first flight delayed to 2020

With five development engines assembled and more than 1,600 hours of combined operation between engine test hours, GE Aviation's new Catalyst turboprop engine is progressing toward a flying testbed on the launch application, the Textron Aviation Denali. However, the engine maker won't deliver the first Denali flight-test engine to Textron Aviation until sometime in 2020, GE officials confirmed on the eve of NBAA-BACE. Both Textron Aviation and GE Aviation had anticipated first flight of the Denali later this year.

"Given the delay in the engine delivery, we are not putting a timeline on first flight of the Denali," the Wichita airframer said. "Textron Aviation is pleased with the performance of the engine, and Catalyst development testing has met or exceeded the program requirements. Engine design and performance has been proven through extensive component and development testing."

A combination of newer turboprop testing standards and engine preparations required for its flying testbed are driving a delay in the initial delivery of GE Aviation's new Catalyst turboprop to Textron Aviation for the Cessna Denali, said Brad Mottier, v-p and general manager of business, general aviation, and integrated systems for GE Aviation.

The primary holdup has been eight test certification requirements for turboprop engines put in place by the FAA over the past 10 years.

The Denali iron bird ground-test article continues to test Fadec and engine connectivity, avionics functionality, and aircraft handling characteristics. GE said the iron bird has completed 300 hours of testing.

In terms of the Denali's airframe, Textron said it was nearing wingmate of the prototype aircraft. All told, the company has three flight test and three ground test articles, the latter of which will be used for airframe static and fatigue tests, as well as cabin interior development and testing.


First flight of Textron Aviation's Cessna Denali should take place next year.

Along with the Catalyst engine, the Denali will be equipped with Garmin G3000 touchscreen avionics, including three, 14-inch diagonal, wide-screen LCDs, synthetic vision, ADS-B In/Out, and weather avoidance radar.

With an expected range of 1,600 nm, a maximum cruise speed of 285 knots, and a full fuel payload of 1,100 pounds, the airplane is configurable for both passenger and cargo missions with its flat floor.

It includes a 53-by-59-inch rear cargo door, as well as executive features such as 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. Large passenger windows, interior LED lighting, and options for a refreshment cabinet and an in-flight-accessible baggage compartment round out the Denali's features.

Denali offers six individual reclining seats, club-configuration tables, and a refreshment unit in executive configuration, and nine forward-facing seats in a high-density commuter configuration.

"It's an airplane that we think can have a big impact on the marketplace," Textron senior v-p of sales and marketing Rob Scholl told **AIN**. **J.S.**

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TEXTRON AVIATION

As it awaits delivery of new aircraft–likely not for several years–Abu Dhabi-based Royal Jet is planning to refurbish six of its BBJs that are nearly 20 years old. The company plans to maintain a mix of older and newer aircraft to suit clients' varied requirements.

Royal Jet moves to refurbish its fleet

by Peter Shaw-Smith

Abu Dhabi-based charter operator Royal Jet has launched a tender to refurbish six BBJs that are approaching 20 years of age, and, longer-term, intends to place orders for multiple new aircraft, deliveries of which are unlikely before 2022 at the earliest, CEO Rob DiCastri, told **AIN** last month.

"On [October 31], we launched a tender for all six aircraft, to refurbish four of them and put high-speed Wi-Fi on all six," he said. "We've gone out to eight different outfitters for the [equipment], and we're going to be closing that bid at the end of this month. We hope soon after that to get the design process going. That's probably a $20 million project to refresh [the fleet]."

Royal Jet operates a total of eight BBJs, two of which were delivered new in December 2016, bringing the fleet to 10 aircraft, with the inclusion of two Global 5000s. "The [original] six BBJs are [almost] 20 years old," he said. "We need to do something about that situation."

He said the company is also at the advanced stages of discussions with both Airbus and Boeing on the purchase of new aircraft. "So multiple aircraft over multiple years to get our fleet to the point where it's a mix of newer and older aircraft. We have customers that are willing to pay [to use] the brand-new aircraft. The older aircraft are fine as long as the configurations are good and the interiors are nice."

The operator may also induct pre-owned aircraft into the fleet until orders for new aircraft go ahead. "We can't be too picky and say, 'We're only going to buy BBJs,'" he said. "We're looking for a couple of those under the radar right now. We haven't hired a broker. We're just searching the market ourselves."

Change is afoot after Royal Jet moved into new headquarters adjacent to Abu Dhabi International Airport this year. Three new board members have been appointed, including a woman. "We're heading into a new era. We're just getting the board up to speed with the plans that we've been making and some of the initiatives we've been moving ahead with, but it's really another signal of a new era. There's lots of tweaking, making the company more efficient, making sure our customers are happy, bringing back some of the customers we used to have, and getting the financial foundation as strong as possible.

"We're in a really strong position. We have a better cash situation than we've ever had. We've had record profitability for 2016, 2017, and 2018 and it's another record already in 19. We've already overperformed 2018, as of September, so we have a final quarter to go even further. We're just controlling costs better than we ever had. And we're bringing utilization to a higher level."

Core business at Royal Jet has always been charter. "VIP charter, in particular, has been 70 percent of our business," he said. "[Today, the customer base] is more diverse. We're flying a lot more heads of state from other countries than ever. We're still doing as much business as before with the Presidential Flight, but it's a smaller percentage overall." ■

FAA sees trust growing with compliance program

by Kerry Lynch

As the FAA's compliance program enters its fifth year, a senior FAA official says the agency and industry are seeing evidence of growing trust, transparency, and effective use of safety management systems (SMS). Tim Miller, director of FAA's Office of Air Carrier Safety Assurance, told attendees at Bombardier's 23rd annual Safety Standdown last month, "I am happy to report we are making progress."

The compliance program relies on voluntary reporting and corrective actions such as training and improved procedures to address deviations or safety issues. Enforcement instead is reserved for "the reckless, inappropriate risk-taking, or those that are unwilling or unable to comply," Miller said.

The compliance program is simple but has many moving parts that require attention to detail both on the regulator and the industry side, he said. It moves away from the former approach to accountability that places blame and focuses on function to an accountability that accepts responsibility and results in action for change.

"Compliance means a lot more than just following the rules. Far more important is proactive risk management," he said. Improvement in safety, he added, "rises from the operators' willingness and ability to proactivity address risk management to deal with the issues that cannot be addressed by federal regulations."

This requires communication, cooperation, and collaboration, he added. In evidence of this growing collaboration, he pointed to an air carrier that changed its procedures after improperly flying passengers without following the regulations. He also pointed to the industry collaboration with the FAA on illegal charter, noting this is requiring information sharing.

But even further evidence of this collaboration has been a jump in submissions to the various voluntary reporting programs, Miller said. In the last full fiscal year for which the FAA has data on the Aviation Safety Reporting System, submissions had grown to more than 96,000 reports. Submissions to the Aviation Safety Action Program in the last 12 months grew to 131,000 reports, a 26 percent increase over 2016. Submissions to the Voluntary Disclosure Reporting program had reached 2,200, he said, adding, "These numbers are phenomenal. That's how we're developing standards."

Miller acknowledged he is preparing to retire from the agency and said while he has found his career rewarding, "When people ask me what I am most proud of, I can point to the work the FAA and the industry have done to raise the bar of safety."

Along with compliance and information sharing is the adoption of safety management systems, as well as the agency's move to realign its divisions to focus more on function rather than geography.

He also praised the Safety Standdown, saying the sustained efforts of the annual seminar have made it "one of the industry's best known and most respected conferences. The longevity of this event and the diversity represented demonstrate a key point that goes along the heart of this year's theme 'Elevating Standards,' that when it comes to aviation safety, we're all a team." ■

NEWS note

Cirrus Aircraft is adding Garmin's Autoland capability *(see page 1)* **to its G2 Vision Jet**, with certification of the autonomous emergency landing system expected in early 2020. The Cirrus Safe Return Emergency Autoland system will be a standard feature on the Vision Jet once the system is certified.

Safe Return is a capability available to aircraft manufacturers that equip their airplanes with Garmin's G3000 (Perspective+ in the Vision Jet) avionics and Garmin's autothrottle. Cirrus added the autothrottle with the upgraded G2 version earlier this year.

Piper Aircraft is also offering Autoland on the new M600 SLS. ■

FAA clears way for pilots with diabetes | by Kerry Lynch

The U.S. FAA has developed a new medical protocol that paves the way for people with diabetes to seek airline transport or commercial pilot flying privileges. A notice published in the November 7 Federal Register reverses the agency's long-standing policy that limited persons with insulin-treated diabetes mellitus (ITDM) to third-class medical certificates that were granted under a special-issuance, on a case-by-case basis.

"Previously available medical science, treatment, and monitoring have allowed the FAA to safely provide special-issue third-class medical certificates for private pilot privileges since 1996, but was not sufficient to meet the higher levels of safety demanded for applicants considered for airline transport or commercial pilot duties," the agency said.

But advancements in medical science, including the ability for continuous glucose monitoring, make "it possible to mitigate flight safety risk so that applicants seeking first- or second-class special-issuance medical certification may be considered for the exercise of either airline transport or commercial pilot privileges."

The FAA opted for the change after consulting with the American Diabetes Association, which recommends that the FAA update its policy to reflect current diabetes medicine. An ADA expert panel concluded, "There are pilots with insulin-treated diabetes whose risk of incapacitation in flight is equivalent to, or lower than pilots who do not have insulin-treated diabetes. Their risk, like the risk presented by pilots who do not have insulin-treated diabetes, is nonzero, but extremely improbable."

After studying the current protocol, as well as the safety record of commercial and ATP pilots permitted to fly with diabetes in the UK and Canada, the FAA developed a new protocol that accounted for the updates in glucose monitoring and other medical treatments.

Under the policy, individuals with ITDM may apply for a special issuance for any class of medical certificates if they follow the new protocol. Those seeking third-class certificates may continue to use the previous protocol or opt for the new protocol.

The FAA is accepting comments on the notice through January 6. ■

NEWS note

Embraer Executive Jets is relocating the production line for its Legacy and Praetor midsize and super-midsize jets to Gavião Peixoto, Brazil, where it manufactures the KC-390 military transport twinjet. That was the message from Embraer Executive Jets president and CEO Michael Amalfitano when he gave a preview of what the company will look like after its commercial aircraft joint venture with Boeing receives EU anti-trust approval. The Embraer Executive Jets site at São Jose dos Campos, Brazil, will be going to the commercial joint venture with Boeing.

"We're currently in the process of moving the tooling and production to Gaviao Peixoto," Amalfitano said. So that's where we will start the process for bringing the product to Melbourne (Florida) for final assembly and delivery to our customers." ■

NBAA-BACE 2019

Honeywell report forecasts short-term delivery bump

by Curt Epstein

Aircraft systems manufacturer Honeywell Aerospace predicts 7,600 business jet deliveries worth approximately $248 billion over the next decade. The Arizona-based company issued its 28th annual Global Business Aviation Outlook on the eve of October's NBAA-BACE, covering a period through 2029. This year's prognostication is down slightly from last year's forecast, which called for 7,700 aircraft deliveries worth $251 billion.

Among the aircraft the company tracks in its survey (excluding personal jets and bizliners), Honeywell lowered its 2019 delivery numbers from 715 to 690 jets, due to longer-than-anticipated certification times on some programs and slow ramp-up rates on others. That still represents a rise from 2018's 633 deliveries, and the aerospace giant sees even more on the horizon for next year.

"Production ramp-up on many new business jet platforms will lead to a 7 percent increase in deliveries in 2020, following a strong projected growth in 2019 over 2018 aircraft deliveries," said Heath Patrick, the company's president for Americas aftermarket. "We are confident that these new and innovative aircraft models will support solid growth in the short term and have a continuing impact on new business jet purchases in the mid- and long-term."

The company predicts total deliveries of 740 jets in 2020, according to Gaetan Handfield, its senior manager of marketing analysis who prepared the outlook.

Between June and September, the company surveyed more than 1,600 aircraft operators, accounting for 13.5 percent of the world's private jet fleet. Fractional ownership providers were not included, but are estimated to account for up to 14 percent of total unit deliveries over the next five years. Those interviews, along with information from OEMs, are used to shape the first half-decade of the outlook, while economic models weigh more heavily in the latter half.

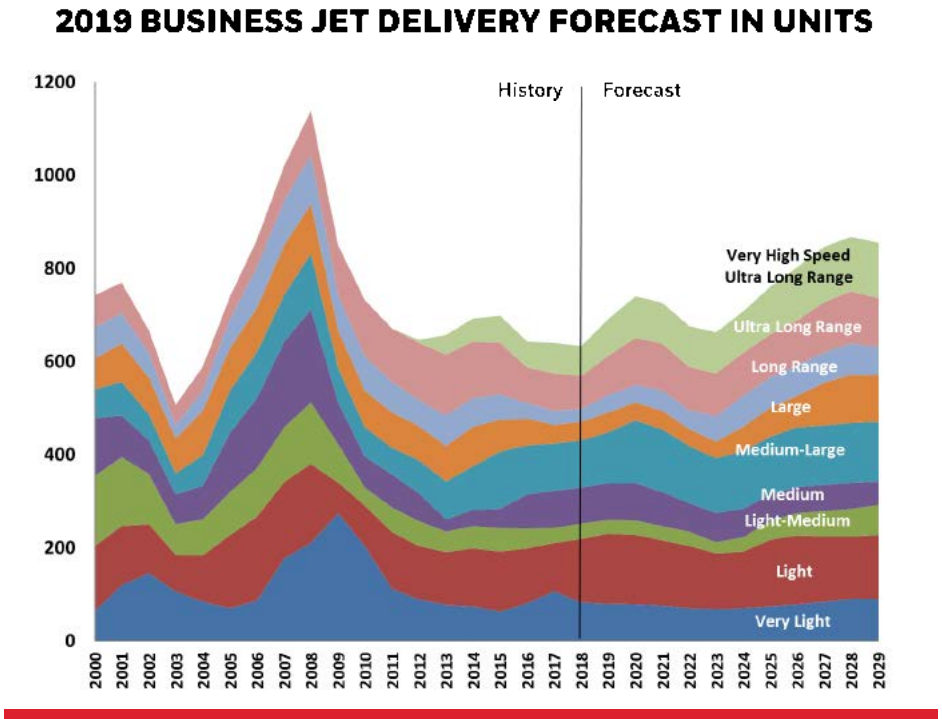
Regional Outlook

Honeywell sees North America accounting for 60 percent of the demand over the next five years, followed by Europe (19 percent), Asia Pacific (10 percent), Latin America (7 percent), and the Middle East/Africa (4 percent). Of those intended purchases, 42 percent mention large-cabin jets, with midsize (which now includes the super-midsize category for the first time) and light jets accounting for 29 percent each. The bigger jets (including bizliners) are expected to account for 73 percent of the total valuation over that span, leaving just 27 percent of the market value for the midsize and light jet categories.

Based on the results of those operator interviews 17.2 percent of the global fleet is to be replaced or expanded with a new business jet over the next five years, a decrease of 2.5 percentage points from last year's survey. Of the total purchase plans over the next five years, 35 percent are expected to happen over the next two years. By the third year, that percentage will swell to 57 percent., which is five points higher than last year's results.

Yet, the company added, operators indicated a stronger willingness to pursue used aircraft. Operators worldwide noted that 32 percent of their fleet is expected to be replaced or expanded with preowned jets over the next five years, an increase of 8 percent over last year's survey. Taken with the new aircraft purchase plans, that would actually represent an increase in aircraft purchases over last year, according to Handfield.

Taken by region, new jet purchase plans declined by 2 percent in North America, with 15 percent of the installed fleet expected to be replaced or supplemented through 2024. Thirty-six percent of those purchases are expected in the next 24 months, while interest in used jets rose by 11 points over last year's survey. A full one-third of the fleet is expected to be replaced or expanded with a used aircraft over the next five years, the highest percentage recorded over the past five years of the survey.



Over the next decade, Honeywell Aerospace forecasts deliveries of 7,600 business jets (not counting bizliners such as the BBJ and ACJ, or personal jets like the VisionJet), worth an approximate $248 billion.

In Europe, where flight activity has been on a recent decline, purchase expectations decreased by five points to 28 percent. Planned timing for those purchases in the first two years of the survey window totals 34 percent, one point behind last year's survey. Another surprise in this year's results involved the UK, where, as a result of the continuing Brexit stalemate, new aircraft purchases could be expected to be lower than last year, but actually increased in the survey.

"The two countries that are down this year in Europe are Germany and France, which could be linked to Brexit anxiety, but could also be linked with the economy, especially in Germany [which] is in a recession right now," said Handfield.

Latin American operators expect to replace 21 percent of their fleet over the next five years. While purchase intentions remain stable in Mexico, operators in Brazil indicated slightly lower plans compared with last year.

Asia-Pacific is forecast to see an increase in the percentage of fleet to be replaced or expanded from last year, moving from 12 percent to 15 percent, with 24 percent of those intended purchases happening by the end of 2020. Handfield said many of those involve orders already placed with the manufacturers and are simply awaiting delivery. While China remained stable in the region, the survey indicated increased demand from India and South Korea.

In the Middle East and Africa, 12 percent of the survey respondents said they anticipated a new jet purchase, down two points from last year's results. Of those, 32 percent indicated that purchase would come in the first two years of the outlook.

Overall, the aircraft with the most intended purchase mentions was the Bombardier Challenger 350. ■

Preowned bizjet values rise for first time in a decade

The preowned business jet market has finally rebounded from its decade-long decline following the global economic downturn of 2008/2009, according to Michael Dwyer, managing partner of aircraft brokerage, appraisal, and consulting firm Guardian Jet. While the ultra-long-range jet market began recovering about five years ago with sales to high-net-worth individuals traveling to and from emerging markets in Asia and South America, last year saw recovery for the entire preowned market, Dwyer said.

"The overall preowned market took a bump up in 2017 when the U.S. passed bonus depreciation and that carried over to 2018," Dwyer told **AIN** at NBAA-BACE 2019. "So 2018 was a record-setting year for a lot of brokers and it was the first year that we saw a strong recovery of the midsize and light jets in addition to the ultra jets."

Recovery means aircraft values have now stabilized and in some cases are going up as inventories begin to shrink. Dwyer noted that preowned Gulfstream G550s, Falcon 7Xs, and Global 5000/6000s are especially in high demand as many first-time jet buyers who are moving up from chartering light and midsize jets are buying super-midsize and larger jets.

"Some of the ultra-long-range equipment is seeing a very healthy rebound because of the pricing of new aircraft," said Dwyer. "A decade ago, a new G550 at $40 million to $50 million was as much money as you could spend on a new aircraft—it was top of the line. Now if you look at the Gulfstream lineup, a $45 million aircraft is about the fourth most expensive in the lineup, and a preowned $15 million to $25 million G550 is an incredible value."

While aircraft interior appearance is important when selling an aircraft, with tasteful earthy tones still favored among most buyers, Dwyer said buyers are generally more interested in connectivity options than the aircraft cosmetics.

"You have very sophisticated charter and fractional customers that are demanding connectivity in the back of the aircraft," he pointed out. "As long as the cabin looks new and everything works, for the first-time buyer it's all about the cabin management system, internet connectivity, and the entertainment system." **K.R.**

Embraer's E195-E2 makes North American debut

by Jerry Siebenmark

Embraer executives told a group of journalists gathered at the Brazilian airframer's Fort Lauderdale, Florida headquarters in mid-October that they're still bullish on the prospects for the company's new E-Jets E2 line, despite union scope clauses that will limit sales of the airframer's newest range of passenger jets in the U.S. "Now if we look today where we are globally, we see almost 30 percent of the market up to 150 seats is represented by Embraer," Embraer Commercial Aviation chief commercial officer Arjan Meijer said. "And we believe that this percentage will go up in the future."

The journalists were gathered to experience flying on Embraer's newest and largest of the E-Jets line, the E195-E2, which has been on a global tour that kicked off with the Paris Air Show in June following type certification in April 2019 by ANAC, the FAA, and the European Union Aviation Safety Agency. Since then, the single-aisle jet that's adorned from nose-to-tail in what Embraer calls the "TechLion" livery—with "Profit Hunter" emblazoned along the aircraft's forward fuselage—has made stops in China, Southeast Asia, Europe, and North America. It will wrap up its tour this year with stops in South America, Africa, and the Middle East, including the Dubai Airshow in mid-November.

Powered by two Pratt & Whitney PW1900G geared turbofans providing up to 23,000 pounds of thrust, the E195-E2 comes in a trio of two-by-two seating configurations: three-class with 120 seats, single-class with 132 seats, or single-class with 146 seats, the latter of which has 28 inches of pitch between seat rows. A fully loaded E195-E2 has a range of 2,600 nm with a 41,000-foot ceiling, maximum cruise of Mach 0.82, and mtow of 135,584 pounds.

Launched in 2013, the E-Jets E2 line—which in addition to the E195-E2 includes the E190-E2 (certified in 2018) and E175-E2—is aimed at offering new variants with improved fuel consumption, emissions, noise, maintenance costs, and longer maintenance intervals. Embraer said it's done so through adding aerodynamically advanced, high-aspect-ratio wings, improved systems, Honeywell Primus Epic 2 avionics, fourth-generation fly-by-wire flight controls, and the P&W geared turbofans (PW1700G on the E175-E2 and PW1900G on the E190 and E195-E2s). Meijer noted that the E195-E2 during flight testing achieved a 25.2 percent fuel-burn reduction compared with the E195, while the E190-E2 saw a 17.3 percent fuel-burn reduction over its predecessor, also during flight testing. The first E175-E2 prototype is in final assembly with expected entry-into-service in 2021.

Unless union scope clauses change, it's not likely that Embraer will see much of any sales of the E2 jets to regional airlines in the U.S., where it claims to have more than 80 percent of the 76-seat regional jet market. That's because the scope clauses limit regional jets to a maximum of 76 seats and mtow of 86,000 pounds. All three E2 variants exceed those measures.

Still, Embraer executives point to demand from outside the U.S. for its new E2 jets. At this year's Paris Air Show, alone, the company recorded firm orders and commitments for up to 37 E195-E2s from Spain's Binter Canarias (two firm orders) and KLM (15 firm orders and 20 purchase rights). ■

JERRY SIEBENMARK)

Embraer's E195-E2 made a stop at Kennedy Space Center in Florida during a media flight as part of its North American demonstration tour in mid-October.

› continued from page 20

figure out how to provide a more objective evaluation of student performance. As Littrell put it, "We consider FlightSmart a revolutionary tool that is designed to turn the aviation professional training experience on its head. It's focusing on the individual themselves, but it also can focus on the population as a whole or a subset of a population. We're tailoring the training to the specific needs, strengths, weaknesses, and focus areas through objective evidence and machine learning."

The collaboration with IBM's Watson service, he added, "is utilizing advanced algorithms, machine learning, artificial intelligence, all of those cognitive technologies to provide the objective evidence or objective evaluation of the student's performance as they're in the entire training ecosystem. Our initial development started focusing solely on the simulator side, capturing the data out of the simulators and applying the algorithms to first automatically identify what training tasks were accomplished during that training session."

The important factor here, however, is what standards apply for measuring the student's performance. Should it be the FAA Airman Certification Standards, as flown perfectly by the simulator?

According to Littrell, "We go more granular than that rather than just an A/B-, pass/fail-type evaluation." There is scoring against the overt regulator-derived standard, but FlightSmart also uses a "gold-standard baseline," which is based on captured human performance.

With skilled pilots at the controls, FlightSmart "captured their sessions flying that particular training task and then worked up a baseline based on all that data," he said. "We could have the simulator fly a perfect steep turn or whatever the case was. But, but that's not realistic, that doesn't take into account the human element. So we opted to use actual humans to create that baseline. The way machine learning and analytics work, the more data you have, the smarter it gets. So over time, the baseline will continue to improve and be more reflective of the pilot population and that gold standard."

The next step is evaluating the student's performance against the new standard. This isn't just a matter of plotting the physical measurement of a student's flying to the baseline standard, but more about assessing the intangible qualities of skillful flying. "It's also evaluating the—for lack of a better term—the smoothness of their flying or their style of flying," Littrell explained. "Looking at the frequency and amplitude of their plotline; are they manhandling the controls? Are they smooth and precise? Are they behind the power curve, slow to respond to deviations, and so forth?"

The benefits don't just accrue to the students, who not only get scored on their performance but also get an objective evaluation of their performance, with information that can help drive improvement. The other benefits are that FlightSmart helps instructors shift from mundane tasks to truly being able to observe and help their students. It also promotes standardization of instructors, Littrell said.

"We've all seen those examiners and instructors—some are more stringent; and others are more lax. So we worked towards standardizing them. There are reports that can be run to look at the scores of students that a particular instructor has, to look for variations. But one of our key drivers from an instructor standpoint is reducing the burden on them."

The burden takes the form of the rapidly growing amount of content that must be taught in the same limited period of time. "There are a lot of times they're very task-burdened," he said. "Our mission from the outset was to reduce the burden as much as possible for those instructors. Providing the objective evaluation is one element of that. Another element is the automatic identification of the training tasks. We don't want the instructor having to make a selection while they're in the simulator and distracting them from what they're there to be doing, which is the teaching."

The teaching itself is not just the time in the simulator, but afterward when the instructor can fully debrief the student, again based on objective information that captures exactly what the student was doing.

"[For a] steep turn," Littrell said, "if they deviate on altitude by 126 feet, a good instructor is going to be able to deduce within reason what may have caused them to deviate from that altitude. But we are using machine learning to drive to the root cause of what caused them to deviate. We have all the parameters available to us, and machine learning looks at those and in essence creates an error chain to determine what was the ultimate root cause of that deviation on altitude. It may have been two minutes and 36 seconds ago you bumped the rudder pedal, which destabilized you, which led to this."

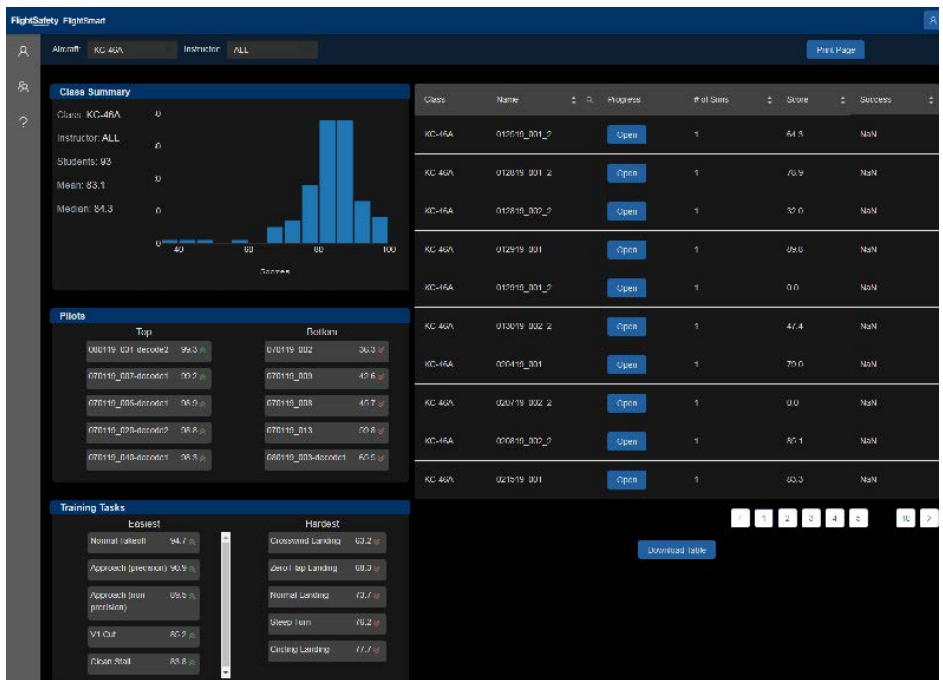
Once debriefed, students can take that critique and practice on their own to hone their skills, using FlightSafety's advanced training devices or graphical flight deck simulators, which can also incorporate FlightSmart. This will also help make the actual full-flight simulator training portion more effective.

More important is that FlightSmart will be used to continually hone the training program to fit the student, all with the goal of improving mastery of the subject and tasks. The instructor will become more of a training or learning manager who can help guide the student toward success.

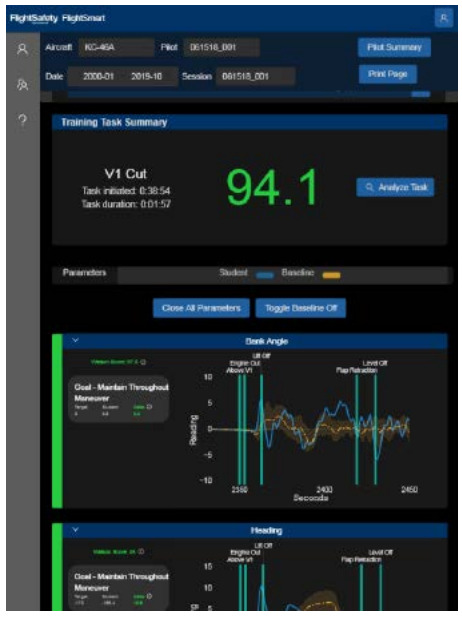
FlightSafety students and instructors can view FlightSmart information on their own dashboards, accessible via browser software and including an overall competency assessment grading view.

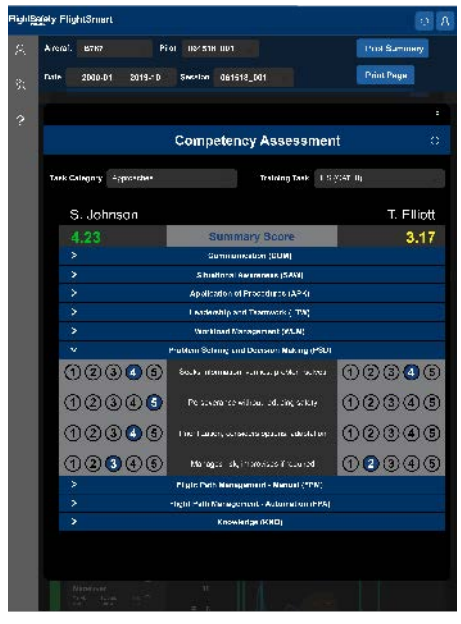
Students will be able to see their scores by task; the top three reasons for failure; next suggested training tasks; the top three recommended next actions; master percentage; and progression trend graph.

The dashboard for instructors (training managers) will show ranking of students by scores, mastery level, and training task score; the likelihood of additional training required; and the likelihood of washout.



FlightSmart dashboards show students their scores by task; the next suggested training tasks; the top three recommended next actions; and master percentage. Instructors will show ranking of students by scores, mastery level, and training task score.





FlightSmart Security

It goes without saying that secure storage of all the data gathered by FlightSmart is critical, and FlightSafety has taken this into account.

"The way we approach that is, first, we only identify data to the level that we received permission to identify it," said Littrell. That means it is up to the customer to specify whether the data is recorded anonymously or that the organization is identified or the identify of the person undergoing training is available to the customer. "Every organization has their own unique requirements as it pertains to data privacy," he added. "We work with each customer to ensure that we meet not only the letter of the law but also their internal requirements.

But FlightSmart's benefits extend well beyond the simulator and it can be integrated into learning/training management systems, classroom environments, computer-based training, etc., to help pilots from early in their career throughout their professional flying lifecycle.

"We're seeing interest from all over the industry," said Littrell, "including large commercial operators to single-pilots, ab initio training, and universities." The FlightSafety Academy, which teaches new pilots, is also looking to implement FlightSmart.

While some FlightSafety instructors worried that FlightSmart was designed to replace them, and students worry that the computer will try to determine whether they are or aren't qualified to fly, the company is sending a clear message. "My goal is to provide you with additional resources to make you better," Littrell concluded. "It's the same with students. We're not trying to determine whether you should or should not continue flying, our goal is to make you a better pilot and provide you with the knowledge necessary to hone your skills." ■

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Airbus unveils stealthy LOUT

by David Donald

Airbus has lifted the veil on its Low-Observable UAV Testbed (LOUT) program, which it has been working on in "Skunk Works"-like secrecy since 2007. The program has recently completed its "iterative camouflage optimization" phase, prompting Airbus and the German defense ministry to partially lift the lid on the project and provide some details about the program. The non-flying testbed was shown to media in carefully controlled conditions while it was mounted on a pole in a radar cross-section (RCS) measurement anechoic chamber at Airbus's Manching plant in southern Germany.

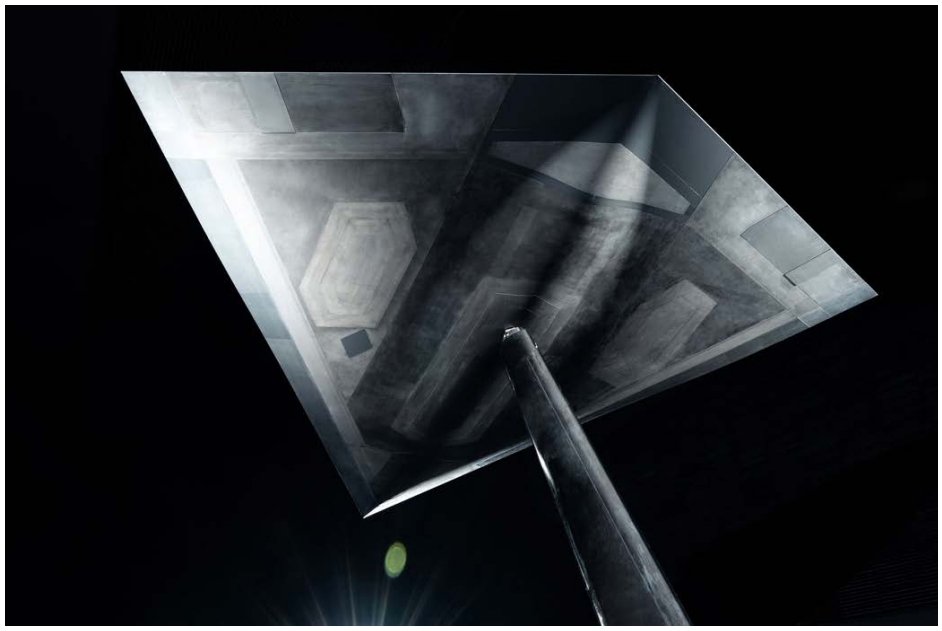
Airbus Germany and its predecessors began studying various stealthy configurations in 2007, following which LOUT was formally launched by the German MoD in 2010. By 2015 the baseline shape of LOUT had been fixed. The path to the final shape began with 2D planform evaluations, followed by 3D layouts, and then full 3D configurations. The three most promising were built in scale-model form and tested in the wind tunnel to assess aerodynamic properties before the final configuration was selected.

The final shape is a four-tonne diamond-shaped craft measuring around 12 meters in both span and length, representative of a craft with a specified range and high-subsonic speed performance. It has low-RCS diverterless inlets and a thrust-vectoring flat exhaust nozzle that are shielded from ground-based sensors. The LOUT incorporates a glazed cockpit and glazed apertures to represent the installation of electro-optical sensors. It also has a representative cover on the spine for an aperture that could accommodate an electronically-scanned antenna for communications, using spread-spectrum datalinks for low probability of intercept. Weapons bay and undercarriage doors are included to demonstrate the ability to overcome discontinuities in the fuselage skin. The skin is treated to provide surface-wave attenuation that decouples mutually spaced scattering effects.

LOUT is intended to demonstrate a holistic approach to low observability, including signature reduction in radar, thermal, acoustic, and visual domains, as well as the use of electronic countermeasures and electromagnetic emission control. Moreover, notional mission management systems are integrated so that mission planning can be optimized to take account of the detailed signature characteristics of the craft. Attention has been paid to low RCS across a wide frequency spectrum, from VHF to Ka-band.

Following the construction of the LOUT, it was placed in an anechoic chamber for a rigorous series of signature measurements to establish a reference. The craft was designed with modularity in mind to permit the replacement of key elements. Some sub-components have been redesigned, or received new treatments, to counter various "hot-spots" and other issues or to test new technologies. This iterative camouflage optimization phase is now complete.

LOUT is not intended to produce a flying testbed, but to provide a vehicle for developing and understanding low observable technologies to inform other products. It is expected that such technologies will find their way into forthcoming Typhoon fighter developments as part of that program's Long Term Evolution (LTE) roadmap, and it will contribute to elements of the Future Combat Air System (FCAS/SCAF) being developed by France, Germany, and Spain, including low-RCS remote carriers and the New Generation Fighter. ■



LOUT includes doors for a weapons bay and landing gear. The thrust-vectoring nozzle is located above the rear part to shield it from ground-based sensors.

Su-35Ss to Russian Knights; maybe Turkey

The Russian Knights air display team of the Russian Air and Space Force (VKS) has received four single-seat Sukhoi Su-35S multirole fighters. The delivery ceremony took place on Thursday, November 7, at the Kubinka air force base, the team's home airfield.

The Russian defense ministry made a point that the Su-35S would supplement rather than replace the Su-30SM two-seaters that the Russian Knights have been operating for two years.

In the meantime, Turkey has acknowledged that it received a proposal concerning Su-35s. Ismail Demir, head of the Presidency of Defense Industries (SSB), told the NTV broadcaster on November 1, "There is an offer and we are evaluating it. The offer's financial and strategic aspects will be examined; there cannot be an immediate decision."

At the same time, he and other officials insisted Ankara would prefer to stay with the F-35, provided that the U.S. reverses its earlier decision to eliminate Turkey from the program.

Daily Sabah reported that Turkish and Russian officials were discussing details of the Russian offer for 36 Su-35s. The proposal was put on the table shortly after President Recep Tayyip Erdoğan inspected a number of modern Russian combat jets on display at MAKS 2019. Soon after, Sergei Chemezov, general director at Rostec corporation, said he would be willing to sell Sukhoi jets to Turkey should the customer "express a desire" to buy them. Later, head of Federal Service of Military-Technical Cooperation (local acronym FSVTS) Dmitry Shugaev, mentioned "a progressive interaction in this area" between the Russians and the Turks. **V.K.**

A price tag of below $80 million is a powerful tool in Lockheed Martin's effort to sell more F-35As.

LM receives $7B F-35 order, F-35A cost dips below $80M

On October 28, the Pentagon announced a contract modification worth just over $7 billion that covers the acquisition of 114 Lockheed Martin F-35 aircraft for U.S. forces and foreign customers. The procurement comprises 48 F-35As for the U.S. Air Force; 20 F-35Bs for the U.S. Marine Corps; nine F-35Cs for the U.S. Navy; 12 F-35As for the Royal Norwegian Air Force; 15 F-35As for the Royal Australian Air Force; and eight F-35As plus two F-35Bs for Italy.

At the same time, Lockheed Martin and the F-35 Joint Program Office have agreed to a new $34 billion pricing structure for 478 F-35s that sees the unit price of the F-35A conventional take-off/landing version fall below the goal of $80 million for the first time, ahead of an aggressive cost-reduction schedule.

The structure covers aircraft in production Lots 12, 13, and 14, comprising 291 for U.S. forces, 127 for F-35 international partners, and 60 for Foreign Military Sales customers. The cost of an F-35A and its engine falls from $82.4 million in Lot 12 to $79.2 million in Lot 13, and $77.9 million in Lot 14. The latter figure represents a 12.8 percent reduction compared with Lot 11 pricing.

Similar cost-savings have been achieved for the other two versions. The price of an F-35C carrier variant falls to $94.4 million by Lot 14, a reduction of 13.2 percent, while a Lot 14 F-35B STOVL aircraft will cost 12.3 percent less, at $101.3 million. The F-35B has always been the most expensive due to its sophisticated propulsion system.

The sub-$80 million unit price is significant as the F-35 competes for international business while also facing domestic competition for funding from Boeing's Advanced Eagle. "With smart acquisition strategies, strong government-industry partnership and a relentless focus on quality and cost-reduction, the F-35 Enterprise has successfully reduced procurement costs of the fifth-generation F-35 to equal or less than fourth-generation legacy aircraft," said Greg Ulmer, Lockheed Martin, F-35 program vice president and general manager. **D.D.**

Other Voices

Honor Flight for military vets

by Curt Epstein

They are called the Greatest Generation, the soldiers, pilots, and sailors who fought and won World War II, and there are fewer of them every day. After the National World War II Memorial opened on the National Mall between the Washington Monument and Lincoln Memorial in 2004, Earl Morse, a retired Air Force captain and physician assistant who worked in a Department of Veterans Affairs clinic in Springfield, Ohio, realized that many of his WWII patients would not be able to travel to D.C. to visit it.

A private pilot, Morse offered to fly with two veterans to Washington, and in January 2005, he pitched the idea to fellow private pilots at his local Air Force aero club. That May, after forming a charitable organization and raising funds, six small airplanes each carried two WWII veterans to D.C. in what became the first Honor Flight. By the end of the year, that number had swelled to 126 veterans transported on a mixture of small aircraft and commercial flights.

A similar organization struck up the idea of ramping up the scale of the project and chartering whole commercial airliners to carry the veterans and their escorts; the two merged in 2007 to form the Honor Flight Network. By 2017, a total of 130 regional hubs existed across the U.S., and they had transported more than 200,000 WWII, Korean War, and Vietnam War veterans on expense-paid trips to view their memorials.

On October 12, I had the proud task of serving as my 94-year-old WWII-veteran uncle's escort/guardian on the Hudson Valley (N.Y.) Honor Flight's 24th mission. It was not a mere spur-of-the-moment whim. An application needed to be filled out, indicating if he would be traveling with a friend or family member. Those without their own guardian would be assigned one from a group of volunteers.

With the ages of veterans extending into the upper 90s, every aspect of the day was examined, from where to position yourself when the veterans boarded the tour buses (walking behind them in case they stumbled or fell) to the location of virtually every restroom on the itinerary. We were told the 83 veterans and their escorts would be assigned to five bus groups for when we reached Washington, each with its own organizer, safety officer, and a volunteer nurse or EMT.

The day itself was a long one. We headed out into the darkness at 4:30 a.m., arriving at the destination at 5:30. There we each checked in and received an identification lanyard and T-shirt, blue for the veterans, gray for the guardians.

We boarded a line of buses and at 6:30, the convoy departed for the half-hour ride to Stewart International Airport, escorted by approximately 250 motorcyclists who braved the pre-dawn darkness to show their respect. Along the way, we passed illuminated highway signs thanking the veterans, fire trucks hoisting giant American flags from their extended ladders, and local law enforcement members who stood by their vehicles and saluted.

On arrival at Stewart, saluting junior Air Force ROTC members from a local high school formed a line leading us to the airport terminal, where several hundred people waited to greet the veterans and see them off. After a brief ceremony, we boarded the chartered American Airlines jet for the quick flight to Washington. The A321's cabin was festooned with American flags, and the flight crew noted their pride at having the veterans on board.

At Washington Reagan National Airport, the sounds of a band and applause rang down the gateway, as we emerged to a terminal filled with cheering people. Members of the crowd shook hands with each veteran as they appeared and headed down the concourse to the bus loading area.

The cargo hold of the aircraft was filled with wheelchairs, which needed to be transported from the ramp to the upstairs streetside exit where they were swiftly stowed under the buses in a well-practiced drill. While many of the veterans were still quite ambulatory, we were told it would be a long day, covering a lot of territory among the four stops and the veterans would appreciate being wheeled at times during the day.

PHOTOS: CURT EPSTEIN

Hudson Valley Honor Flight Mission #24 carried 83 veterans from World War II through the Vietnam War to Washington, D.C., on October 12. For some, it was their first, and likely last, opportunity to see the memorials dedicated to their service and sacrifice.

Four Stops

With a U.S. Park Police escort closing off traffic as we merged onto highways, we quickly reached our first stop, the National World War II Memorial. Wearing his World War II Veteran ball cap, my uncle was continually approached by people thanking him for his service, shaking his hand, patting his shoulder, or even hugging him. The most poignant was a middle-aged blond man who approached, and in an accented voice said "I am Dutch. Thank you for freeing my people and saving my country." On the monument, there is a wall of remembrance consisting of more than 4,000 gold stars, each representing 100 U.S. servicemen who lost their lives in the war.

The next stop was the Lincoln Memorial for a group photo, before dispersing to the nearby Korean War and Vietnam War Memorials. There were at least three other Honor Flight chapters visiting D.C. while we were there, each wearing its own specific colored T-shirts and identification badges showing which war they served in. The Honor Flights are typically conducted in the spring and the fall when the D.C. weather is most hospitable to nonagenarians. Our group consisted of 10 WWII vets, 37 Korean War, 20 Cold War and 16 Vietnam War vets.

Volunteers from the organization roamed each of the locations with extra wheelchairs and bottles of water for any who needed it, and at the conclusion of each stop, careful roll call was taken to ensure that every person was back on board the bus.

We then headed to Arlington National Cemetery to see the changing of the guard at the Tomb of the Unknown Soldier. While the tomb guards cannot break from their precision routine, we were told that if you heard a faint scrape on the pavement as they passed, from the taps on the soles of their shoes, that was as much as they were permitted to acknowledge and salute the veterans, while performing their ceremonial role.

The final stop in D.C. was at a hotel for a banquet dinner and closing comments. Then a quick drive back to the airport, where we re-boarded our aircraft. By this point, it was after 8 p.m., and most were clearly tired, either by their exertion or from the memories that were stirred up. Landing at SWF after the less-than-one-hour flight, no one on board was prepared for the arrival they received. As each veteran walked down the hall towards the baggage-claim area, a roar erupted from the hundreds of well-wishers who packed the facility. A narrow pathway was roped off amid the pandemonium to allow us to proceed to a desk where the guardians signed the veterans out of the program, and then we navigated through the throng, saluted by members of local VFW chapters, packs of scouts, friends, family, uniformed active-duty members and countless others from the area waving flags and banners.

After retrieving my car, I drove my uncle home, returning him around 11 p.m. He was awake for nearly 20 hours straight, and he came through with flying colors, stimulated by a day unlike any other he had previously experienced.

I can only thank those volunteers and organizers who made this day possible. For those veterans reading this, or those with relatives or friends who served, I suggest you seek out your closest Honor Flight chapter and apply. ■

Leonardo is preparing a North Philadelphia training academy as it continues construction of its production-conforming AW609 civil tiltrotor.

Training time: Flying the AW609 sim

by Richard Ward

When Leonardo opens its training academy at its Northeast Philadelphia Airport facility—planned for the summer of 2020—it will be home to the first level D full-flight tiltrotor simulator. But until then, the closest thing to actually flying the AW609 is the System Integration Simulator (SiSL) used by engineers and test pilots to explore and validate modifications before they go onto the aircraft. It is also used to develop and rehearse flight-test programs, among other duties.

The flight deck section of the SiSL is located at the far end of a large room, mounted on a fixed-base raised stage and facing a 180-degree wrap-around visual screen, approximately 15 feet high. The remainder of the room is filled on one side with racks of computers and on the other, various engineering and operating work stations.

Dan Wells, one of Leonardo's team of test pilots, is going to give me my first lesson in flying tiltrotors. Wells has been with the program since the early days and has amassed 690 hours on the 609. Before this, he was a graduate of the U.S. Naval Test Pilot School at Patuxent River, Maryland, and flew the V-22 and CV-22 tiltrotors.

Wells guides me around the cockpit of the SiSL, which is equipped to the standard of the third test aircraft, AC3. That includes Collins Pro Line 21 EFIS, two smaller radio/nav control panels, and an integrated standby horizon. Production-configured versions, starting with AC4, will fly with the touchscreen Collins Pro Line Fusion. On the Pro Line 21 flight deck, each pilot has a PFD and the third screen is an MFD with engine and system instruments. The SiSL's appearance is very much that of a helicopter flight deck, with its large transparencies and collective and cyclic controls. The P1 command seat is on the right, but the pressurization controls on the center console and the flap lever in front of the P2 seat tell you that this is something different.

Normal Operations

When we climb into the simulator, our virtual AW609 is positioned at the end of Runway 26L at Vancouver, British Columbia, with engines running and prop-rotors turning on what looks like a nice CAVOK day. We get straight into it with a normal helicopter takeoff into the hover. The takeoff feels entirely normal, with the engine nacelles pointed upwards.

Using the trim release button on the cyclic, I can make small corrections to keep us stationary above the threshold. I use the collective to adjust the hover height, aiming for a high hover of around 20 feet, which I read off the radar altimeter on the PFD. The flaps have five settings—AUTO, 0 degrees, 20 degrees, 40 degrees, and FULL. We selected the AUTO setting to ensure that, in the hover, they extend to FULL to minimize the wing area to reduce the effects of downwash. A spot turn is straightforward, with only small flight control inputs required. The chin windows provide excellent visual references.

As we line up with the runway, Wells briefs me on the first takeoff. The engine nacelles are controlled by a knurled thumbwheel on the collective and have three preset angles: 75 degrees, 50 degrees, and 0 degrees. Pushing the control fully forward selects the first stop at 75 degrees and the nacelles rotate at a rate of 3 degrees per second. The rotation of the nacelles tilts the thrust vector forward to provide acceleration. In a helicopter, this is achieved by lowering the nose using the cyclic. Having tilted the thrust vector away from the vertical, power must be added to prevent losing altitude, achieved quite naturally using the collective. The aircraft accelerates briskly while I maintain a level attitude with the stick.

On the round-dial airspeed indicator in the top left corner of the PFD, a white arc appears, looking similar to the flap operating range on a fixed-wing ASI. It displays the speed range appropriate to the nacelle angle. At 75 degrees of tilt, the maximum speed during conversion, known as Vcon, is 90 knots, a limit based on loads on the prop rotors. As we approach this speed, I push the nacelle angle controller forward to move the nacelles to their 50-degree position, and the arc moves to display a minimum speed of 94 knots and a max of 130 knots. The wing has begun developing lift, and the flaps are automatically retracting.

After less than 90 seconds in the hover, we rotate the nacelles to 0 degrees, which coolly brings the starboard nacelle and prop rotor into my peripheral vision. The flaps have fully retracted, and without having made any conscious transition, I am now flying a fixed-wing aircraft at 220 knots indicated airspeed. We briefly level at 3,000 feet and set up for a stall, which is very conventional, reducing power with the collective and maintaining pitch attitude with the cyclic.

The touchscreen Collins Pro Line Fusion suite powers the AW609 flight deck.

One change that has occurred is that once the nacelle angle is at 0 degrees, the force trim is no longer functional. All trim changes are effected using a cone-hat thumb control, but as with everything that has happened thus far, it feels perfectly intuitive. The SiSL has no motion, but the visuals show a low-speed buffet and the nose drops at the stall. I apply power and hold a pitch of around five degrees nose down. The aircraft recovers quickly and we turn back to the airfield.

The first approach is to the hover and at 1,500 feet AAL (above airfield level), and a speed of 120 knots, I bring the nacelles to 50 degrees. We start to slow using a sight picture similar to that in a twin-engine helicopter. Progressively reducing speed and increasing the nacelle angle, I arrive over the threshold. Raising the nose slightly reduce the groundspeed to zero, and coming to a hover with the nacelles vertical, we settle back onto the runway. Rolling takeoffs and landings improve payload and are easily accomplished using a nacelle angle of 82 degrees. On touchdown, transitioning to 95 degrees brings the aircraft to a swift stop without any braking.

Engine Failures

The next step is to explore single-engine handling, and the first maneuver we try is an engine failure during a vertical takeoff. As in a twin-engine helicopter, the takeoff decision point (TDP) is the rotation at a height of around 60 feet. As we climb vertically, Wells brings back the power on one engine. I call "reject" and lower the lever to return to the ground and then cushion the touchdown by increasing power to a "soft stop." The fly-by-wire has automatically adjusted the collective to allow 30 seconds of additional power at the one engine inoperative (OEI) takeoff limit.

For the next takeoff we continue at TDP. Wells fails the engine, and, again without having to look inside the cockpit, I pull the collective to the soft stop to give takeoff power. We climb away, rotating the nacelles on the speed schedule. After 30 seconds, the collective automatically eases down to limit the OEI power to a two-minute maximum and then further reduces to max continuous power. All the stops can be overridden if more power is required.

The 30-second OEI limit of approximately 2,500 shp is designed such that it can be used three times before maintenance action is required. This provides enough power for a takeoff, a missed approach, and a landing. We flew the single-engine landing as a run-on landing at around 40 knots with the nacelles at 82 degrees, bringing me to an end of a very enjoyable hour's flight.

My overriding impression is the AW609 is a remarkably intuitive machine to handle and moves almost seamlessly between helicopter and fixed-wing mode. ■

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Drones from manufacturer DJI were identified as a security risk in 2017, and despite software updates and company assurances, a number of senators want to ensure they do not find their way into government service.

U.S. security concerns mount over Chinese drones

by Mark Huber

The U.S. Department of Interior is standing down its 800-plus drone fleet either of Chinese origin or that carry Chinese components pending a security review, the department announced last week. The move came days after the House Committee on Homeland Security voted to ban the U.S. government purchase of Chinese drones for the Department of Homeland Security (DHS). It's the latest measure highlighting potential security concerns voiced by lawmakers and other government officials regarding the potential for Chinese companies and the Chinese government to misuse data from U.S.-based drones for nefarious purposes.

Concern about the issue was first widely publicized in 2017 when separate organizations within the U.S. Army and U.S. Navy issued memoranda outlining technological and operational risks associated with Chinese-manufactured drones, and the Army ordered its forces to stop using them. Separately that year, the U.S. Department of Homeland Security issued an unclassified memo that flagged drones manufactured by China's DJI, the world's largest manufacturer of recreational UAS, as a security risk. In 2017, DJI held an estimated 50 percent share of the North American market and nearly 70 percent of the North American market for UASs priced between $1,000 and $4,000. DJI drones are widely used by a variety of public safety and infrastructure entities in the U.S., from fire departments in Los Angeles and New York to the country's largest railroads and water and power utilities. In a 2018 report, Bard College's Center for the Study of the Drone noted that of the 910 U.S. state and local public safety entities using drones, 523 had DJI models.

DJI has repeatedly and vociferously denied charges that data from its drones is used for illicit purposes such as espionage, but did admit that its data was shared with the Chinese government as it applies to drone operations in China to comply with "location-specific rules and policies within China" related to registration and no-fly zones.

To further assuage security concerns, in July 2019, DJI unveiled a special "Government Edition" drone line designed to safeguard sensitive data. The new drones have architecture that ensures that drone data—including photos and videos captured during flight—never leave the drone and therefore can never be shared with unauthorized parties, including DJI.

In a letter to the U.S. Senate's Committee on Commerce, Science, and Transportation written in June, DJI's Mario Rebello, vice president and regional manager for North America, pointed out that DJI drones have multiple safeguards to ensure against data misuse, including embedded passwords, data encryption, and internet disconnect. But neither DJI's newer, more secure model nor the company's security assurances appear to have persuaded a bipartisan group of six U.S. senators, who in September introduced the American Security Drone Act of 2019, which would ban U.S. Government entities from acquiring or operating any drone made by any entity considered a threat to national security, including China.

"Our taxpayer dollars shouldn't be used to support Chinese-developed technologies that undercut American companies and put our national security at risk," said Sen. Chris Murphy (D-Connecticut). "We know that China and other adversaries have used drones to spy and collect sensitive data in the past, and I've heard directly from companies in Connecticut that are concerned about this issue." Murphy called China "a bad actor." Connecticut is home to key U.S. defense contractors including a defense electronics arm of Northrop Grumman, jet engine maker Pratt & Whitney, Lockheed Martin's Sikorsky Helicopters and the Electric Boat division of General Dynamics, which builds nuclear attack and ballistic-missile submarines.

Similar bipartisan legislation to that in the Senate, The Drone Origin Security Act (H.R. 4753), has been introduced in the U.S. House of Representatives and was unanimously approved by the House Committee on Homeland Security on October 23. The bill bars the Department of Homeland Security (DHS) from operating drones from "strategic competitors" as identified by the Department of Defense. China is so identified. ■

First U.S. AW169 HEMS fleet operational

The first fleet of Leonardo AW169 helicopters in the United States to be configured for EMS and search-and-rescue is now in service. Travis County's (Texas) Star Flight began operating its third AW169 medium twin earlier this year in south-central Texas, an area notorious for flash flooding and with a population of more than 1.2 million, including Austin.

AW169

Star Flight's AW169s are equipped for 24/7 operations. Missions include emergency medical transport, still- and swift-water rescue, search-and-rescue, high-angle rescue, fire suppression/aerial reconnaissance, and law-enforcement safety assistance. Star Flight also transports neonatal, pediatric ICU, and high-risk obstetrics medical teams and patients. The cabins are configured to transport up to two patients and five medical personnel. Each of Star Flight's AW169s is also equipped with a rescue hoist and a 300-gallon Simplex belly tank for fire suppression.

The AW169 has a maximum range of 440 nm and cruises at 160 knots. Standard avionics include four-axis, dual-duplex digital automatic flight control, and a night-vision-compatible cockpit. More than 200 AW169s have been ordered worldwide, including from parapublic customers in the United Kingdom, Japan, Republic of Korea, and New Zealand. **M.H.**

News Update

Bristow Out Of Bankruptcy

Bristow Group officially emerged from Chapter 11 bankruptcy reorganization in late October with $535 million in new capital and a new board of directors with extensive experience in energy, finance, and helicopter businesses. The company filed for bankruptcy in May, claiming debts of $1.885 billion against assets of $2.86 billion and citing "previously disclosed financial challenges" and "constrained liquidity."

L. Don Miller, who was appointed Bristow CEO in February 2019 and guided it through the bankruptcy process, will remain in his current office.

Outerlink Adds Analytics To IRIS

Outerlink has added a cloud-based flight analytics system for its IRIS combined voice, video, and flight-data monitoring system. IRIS provides military-style situational awareness by providing an uninterrupted connection, constant communication, and push-to-talk VOIP (voice over internet protocol) radio, enabling operators to communicate with one aircraft or an entire fleet worldwide

The cloud service gives users access to critical flight data and organizes predefined events in clear formats, allowing operators to prioritize data points used to identify trends and training opportunities.

Life Flight Expands AW109 Fleet

Utah-based Intermountain Life Flight is adding a sixth Leonardo AW109 GrandNew to its fleet of five AW109 GrandNews and one AW109K2 light twin EMS-configured helicopters. Intermountain is the only civilian air ambulance service in the U.S. to have an FAA-approved external load hoist rescue operation and is the sole IFR EMS operator in Utah with its own low-level IFR infrastructure and proprietary heliport approach procedures. The service makes 4,000 transports annually from seven base hospitals across the state and provides high-risk obstetrics, complex cardiac care and intra-aortic balloon pump transports.

Safran To Build, Service Helo Engine with China's AECC

Safran and Aero Engine Corporation of China (AECC) have agreed strengthen their cooperation on the WZ16 French-Chinese helicopter engine. The agreement was signed in Beijing by Alexandre Ziegler, Safran senior executive vice president, international and public affairs, and AECC chairman Cao Jianguo, during French President Emmanuel Macron's recent state visit to China.

Terms of the deal include study of a potential joint venture in China to support and maintain in-service WZ16s, production launch of the first 120 WZ16s with an opportunity for 100 more engines and new applicationt. Certification of WZ16 by the Civil Aviation Administration of China (CAAC) was announced in October.

Industry slams proposed NYC helo ban bill

by Mark Huber

A trio of congressional helicopter critics from New York City has introduced legislation to ban them from Gotham's airspace, including over waterways. In late October, Democratic Reps. Jerrold Nadler, Carolyn Maloney, and Nydia Velazquez introduced "The Improving Helicopter Safety Act of 2019" that would essentially eliminate helicopter flights conducted under either Part 91 or 135 over "any city with a population of over eight million people and with a population density of over 25,000 people per square mile."

In a strongly worded rebuttal issued on October 28, the Helicopter Association International (HAI) slammed the bill, calling it "an attempt to completely dismantle a thriving industry" and further characterizing it as having a chilling effect on development of one of the potentially largest urban air mobility (UAM) markets in the world.

The bill would allow civil helicopter operations at airports but would charge the FAA to develop "the shortest, most direct routes possible to access or depart from airports" and update aeronautical charts accordingly. Helicopters flying law enforcement and air medical missions would be exempted.

At a press event in New York City, the lawmakers took aim at the area's helicopter businesses."The risks that commuter, charter, and tourism helicopter flights pose to New Yorkers far outweigh the benefit to the very small number of people who use them," Maloney said. Nadler served harsh criticism on the city's already highly restricted helitourism, saying, "There is simply no justification for allowing tourists to joy-ride over our city, endangering lives and creating unnecessary noise pollution."

The lawmakers were joined by representatives of local government and various community groups, including Stop the Chop NY-NJ and the Brooklyn Heights Association. "With the exponential growth of private, commercial helicopter traffic, New York's skies are quickly becoming just as congested as our streets," charged New York State Assembly member Linda Rosenthal (D).

In 2015, there were 59,000 helicopter flights departing lower Manhattan's Pier 6 heliport. Via an agreement with operators, that number was cut to 28,000 beginning in 2017. New York City mayor Bill de Blasio, who brokered that agreement, said he had "no use" for civil helicopter flights over the city.

While air tour flights that originate in New York are down, the *New York Times* reported sharp increases in the amount of helicopter traffic at both LaGuardia and Newark airports in August, with traffic up at the former by 25 percent to 1,096 operations and an operations increase of 21 percent at the latter, to 4,391. Per-seat helicopter ridesharing services such as Blade and Uber Copter are credited for much of this increase.

Industry Response

"With an industry advancing in terms of both urban mobility and unmanned aircraft, these politicians are looking back, not forward," said HAI president Matt Zuccaro, a veteran NYC helicopter pilot and a former aviation executive for the Port Authority of New York and New Jersey. "There is no one more focused on safety than the helicopter pilots and operators themselves," Zuccaro said. "These politicians' draconian solution to the perceived threat of helicopters is to put an industry out of business."

HAI attacked the bill as having "no positive effect on aviation safety over New York City" and a threat to the "viability" of the helicopter industry there. HAI went further, accusing the bill's primary sponsors Maloney, Nadler, and Velazquez of promulgating falsehoods and selectively manipulating accident data to create a rationale for the legislation. HAI said the bill's sponsors used nearly 40 years of accident data to inflate safety claims and falsely state that the FAA "does not have any regulations, policies or procedures to account for New York City's uniquely crowded airspace."

The association pointed out that the FAA publishes helicopter route charts in select markets including New York City providing guidance on "standard routes, specific altitude limitations when appropriate, standard frequencies, and mandatory reporting points" and also noted that the charts are updated every 58 days.

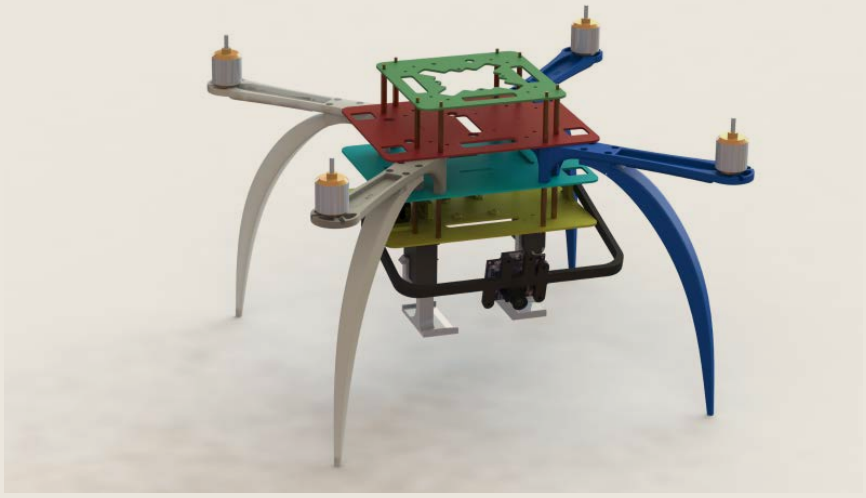
HAI also said that the lawmakers ignored the protections offered by established altitude ranges in New York Class B airspace including the Hudson River and East River Exclusion Special Flight Rules Area (SFRA), and special practices adopted by New York helitour operators, including "established flight routes that standardize pending flight paths, altitudes flown, and frequencies used by all aircraft" that minimize the need for interaction with air traffic controllers.

Despite two high-profile NYC helicopter crashes that killed six over the last year, HAI noted that helicopter traffic in the city is far safer than ground transportation there, which accounted for more than 60,000 injuries and 203 fatalities in 2018. The association called for increased community dialogue, including reconstitution of the NYC helicopter task force, to "work in good faith to address the concerns of all stakeholders at the table."

The bill also drew objections from the National Air Transportation Association (NATA). "This particular proposal is poorly disguised as safety legislation when in actuality it really is another anti-aviation NIMBY-ism proposal," said Jonathon Freye, v-p of government and public affairs for NATA, adding the association "strongly opposes to any attempt to restrict access to the National Airspace System especially in instances like this one where they single out one group."

Freye was also concerned about broader ramifications of such a bill. "Proposals like this one... embolden other policymakers to pursue similar legislation," he said, saying the proposal is the latest in a series of attempts by lawmakers to restrict airspace access at the local level. "It's a constant drumbeat of legislators trying to whittle away at access for aviation stakeholders, and that's the problem."

While the proposal may not progress this year, Freye said, "I think its incumbent on our industry to take all proposals like this one seriously. Whether or not it will pass, it reflects some kind of sentiment and represents a call for our industry to reengage with policymakers." ■



Ford has launched a research effort to explore "vehicle-integrated" drone technology. They could deploy in the case of an accident, either to transmit a message to first responders, enhance mobile phone connectivity, or even illuminate the accident scene and/or stream video.

Ford patents 'vehicle-integrated drone'

Think of it as OnStar on steroids. Automaker Ford has patented a "vehicle-integrated drone" that is programmable and can automatically deploy from cars and trucks in emergencies and fly either autonomously or under pilot control to illuminate accident scenes with lights and sirens, stream photos and video, boost emergency communication, and enhance navigation. The law enforcement applications are obvious, but so are those aimed at rural users of unimproved roadways who need to see the road ahead or who travel in areas of spotty/nonexistent cell service.

The integrated drone is just one of several drone-related technologies Ford is working on, according to a recent company publication. It is also looking at using a drone's anti-collision lights as an I.D. and tracking solution. This patent-pending idea uses the lights to "broadcast a drone's 10-digit code in an ASCII-encoded binary signal at a baud rate" that could be synced for consistency across the system to ensure universal compatibility.

These lights also could be used to communicate system status "with a combination of color and blinks." The light patterns would be captured by a camera-based software app. Decoding algorithms can run on a smartphone, which would allow anyone to identify and report illegal drone operations. Field tests to date have shown the system to be accurate to within 80 feet. Ford also is developing onboard subsystems to take the place of traditional radio and ADS-B transmitters, saving expense and weight.

Ford has stood up a UAV Systems group in Palo Alto, California, that has created a "customizable development platform" that gives Ford the ability to rapidly test drones and vehicle missions and interfaces. The modular platform allows those with limited drone knowledge to test these concepts.

Ford research manager John Luo and scientist Adi Singh described the company's drone raison d'etre, "We think many of our customers will want to use these [drone] devices as part of their lifestyle, whether to pursue hobbies or even as a tool for their business—no different than how they use an F-150 [pickup] or Transit [van] on a job site. By conducting in-house research in this emerging area while simultaneously participating in the regulatory conversation at the federal level, Ford is laying the groundwork to make sure our vehicles can deliver the right experiences to our customers as we transition to a smart world." **M.H.**

Crashed Korean H225 had recent mx

by Mark Huber

The Airbus Helicopters H225 that crashed at night off the South Korean coast on October 31 had recently been returned to service after maintenance providers completed a 1,000-hour heavy inspection.

None of the seven occupants aboard survived when the H225, operated by the country's 119 rescue service, crashed after lifting off with an injured fisherman from the islet of Dokdo, located in the East Sea 117 nautical miles off the South Korean coast. VFR, but moonless, conditions and light winds were reported at the time. The accident helicopter entered service in 2016 and is one of two operated by 119. It has two more H225s on order from Airbus and also operates a pair of smaller Airbus AS365 N2s. The two-pilot flight crew was described by multiple sources as highly experienced.

Witnesses to the accident said the helicopter crashed within two to three minutes of departing the helipad at approximately 11:30 p.m. local time and that it was flying erratically at a low altitude. The wreckage was located November 1 on the seabed at a depth of 230 feet and pulled to the surface on November 3. Photos published by the Yonhap news agency show the helicopter's rotorhub attached to the main wreckage, but substantial cabin damage. The cockpit and tailboom are not attached.

Inspections Mandated

On November 1, South Korean President Moon Jae-in ordered safety inspections of all H225s in the country. It was not immediately clear if the order also applied to the country's large fleet of more than 90 KAI KUH-1 Surions, a locally-produced variant of the Airbus AS332 L2 used by South Korean defense and police forces.

The H225 and the AS322 L2 are both members of the Airbus Super Puma family and share a variety of common components. Past safety grounding orders regarding the H225, most notably in the wake of the fatal crash of one near Turoy, Norway, in 2016, also have been applied to the AS322 L2. In the Turoy crash, a fracture in one of the main gearbox's second-stage planet gears caused the rotorhub and the main rotors to depart the aircraft in flight. The related grounding was lifted after Airbus re-sourced and replaced the problem part and devised a heightened replacement and inspection regime.

The Turoy crash substantially undermined market confidence in the H225, with at least one North Sea offshore oil workers union, Unite, gathering 10,000 signatures in support of permanently grounding the helicopter. A 2017 survey conducted by Airbus found that 62 percent of respondents would not fly on it. In October of that year, Guillaume Faury, then CEO of Airbus Helicopters (now CEO of Airbus), told reporters, "It takes time to restore trust after these accidents," after he stepped off an H225 publicity flight in London. Behind the scenes, Airbus negotiated multimillion-dollar settlements with H225 operators and leasing companies who were adversely impacted by the groundings, loss of customer confidence in the helicopter, and a dramatic plunge in the market value of their H225s. Altogether, H225 operators took hundreds of millions of dollars in H225-related write downs.

Earlier this year, prospects for the H225 appeared to be improving, with a limited number of used models moving again on what had been a moribund market for the helicopter. In September, Airbus celebrated the delivery of its 1,000th Super Puma. However, fresh safety concerns about the H225 re-emerged just last month when EASA issued an emergency airworthiness directive requiring the replacement of certain module bevel gears in the helicopter's Safran Makila 2A and 2A1 turboshaft engines (EASA AD #2019-0247-E) following a reported in-flight engine shutdown. ■

Blade expands into Los Angeles

Per-seat helicopter booking service Blade is expanding into the Los Angeles metro market with service between downtown L.A. and the Los Angeles International Airport (LAX), L.A. Westside, Orange County, and Burbank, the company announced in late October. Blade said flights to downtown L.A. will be scheduled for hockey and basketball games, marquee concerts, and other events at the Staples Center. Prices begin at $195 per passenger. Blade's L.A. operations use Airbus H130s and will follow noise abatement routes, altitudes, and best practices, the company said.

"The H130 is the perfect aircraft for this type of mission thanks to its comfort, efficiency, and environmental standards, as it's the quietest in its class," said Romain Trapp, president of Airbus Helicopters, Inc. Airbus Helicopters is an investor in Blade.

"Since expanding our continuous flight service in Manhattan and San Francisco, we are seeing faster-than-expected adoption by people choosing to fly rather than drive," said Shivani Parikh, Blade West Coast general manager. "Los Angeles is on the forefront of embracing multi-modality transportation options." Similar to Blade service at New York's JFK airport, L.A. customers can opt to be escorted on the tarmac from the helicopter to their American Airlines flight (or vice versa) with that carrier's Five Star Service; which can be purchased over the Blade app by choosing "American add-on," or ordered via the Blade website. **M.H.**

Volocopter launches freight, cargo eVTOLs

by Charles Alcock and Mark Huber

Volocopter's VoloDrone with agricultural kit.

Would-be electric vertical takeoff and landing (eVTOL) maker Volocopter has introduced two new versions of its eVTOL aircraft. The first is VoloDrone, a freight-carrying version of its VoloCity eVTOL. The demonstrator was unveiled on October 30 at the company's headquarters in the southern Germany city of Bruchsal. It had already made its first flight earlier in October.

Like the two-passenger VoloCity, the unmanned VoloDrone can carry a payload of up to 440 pounds (200 kg). The aircraft has been designed to carry items such as boxes, liquids, and equipment up to 25 miles (40 km). It is intended to be remotely piloted or flown autonomously on preset routes.

The VoloDrone's rail attachment system has been developed to match standard hardware commonly used for various aerospace and logistics applications. With a diameter of just more than 30 feet (9.2 meters) and a height of 7 feet 6 inches (2.3 meters), the aircraft has been sized to be compatible with Euro-palette packages and has sufficient space in the attachment unit for a sling, a sprayer, or other customized equipment.

Volocopter sees the VoloDrone being used by various sectors, including agriculture, logistics, infrastructure, and public services. Like the VoloCity, the multicopter has 18 rotors and gets power from swappable lithium-ion batteries

In addition, the company has partnered with American agricultural vehicle and equipment manufacturer John Deere to create the first large agricultural application drone for missions traditionally performed by helicopters, the drone-maker announced last month. The aircraft is based on the VoloDrone and fitted with a John Deere-designed and -manufactured crop-protection spray system with two tanks, a pump, and a spray bar.

Volocopter said the agricultural drone, which also has a potential materials payload up to 441 pounds, is reconfigurable for multiple missions, including spraying, sowing seeds, and frost control and that it can be piloted by a remote operator or fly a pre-programmed route.

As with all the VoloCity/VoloDrone variants, a battery charge provides 30 minutes of flight time. For agricultural spraying, the VoloDrone can typically cover an area equal to approximately 15 acres per flight hour.

Volocopter called the agricultural VoloDrone a "sustainable, precise, and cost-effective alternative to helicopters. Flight and application tests are scheduled to begin next year. ■

COLUMBIA AVIONICS

Columbia Avionics modernized this Citation 500's instrument panel with dual Garmin G700 TXi displays and GTN 750 com navigators.

Garmin touchscreens STC'd for Citation 500s

by Matt Thurber

Missouri-based avionics installation and service provider Columbia Avionics has developed a supplemental type certificate (STC) for Garmin G700 TXi touchscreen displays in Cessna Citation 500 series jets equipped with Honeywell's SPZ-500 autopilot.

According to Columbia, the G700 TXi's recent Part 25 software release enables interfacing with existing TCAS II, thanks to the TXi's integral altitude alerter system, as well as the option to install Garmin's GTS 8000 TCAS II. "This is another element to make sure we can provide upgrade options to customers overseas that require TCAS II," said Lance Fox, president of Columbia Avionics and Aircraft Services.

The Columbia STC, which can include dual G700 TXi displays with synthetic vision, offers the option to add a variety of Garmin avionics, including dual GTN 750 com navigators, GTX 3000 transponders, dual GRS 70 AHRS, GDC 7400 air data computers with RVSM, GWX 75 weather radar, as well as a Mid-Continent MD-302 Standby Attitude Module, and a Shadin AIS-380 fuel flow system. With the GTN 750s, weight savings of up to 230 pounds is possible.

Columbia Avionics is planning to add STC approvals from Transport Canada, EASA, Mexico's DGAC, and Brazil's ANAC. Others will be added based on customer requests.

"With the rising cost of the aging Honeywell EFIS in the Citation and the upcoming ADS-B mandate," Fox said, "this came at an ideal time for the operators who haven't pulled the trigger yet." ■

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Garmin reveals Autoland feature

fly but the airplane is still operating normally and there is no other qualified pilot on board.

"I thought of my grandmother," said Bailey Scheel, Garmin senior aviation programs engineer and manager. Although her grandmother has done pinch-hitter courses that teach non-pilots how to land in case the pilot has a medical issue, a safe outcome isn't guaranteed. She added, "[Autoland] is more for her and her comfort."

Another way to look at Autoland is that it gives aircraft manufacturers an alternative to a parachute-type rescue system for situations where the pilot is incapacitated and the airplane is still operating and given proper guidance, could land on a suitable runway. For Cirrus, Autoland adds the option of getting the airplane to a nearby airport where medical assistance may be more readily available, as opposed to deploying the parachute system over a remote area and hoping rescuers arrive in time.

Garmin can help OEMs adapt Autoland to almost any airplane, and it could work on anything from piston singles to jets. The M600, for example, didn't have an autothrottle as standard equipment, but for Autoland, Garmin added an autothrottle, which is part of a new M600 SLS Halo-equipped version. An airplane that already has electronically controlled brakes will not need extra equipment, but the M600 did require the addition of servos and wheelspeed sensors to manipulate the brakes. "We can tailor it to the OEM," said Scheel. "It's very configurable, and depends on what the OEM wants."

In the M600 Autoland application, the system activates at 18,000 feet if the autopilot is engaged and the pilot doesn't interact with the avionics in a 15-minute period. At higher altitudes, the engagement period is shorter. Autoland also tries to alert the pilot with repeated chiming sounds and asking, "Are you alert" before engaging. Autoland will also engage if the Electronic Stability and Protection system is engaged for a prolonged period of time, first putting the M600 into level mode, and if the pilot doesn't disengage level mode, then implementing an automatic landing. Even with a worst-case scenario of an incapacitated pilot and an engine failure, Autoland can improve the outcome by implementing a controlled descent to nearby smooth terrain. Autoland could also help rescue a pilot trapped by widespread zero-zero fog, allowing a safe landing where it would be difficult if not impossible to safely land using an ILS or LPV approach.

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News Update

Aurigny Is Launch Customer for ClearVision EFVS

Guernsey-based airline Aurigny has taken delivery of its first ATR 72-600 equipped with the Universal Avionics ClearVision enhanced flight vision system (EFVS) with SkyLens wearable head-up display (HUD). The SkyLens HUD has an unlimited field of view because pilots can look in any direction and see high-resolution HUD symbology, as well as enhanced vision system, and optional synthetic vision and combined vision system imagery.

Elliott Aviation Ramps Up G5000 Deliveries

In October, MRO and avionics retrofitter Elliott Aviation delivered three Garmin G5000-upgraded Citation Excel/XLS business jets to customers. The company has another 15 G5000 Excel/XLS packages scheduled and has also installed more than 25 G5000 systems in Beechjet 400As/Hawker 400XPs and completed more than 350 King Air G1000/G1000 NXi upgrades. The G5000 upgrade replaces the aging Honeywell Primus 1000 avionics in the Excel/XLS, adding WAAS/LPV, ADS-B, SiriusXM weather, electronic charts, SafeTaxi, engine monitor, and emergency descent mode.

Garmin Adds Models to GFC 500 STC

Garmin's GFC 500 autopilot is now approved for more models of the Piper PA28 and PA32, including the PA28-201T Turbo Arrow, PA28-236 Dakota, and PA32-260 and-300 Cherokee Six. The GFC 500 autopilot features altitude hold and preselect, vertical speed, heading modes, airspeed hold, coupled approaches and coupled VNAV when paired with a GTN 650/750 navigator, GPS roll steering, Level mode, underspeed/overspeed protection, and coupled go-arounds. The GFC 500 requires Garmin's G5 electronic flight instrument, and both are available for less than $10,000 for the 2-axis autopilot. For aircraft already equipped with the G5, the 2-axis GFC 500 is priced at $6,995.

Inmarsat Offering Helo Satcom

Inmarsat has developed a SwiftBroadband-class satcom optimized for helicopters, called SB-Helo X-Stream. The satcom works with intermediate- and high-gain antennas and is designed to alleviate "the connectivity constraints traditionally caused by rotary blades," according to Inmarsat. SB-Helo X-Stream mitigates against data packet loss, the company explained, and testing earlier this year revealed that it "has been proven to achieve a 40 percent reduction in data packet loss compared to the standard background IP service, as well as delivering throughputs of up to 400 kbps per single channel." A useful characteristic of SwiftBroadband is that buyers can aggregate multiple channels to achieve improved performance.

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As a pilot flies along, Autoland is constantly looking at the weather, terrain, obstacles, and available airports, preparing for the rare case when it is activated.

In the M600, there is a prominent guarded Autoland button on the instrument panel. The Cirrus Vision Jet button will be on the overhead. All a pilot needs to do in terms of briefing passengers is tell them how to push the button.

When engaged, Autoland immediately turns the airplane toward the nearest suitable airport while displaying on all three flight deck screens carefully designed messages that show the passengers what is happening. A moving map on each PFD clearly illustrates the path that the airplane is taking to get to the selected airport. The PFD shows a split-screen with moving-map on one side and synthetic vision system on the other. The MFD in the center shows messages for the passengers, as do the PFDs.

One MFD message is an animation of the cockpit and the controls, with a warning: "Keep hands and feet away from aircraft controls." Another explains in simple terms how to use the radio. On the displays at all times are the words: "Emergency autoland active" and "landing in XX minutes."

The MFD also shows how many miles to the destination and how much fuel remains in hours and minutes. Both PFDs show time until the next turn, if applicable, and time until descent.

A smoothly modulated voice tells passengers exactly what to expect.

At the same time, Autoland uses information about the state of the airplane to broadcast an emergency radio message on appropriate frequencies, and it resets the transponder to the 7700 emergency code. The radio broadcast might occur on the local approach control or control tower frequency. But if landing at a non-towered airport, Autoland will broadcast on the local CTAF frequency. These radio messages not only alert authorities to what is going on, but also warn pilots flying in the area that an emergency is underway and that after landing, the runway will be occupied by the automatically landing airplane.

As it flies toward the airport, Autoland slows the airplane down and, if necessary enters a hold to bleed off excess airspeed. Passengers can communicate with controllers via radio if they wish, but it's not necessary. Autoland helps by showing the passenger how to make a radio call, using the Garmin touchscreen as a pseudo microphone button.

The airport must have a GPS approach with vertical guidance, and Autoland follows the approach precisely, lowering the landing gear and flaps at the correct time. As it nears the runway, Autoland reduces power and lines the airplane up with the centerline of the runway, then lands and applies brakes until the airplane stops. After stopping, it then switches off the engine and instructs passengers on how to open the door. The reason it shuts off the engine is to prevent the possibility of a passenger running into a moving propeller.

MATT THURBER

Garmin's Autoland adds an extra layer of safety for single-pilot operations.

Autoland offers a new way to ensure a safe outcome when a pilot becomes incapacitated for any reason, and it's much easier for a non-flying spouse compared to learning how to land the airplane. If the pilot or passenger is unable to engage Autoland—say in a case where a pilot is flying alone and experiences oxygen deprivation—then Autoland engages automatically after a certain period of time of pilot inactivity.

A pilot who recovers, perhaps after Autoland has descended to a lower altitude, can easily abort the Autoland procedure by pushing the autopilot button on the mode controller or the button on the yoke.

Real-time Demo

After taking off in the M600, Sargent climbed to about 4,500 feet not far from New Century Aircenter Airport so that the system would use that airport for the automatic landing. While cruising along, Sargent told me to push the Autoland button, which I did.

Immediately, the MFD in the center turned white, and big black letters spelled out "AUTOLAND" while a soothing female-sounding voice said "Emergency autoland activated. The emergency autoland system is controlling the aircraft and will land at the safest nearby airport. Please remain calm. Avoid touching the flight controls, which may interfere with Autoland. Your destination is..."

During the demo flight, the automatic radio broadcast was not active, to avoid declaring an emergency where none existed.

On the two touchscreen controllers below the MFD, which double as microphone buttons, the aircraft's registration number is given ("Your aircraft ID is N60HL") and a message says, "Informing air traffic control, please wait."

Autoland eliminates much of the information shown to pilots on the PFDs and MFD to keep the messaging simple for passengers. Engine information, for example, is unnecessary. All the passengers need to know is what the MFD says at the bottom: "No action required" and on the PFDs: "Enroute to New Century Aircenter - Olathe, KS" and "Landing in 11 minutes."

The PFDs show the flight path on the moving map, while the synthetic vision display retains the airspeed and altitude tapes as well as the flight director and attitude indicator.

Periodically, the MFD switches to a message instructing passengers how to contact ATC if they wish and reminding them that they will hear messages automatically broadcast to ATC.

In our case, the M600 needed to lose some altitude, so it flew one turn in a hold before aligning with Runway 18. The MFD told us that we were "Approaching destination airport" and to put on seatbelts and stow loose items. The synthetic vision showed the reassuring sight of the runway straight ahead.

Autoland announced, "Your airplane has begun maneuvering into position for the final approach to landing. The emergency Autoland system is controlling all flight functions. You won't need to do anything."

The Autoland system set flaps to the approach setting then lowered the landing gear. Approach flaps are used in case of wing icing. Neither the flaps nor landing gear switches moved, so it was a little odd to be landing with the gear switch in the up position. But passengers will likely not notice this discrepancy, and it is much simpler than trying to explain to them how to manipulate the flaps and gear switches.

As the M600 neared the runway, it flew a perfectly stable approach and then reduced power and touched down by itself. It didn't quite nail the centerline, but there was plenty of room on the runway. After touchdown, Autoland recentered the M600 on the centerline and braked to a full stop. It didn't shut the engine down during the demo, but in a real autolanding it would have done so. Sargent had warned the tower that we would be stopping on the runway.

After landing, the system tells passengers to "Wait for aircraft and propeller to stop before exiting the aircraft," then shows on the MFD how to open the door.

Flying an automatic landing in the M600 was fascinating, and it convinced me that this is a valuable addition to the safety toolbox. With Autoland, the era of losing airplanes because a lone pilot suffers hypoxia due to pressurization problems or lack of oxygen or loses consciousness because of a medical issue may finally end. ■

FAA releases privacy plan for ADS-B Out

The FAA is putting one of the final pieces in place for the transition to the January 1 ADS-B Out deadline, releasing a plan to protect the privacy of operators from real-time flight-tracking services.

Agency officials announced the flight-tracking opt-out plan at NBAA's recent Flight Planners Summit held in conjunction with the association's annual convention in Las Vegas. Additionally, the officials said they would establish new data-sharing limits for air traffic tracking service providers if operators want to opt out of having their flight information broadcast over the internet. Those limits are expected to go into effect by year-end, NBAA said.

The Privacy ICAO Address (PIA) Program will be implemented in phases. Under the first phase, to be in place by January 1, the FAA will set up a portal to accept requests from operators seeking to keep their real-time ADS-B position and identification information private. Those operators will receive an alternative, temporary ICAO aircraft address that is not linked with their FAA registration information. To qualify, the aircraft must be U.S-registered, 1090-MHz ADS-B equipped, and fly in U.S. airspace.

Under Phase 2, the FAA will transition the PIA program to a third-party service provider. That move is anticipated in mid-2020.

NBAA, which has long sought protections for operators from the publicly available information that comes with ADS-B, welcomed the move. "We're pleased the FAA has responded positively to ADS-B privacy concerns of operators, which NBAA has raised in numerous government/industry forums, including with the NextGen Advisory Committee," said NBAA president and CEO Ed Bolen. "Until now, the lack of a privacy solution has been a disincentive for some operators to equip with ADS-B. No one should have to surrender their privacy and security just because they board an airplane." **K.L.**

Airbus cuts delivery forecast on A321 ACF

by Gregory Polek

Continuing "challenges" associated with the industrialization and production acceleration of the Airbus Cabin Flex (ACF) version of the A321LR in Hamburg have prompted Airbus to lower its delivery forecast for this year to 860 airplanes from a previous projection of between 880 and 890, company executives said on October 29. Speaking during Airbus's earnings call for the first nine months of 2019, CEO Guillaume Faury explained that the complexity involving the ACF's cabin configuration the company must "digest" would persist until the end of 2020, by which time it expects to have delivered all of the model's heads of version airplanes. Notwithstanding the continuing struggles, the situation has begun to improve, he reported, as the company plans to deliver in the fourth quarter roughly half of the near 100 ACFs targeted for shipment this year.

First delivered to Turkish Airlines in mid-2018, the A321neo ACF encompasses modifications including a new rear section and a modification in which designers removed the door located forward of the wing and introduced new overwing emergency exits in the center section. Airbus plans to make the ACF configuration standard for all A321neos sometime next year and expects ACFs to account for all A321s that roll off the assembly line by the end of 2021.

By that time the company also plans to increase total A320 production from 60 to 63 per month, a plan that presents another reason Airbus considers resolving the ACF complexities so vital.

"There is a lot of industrialization to be done with each of the head of versions, and therefore this big one-off comes with a lot of additional work, and we are doing this at the same time we are improving the underlying performance and structure of the production systems to ramp up to higher rates with even more ACFs next year," said Faury.

The CEO explained that the ACF's cabin differs virtually entirely from that of the standard A321neo and includes provisions for new systems, including those related to fuel tanks because designers based the ACF on the LR version to allow for more range. The changes require relocation and rerouting of wires harnesses and fuel lines as well as airframe modifications, resulting in further complexity.

Although during the call Faury also warned of the potential negative effects associated with the 10-percent tariffs the U.S. has placed on Airbus exports from Europe, he noted the duties did not play a role in Airbus's cut in the 2019 delivery target.

"These are import duties so by contract they have to be paid by the customers themselves," he noted. "Now there's a lot of complexity in the short term...but moving forward by the middle of next year, we want to be in a situation where the tariffs are paid by the customers." ■

AIRBUS

Airbus's Hamburg, Germany plant builds most of the company's A321s, including all the heads of version A321 ACF examples.

IAG to buy Air Europa as consolidation wave swells

by Cathy Buyck

International Airlines Group (IAG) has agreed to buy Air Europa, a move that will further alter the alliance landscape and give the parent company of Madrid-based Iberia and Barcelona-based low-cost carrier Vueling a dominant position in the Spanish market and re-establish its leadership position in the Europe-to-Latin America market. In a regulatory statement released on November 4, IAG announced it signed definitive transaction agreements with integrated travel company Globalia to buy its airline subsidiary Air Europa for €1 billion ($1.11 billion).

IAG will "initially" retain the Air Europa brand and the company will remain a standalone profit center within Iberia, run by Iberia chief executive Luis Gallego. "Acquiring Air Europa would add a new competitive, cost-effective airline to IAG, consolidating Madrid as a leading European hub and resulting in IAG achieving South Atlantic leadership," said IAG CEO Willie Walsh. Gallego described the deal as "of strategic importance" for Madrid–Barajas Airport, which in recent years has lagged behind the continent's leading four hubs at Amsterdam, Frankfurt, London Heathrow, and Paris Charles De Gaulle—in spite of the Spanish airport's spare runway capacity. "Madrid will be able to compete with other European hubs on equal terms with a better position on Europe to Latin America routes and the possibility to become a gateway between Asia and Latin America," he said.

The "bolt-on" acquisition will elevate IAG's share in the passenger market between Europe (including Turkey and Russia) and Latin America, defined as South and Central America excluding the Caribbean, to 26 percent, up from 19 percent currently, IAG pointed out during an analysts' presentation on November 4.

The deal, however, spells bad news for Air France-KLM, which had envisioned becoming the leader in the Europe-to-South/Central America market through a joint-venture with its fellow SkyTeam alliance member Air Europa. The Franco-Dutch group and Air Europa control a 19 percent and 7 percent share in that market, respectively. The SkyTeam partners announced their new metal-neutral joint venture in August 2018 and awaited the launch of the planned cooperation pending regulatory clearance of the relevant competition authorities in Europe and South America.

IAG's announcement that it will buy Air Europa and that the Mallorca, Spain-headquartered carrier will leave SkyTeam—Air Europa became a full member of the Delta Air Lines and Air France-KLM led grouping in 2010—comes about one month after Delta shook up the alliance scene by buying 20 percent of South American airline and Oneworld member Latam. Delta will pay $1.9 billion for the stake and provide another $350 million to aid in Latam's exit from Oneworld. The Delta-Latam tie-up

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News Update

Airbus Lands Mammoth Neo Order from IndiGo

Airbus landed one of its largest-ever aircraft orders from a single operator with the sale of 300 A320neo-family jets to India's IndiGo, the companies announced on October 29. The order consists of a mix of A320neos, A321neos, and A321XLRs and takes IndiGo's total number orders for the Airbus narrowbody family to 730.

IndiGo accepted delivery of its first A320neo in March 2016 and has since expanded its fleet of single-aisle jets to 97, ranking it as the world's largest. IndiGo also operates 128 A320ceos.

Based on the most recent list prices published by Airbus, the value of the deal could total $33 billion. IndiGo has not chosen an engine supplier for the airplanes. The airline placed an order at June's Paris Air Show for CFM Leap-1A turbofans to power 280 Airbus airplanes already on order, signaling a switch from original engine supplier Pratt & Whitney following a spate of durability findings involving the PW1100G.

Russia Considers Re-launch of L-610

Russia's ministry for trade and industry has signaled its intent to allocate state funding for a project to establish serial production of a redeveloped variant of the L-610 40-seat regional turboprop developed by Czech company Let in the 1980s. Plans call for series production to start in 2023, according to Dmitry Lysogorski, head of the ministry's aviation department.

State officials began discussing the possibility of the L-610's production in Russia last year, but with little fanfare. However, at August's Moscow Airshow Polar Airlines signed a memorandum of understanding with the Urals Plant of Civil Aviation (local acronym UZGA) covering 10 aircraft for delivery from 2023 to 2025. The renewed airplane would use a powerplant and avionics set supplied by the Russian companies, according to Russian trade minister Denis Manturov.

Airbus Adds A350 to Tianjin Completion and Delivery Center

Airbus moved to further expand its industrial and commercial footprint in China last month with the signing of an agreement to add A350 XWB capabilities to its widebody completion and delivery center (C&DC) in Tianjin.

While the facility currently works only on A330s, from the second half of 2020 it will also perform A350 completion work including cabin installation, aircraft painting, and production flight test as well as customer acceptance and aircraft delivery. Airbus expects to complete first delivery of an A350 from Tianjin by 2021.

Separately, Airbus's Tianjin A320 assembly line remains on track to accelerate its production from four to six aircraft per month by year-end.

BARRY AMBROSE

A row of stored 737 Max jets sits idle in Moses Lake, Washington, awaiting an FAA directive to allow the model to re-enter service.

Lion Air crash report cites lapses from multiple sources

by Gregory Polek

Indonesian investigators have determined that design flaws in the Boeing 737 Max combined with insufficient oversight by U.S. regulators, failures in crew resource management (CRM), and maintenance lapses all contributed to the October 2018 crash of Lion Air Flight 610 off the coast of Java, killing all 189 on board. A final report into the accident released last month by Indonesia's National Transportation Safety Committee (KNKT) gives nine main contributing factors that led to the crash, including the fact that a faulty reading in only one angle of attack sensor caused the airplane's maneuvering characteristics augmentation system (MCAS) to pitch the nose of the airplane downward, sending the airplane into a steep dive from which the crew failed to recover.

"During the design and certification of the Boeing 737-8 (Max), assumptions were made about flight crew response to malfunctions which, even though consistent with current industry guidelines, turned out to be incorrect," said the report. "Based on the incorrect assumptions about flight crew response and an incomplete review of associated multiple flight deck effects, MCAS's reliance on a single sensor was deemed appropriate and met all certification requirements."

Other factors include a lack of documentation about the existence and function of the MCAS in flight manuals or training programs and the U.S. Federal Aviation Administration's over-reliance on Boeing's own employees to oversee the system's certification.

The report also named the absence of an angle of attack disagree alert—a system that came standard on the 737NG—as a contributing factor.

Still, the KNKT did not place all blame on the airplane design, noting that maintenance crewmembers failed to detect a miscalibration of an AOA sensor they replaced on the Max before its fateful flight. However, said the report, the investigation could not determine whether or not the mechanics properly performed the installation test of the AOA sensor, only that the miscalibration "was not detected."

Meanwhile, the KNKT attributed a lack of detection by maintenance and the flight crew's failure to recognize the reasons for the uncontrolled dive at least partly to a lack of documentation related to MCAS.

Finally, for their part, the flight crew did not "effectively manage" the multiple alerts, MCAS activations, and distractions resulting from numerous ATC communications due to a failure of CRM. "This was caused by the difficulty of the situation and performance in manual handling, [non-normal checklist] execution, and flight crew communication, leading to ineffective CRM application and workload management," concluded investigators. "These performances had previously been identified during training and reappeared during the accident flight."

In reaction to the report, Boeing issued a statement on Friday that commended the investigative committee for its efforts.

"We are addressing the KNKT's safety recommendations, and taking actions to enhance the safety of the 737 Max to prevent the flight control conditions that occurred in this accident from ever happening again," said Boeing.

"Over the past several months Boeing has been making changes to the 737 Max," it added. "Most significantly, Boeing has redesigned the way angle of attack (AOA) sensors work with a feature of the flight control software known as MCAS. Going forward, MCAS will compare information from both AOA sensors before activating, adding a new layer of protection."

In addition, MCAS will now only turn on if both AOA sensors agree, will only activate once in response to erroneous AOA, and will always be subject to a maximum limit that can be overridden with the control column.

"These software changes will prevent the flight control conditions that occurred in this accident from ever happening again," the company concluded. ■

Trent 1000 TEN suffers new delay

Rolls-Royce is accelerating investments in additional maintenance capacity and spare engines to reduce disruption to operators of the Boeing 787 powered by its Trent 1000 engines after admitting it still faces delays in the redesign of an improved high-pressure turbine (HPT) blade for Trent 1000 TEN. Rolls said a new HPT blade for the Trent 1000 TEN will likely not find its way onto the engines in question before the first half of 2021. Earlier plans called for a start to incorporating a redesigned HPT blade into the fleet in early 2020. The revised timeline follows a detailed technical evaluation of the proposed HPT redesign that determined "it will not deliver a sufficient level of enhanced durability."

"We deeply regret the ongoing disruption caused to customers," said Rolls-Royce CEO Warren East. He insisted that "improving customer confidence in the Trent 1000" stands as his top priority and promised additional action to further expand the OEM's maintenance capacity and increase its stock of spare engines. "These steps, which build upon progress made to date, will further reduce disruption to our airline customers and give them the certainty that they need," East said. Rolls, he added, remains committed—as guided in September—to reducing the number of aircraft on ground to single-digit levels by the end of the second quarter of 2020.

MRO expansion plans include a doubling of Rolls-Royce's overhaul capacity at London Heathrow and an increase in Derby, as well as transitioning its sites in Dahlewitz, Germany, and Montreal to service hubs with the capability of performing Trent 1000 engine overhauls. It also secured the use of an additional testbed at Dallas/Fort Worth. In addition, the OEM will increase investment in engineering to support the specialist team that it assembled to focus on resolving the final design and engineering "challenges" on the Trent 1000.

Rolls pointed out that the improved HPT blade for the Trent 1000 TEN is the last major redesign activity of the three "significant technical issues" that have affected each of the three variants of the Trent 1000—Package B, Package C, and TEN. Of the nine fixes required, it has so far designed eight and certified seven.

The engines' prolonged issues forced the company to update the financial effect and it expects cash costs of around £2.4 billion ($3.1 billion) from 2017 to 2023, up from previous guidance of £1.6 billion. **C.B.**

› continued from preceding page

IAG to buy Air Europa

followed an earlier setback for IAG and Oneworld's efforts to strengthen their foothold in Latin America when Chilean courts rejected an attempt by American Airlines to acquire a stake in Latam, ending plans for a joint business between IAG carriers British Airways and Iberia, Latam, and American Airlines.

For Globalia, "the incorporation of Air Europa to IAG implies the strengthening of the company's present and future that will maintain the path followed by Air Europa in the last years," the group's CEO, Javier Hidalgo said. Javier's father, Juan José Hidalgo, founded Globalia in 1971 and the company remains privately held. The acquisition of Air Europa and Air Europa Express will increase Iberia's size by 50 percent and IAG's by 10 percent in terms of traffic revenue. Its operations will integrate with the existing Iberia hub structure at Madrid Barajas. Air Europa operates flights to 69 destinations across a range of domestic and European short-haul routes and long-haul routes to Latin America, the U.S., the Caribbean, and North Africa. In 2018, it generated revenue of €2.1 billion and an operating profit of €100 million. It carried 11.8 million passengers aboard a fleet of 66 aircraft—12 Airbus A330-200/300s, eight Boeing 787-8s and two -9s, twenty-one 737-800s, 11 Embraer E195s, and 12 ATR 72s. Air Europa will phase out all of its A330s by the end of 2021 and increase its 787-9 fleet to 21 examples by 2025. Air Europa also has placed an order for 25 Max jets, with the first three due for delivery next year.

IAG said it expects to close the deal in the second half of 2020. The transaction does not require IAG shareholder approval, though it stands subject to regulatory approval. Ryanair has already vowed it will ask competition authorities to require IAG to make divestments, particularly in Air Europa's short-haul markets, Reuters reported. Speaking during the LCC's half-year results presentation on Monday, Ryanair CEO Michael O'Leary called it "a merger to monopoly in Madrid."

"I think it is a good deal for IAG, for Willie Walsh," said O'Leary. "I think it is a bad deal from a competition point of view." ■

GE Digital Works's Andrew Coleman, left, and Bombardier Aviation's Jean-Christophe Gallagher show the new Smart Link Plus health monitoring unit box that Bombardier will include on all new Challengers and Globals, with plans to retrofit on more than 2,500 in-service Challengers and Globals.

Bombardier Expanding Service Offerings

A new Bombardier service partnership with GE Aviation is expected to result in a free health monitoring unit (HMU) for more than 2,500 in-service Challenger and Global aircraft. A preferred service provider agreement between the two companies calls for GE Aviation to offer curated service bundles around cabin and cockpit connectivity for new and in-service Bombardier Challengers and Globals, including models as early as the Global Express.

It's the first step in Bombardier's plans to launch the Smart Link Plus connected aircraft program in the second half of 2020. That program is expected to collect fleet-wide operational and maintenance data from the Smart Link Plus HMU boxes. This data is then wirelessly downloaded in flight and on the ground to Bombardier for analysis and service recommendations for Challenger and Global operators.

The technology behind the smart box was original to the Global 7500.GE Aviation's Digital Works is key to the development of Smart Link Plus, which is expected to provide operators future features such as predictive maintenance. GE Aviation's Digital Works is key to the development of Smart Link Plus, which is expected to provide operators future features such as predictive maintenance.

CVC Capital Closes On Acquisition Of Ontic

CVC Capital Partners' CVC Fund VII has completed its purchase of BBA Aviation's Ontic, a manufacturer of OEM-licensed parts for legacy aircraft, in a deal valued at more than $1.3 billion. The acquisition was originally announced in July.

Cheltenham, UK-based Ontic supports more than 39,000 in-service aircraft through a portfolio of more than 165 licenses to manufacture more than 7,000 parts. It has more than 1,200 customers and manufacturing and repair facilities in Chatsworth, California; Creedmoor, North Carolina; Plainview, New York; Cheltenham; and Singapore.

Dart Acquires Aero Design

Dart Aerospace recently acquired key product lines and more than 30 STCs from Canadian helicopter mission equipment manufacturer Aero Design and its brand trademark. Terms were not disclosed. The deal follows Dart's acquisition of Simplex Aerospace earlier last month. The pair of purchases expands Dart's STC portfolio from 900 to more than 1,100.

Gulfstream Goes Down the Middle in St. Louis

Gulfstream has designated its Cahokia, Illinois MRO facility as a mid-cabin maintenance center of excellence, with a hangar, operations center, and technician team dedicated to its midsize business jets.

While Dallas will remain the airframer's facility for mid-cabin completions, the location at St. Louis Downtown Airport will offer centralized support for the company's fleet of 560 midsize aircraft including the G280, G200, G150, and G100, about 70 percent of which are based in the U.S. The 70,348-sq-ft hangar includes 30,000 sq ft of aircraft floor space and 20,000 sq ft of back shop space. It will be base for a service team manager and technicians responsible for airframe inspections and repair, avionics installations and upgrades, and interiors.

Refurbishment capabilities at the location include full cabinet fabrication and finish, upholstery, composites, and paint.

Embraer Names Russia Service Center for Legacy 600/650

Jet Flight Service at Vnukovo International Airport in Moscow has been named an authorized service center (ASC) for Embraer Legacy 600/650 business jets, the Brazilian airframer announced. Certified by the European Union Aviation Safety Agency, Jet Flight can perform scheduled and unscheduled maintenance, component and part exchange, and types of inspections at different levels of complexity for those large and super-midsize jet types under the ASC.

Duncan Aviation Creates New EU Parts Post

Following European Union customer requests, Duncan Aviation has appointed a specialist to address all international parts and rotables requests, the Lincoln, Nebraska-based MRO provider announced. Sandra Phelps, who previously worked on the company's parts and rotables international sales team, will now serve as its international parts and rotables sales representative.In her new role, Phelps will focus on aircraft parts sales in the European market, managing work orders, parts exchange transactions, and international shipments, including hazardous materials.

True Blue Power Shows New Ultra-lightweight Battery Sets

True Blue Power has continued its introduction of the company's fifth-generation (Gen5) main ship batteries unveiled last March at Heli-Expo in Atlanta with three ultra-lightweight batteries: TB20 (20 amp-hour), TB30 (30 amp-hour), and TB40 (40 amp-hour). These are True Blue Power's first on-condition, lithium-ion engine-start batteries. Gen5 batteries are engineered to overcome the challenges inherent in lead-acid and nickel-cadmium (NiCad) technologies, eliminating expensive battery maintenance, frequent capacity checks, low-voltage operational delays, and most battery-related AOG situations. True Blue Power expects FAA and EASA certification for the Gen5 series by year end.

Gen5 batteries from True Blue Power eliminate a number of costly maintenance requirements, including most battery-related AOG issues, according to the company.

Bell Names Fifth Authorized MRO in China

Bell Textron has appointed China State Grid General Aviation its newest Bell 429 authorized maintenance center (AMC), making it the helicopter manufacturer's fifth Civil Aviation Administration of China Part 145 certified Bell-authorized MRO in China. This year, Fort Worth, Texas-based Bell said it has undertaken a significant expansion of its support network in China, appointing Reignwood Star a Bell 505 AMC and opening a supply center in Shanghai.

C&L Acquires Global Parts's Beechjet Rotables Inventory

C&L Aerospace has purchased the Beechjet 400 rotable parts program from Global Parts in Augusta, Kansas, and the inventory now resides at C&L's warehouse in Bangor, Maine. The acquisition allows C&L to boost existing inventory and support for what it calls a "robust" Beechjet support program.

Sherwin-Williams Intros 'Upscale' Interior Coating

Aerospace coatings specialist Sherwin-Williams (N3206) is introducing Jet Suede, a two-component urethane topcoat with an upscale, textured finish created to enhance the feel of aircraft interiors, for both OEM and aftermarket applications. Available in low gloss and solid neutral colors, including an array of OEM hues, the durable finish provides stain, abrasion, and scratch resistance, according to the Cleveland-based company, and can be applied on both rigid and flexible plastic and substrates. For refurbishments, Jet Suede makes a suitable replacement for worn leather armrests, cabin fabrics, and cockpit yokes, and is also an efficient alternative to painting interior plastic parts.

Av8 Group Expands Facilities and Capabilities

Houston-based Av8 Group has expanded its facilities and added new equipment in a bid to increase its testing and overhaul services. The expansion includes the addition of 9,000 sq ft of space to its current facility,

bringing the total to 30,000 sq ft.

It also added a servo test stand that can measure data in milliseconds and allows Av8 to overhaul servos and valves in assemblies, including anti-skid control valves. Also, the acquisition of a dedicated actuator test stand expands its capabilities to overhaul mechanical and hydraulic components such as flap/stabilizer screw jacks and leading-edge actuators.

"The expansion and additional testing capabilities are in line with our renewed focus on value in overhauls," said Av8 Group CEO Yoel Arnoni. "This extends far beyond the initial landing gear overhauls we have become known for. We can now bring the same substantial value to other systems and component overhauls that we have been delivering to our landing gear customers."

Skyservice Expands MRO Footprint in Canada

Skyservice Business Aviation, one of Canada's largest industry service providers, has expanded its MRO footprint with the acquisition of Muskoka Aircraft Center, an approved maintenance organization (AMO) in Gravenhurst, Ontario. The purchase includes a 60,000-sq-ft hangar at 24-hour Muskoka Airport, a Canadian Customs Airport of Entry that, with its 6,000-foot runway, can handle any business jet or narrowbody commercial airliner. The facility—which will supplement Skyservice's existing maintenance operations in Toronto, Montreal, and Calgary—services corporate, regional, and commercial aircraft.

"With more than 35 years of expertise in maintenance services, our highly skilled team is looking forward to delivering a world-class customer experience in the Muskoka area," said Skyservice president and CEO Emlyn David. "The Muskoka location is a one-stop-shop for all aircraft needs, with safety and service excellence at the forefront."

The company carries authorized service facility designations from several OEMs—including Bombardier, Gulfstream Aerospace, Dassault Falcon, and Honda Aircraft—and performs maintenance and warranty work for its own managed aircraft fleet, as well as those from other operators.

Researchers Focus On Blade Failure Predictors

Researchers at Purdue University say they have developed a monitoring system that can detect rotor forced response vibration, one of the most common causes of premature blade failure in turbine engines. Turbine blades can act as a tuning fork with a specific frequency when they vibrate, and at times the vibrations can be so intense they affect the engine's functioning.

Purdue University researchers are narrowing in the causes of turbine blade failure and how to predict them in the future.

"The key challenge is how to filter out all the noise and just listen to the sound of the blade vibration," said Yujun Leng, a research scientist in the university's College of Engineering. "Our technology is a blade vibration monitoring system using multiple unsteady pressure sensors to listen to the specific sound of gas turbine engine blade vibration."

Data analytics make it possible for that blade vibration information to be used to predict possible engine failure, noted Nicole Key, a professor of mechanical engineering. "This technique has great potential to be used as a real-time blade vibration health monitoring system for the gas turbine engines used in both aviation and power generation." She added that existing pressure sensor arrays already present in most engines can also be used to measure and monitor blade vibration at the same time.

The university's research foundation has filed for a provisional patent for the technology and the researchers are looking for partners to further test and commercialize it. ■

Parts specialist Able looks to 737 NG for growth

by Jerry Siebenmark

For aircraft component repair and overhaul specialist Able Aerospace, work on the landing gear of the Boeing 737 Next Generation (NG) represents a new and significant piece of business. It's a big reason why the Textron Aviation unit spent $3 million on new equipment and undertook a 60,000-sq-ft facility expansion earlier this year. Such an investment could pay off in other ways, too, for the Mesa, Arizona-based company.

"When you look at the amount of tooling and new automated processes and CNC capabilities that we're purchasing on brand-new equipment to automate this process and to keep tolerances tight to provide a very robust and quality product...it can lead into other markets as well," Able Aerospace general manager Michael Vercio told **AIN**. "So the 737, I would say, is the catalyst for us to continue to grow our product line, and in bigger areas."

With the investment, Able has sold its first three landing gear sets to what it said is one of the world's largest commercial airlines. Its new capabilities allow it to modify and upgrade the landing gear on Boeing 737-700/-800/-900 NG models, of which there are nearly 7,000 in operation.

"Obviously we're new to the marketplace, but we do have a history of supporting airline needs, whether it's through some part design improvements that we've manufactured and designed and sold to airlines, or whether it's in overhaul," Vercio explained.

That history extends all the way back to component repair and overhaul on the Boeing 727 when that type was in service. More recently, it includes the manufacture of engine mounts on Boeing and Airbus single-aisle aircraft and Boeing 747 flap tracks and carriages. "And so while that airplane [747] is starting to be phased out, we still have those great relationships with those customers," he said. Other capabilities, including special chemical processes, platings, and nondestructive inspection and testing, made the addition of 737 landing gear work "a natural fit for us to grow our product line," Vercio added. "We believe there's a big wave of demand coming. A lot of those [737s] are starting to come up on their regularly scheduled overhaul events." He added that 737 landing gear typically is overhauled every 10 years; or even less for high-utilization airframes.

Able Aerospace's Boeing 737NG landing gear overhaul and repair team.

To accommodate the move into 737 landing gear and other growth, Able has added about 40 new workers this year, bringing its total employment to more than 450. "Our plan is to continue something probably fairly close to that going into 2020," he said.

Able started out in 1982 primarily as a component and overhaul business to the rotorcraft industry, serving OEMs and providers such as Bell, Airbus, Erickson, and Leonardo. Following Textron Aviation's 2016 acquisition of Able, it has expanded its work for sister company Bell as well as grown its involvement in business aircraft, including some Citations and Hawker jets as well as King Air turboprops. Its current business aircraft work statement includes landing gear overhaul on Hawker 800/900/1000 jets as well as brakes and starter generator overhauls on some King Airs and Citations.

"We've also been kind of the back shop for Textron Aviation, so some of the one-off, hard-to-find jobs [for which], maybe, a vendor's gone out of business or [there are] quality issues with a vendor, we'll bring those products into Able," Vercio said. "We've started to do a lot of the overhaul and repairs of those parts." ■

FBO and Airport news by Curt Epstein

Desert Jet Center's new $7 million facility makes it the most recent of the three service providers at California's Jacqueline Cochran Regional Airport. Among its amenities are an autospa where customers can leave their vehicles for washing and detailing.

Million Air Goes Live in Austin

Million Air has expanded its network with the opening of its newest FBO at Austin-Bergstrom International Airport in Texas. This new location represents the FBO network's fourth in the state and its 31st globally.

The gala grand opening and ribbon-cutting in Austin was held for hundreds of guests, featuring a private concert by country music star Aaron Tippin, as well as a mini static display that included one of the remaining few airworthy Beechcraft Starships, in addition to a King Air 350i, Citation M2, and Bell 505.

Groundbreaking on the $40 million, 20-acre facility was in 2018, and the company began providing service from a temporary facility earlier this summer. The spacious two-story terminal has a 14,500-sq-ft lobby with elegant seating groups, wood and granite features, a marble-framed fireplace, and wood-beam ceilings, as well as private sky lounge bar, complementary Starbucks-trained barista and refreshment bars, pilot lounge with snooze rooms and shower facilities, wraparound ramp-side balcony, flight planning room, and a pair of conference rooms with available concierge service.

The newest of three service providers at the airport, it also includes a 6,750-sq-ft aircraft arrivals canopy, more than seven acres of ramp space, and seven hangars ranging in size from 15,600 sq ft to 19,950 sq ft, each a stand-alone facility with independent secure parking and entries. With 28-foot-high doors, they can easily accommodate ultra-long-range business jets up to a Gulfstream G650. Aircraft maintenance is also available on site.

Desert Jet Completes New FBO

California aviation services provider Desert Jet has completed its FBO complex at Jacqueline Cochran Regional Airport. The Thermal-based company had been operating from a temporary facility since 2015, and construction of its state-of-the-art facility had been hampered by a series of legislative hurdles placed by local officials.

The $7 million Desert Jet Center features a 10,000-sq-ft terminal with floor-to-ceiling windows, observation deck, and a full slate of amenities including a pair of eight-seat conference rooms, pilot lounge with snooze room and shower facilities, kitchen, laundry service, autospa, pet relief area, and refreshment bars for both passengers and pets.

It has a 22,500-sq-ft hangar with 28-foot-high doors and can accommodate the latest ultra-long-range business jets. It is the only air-conditioned hangar in the Palm Springs/Coachella Valley region. The company also offers an onsite FAA Part 145 repair station with 24/7 mobile AOG service and complete aircraft detailing. The FBO recently launched a customer loyalty program that it says will combine its five-star customer service with additional cost savings.

Louisiana's Capital Airport To Get Another FBO

Louisiana's Baton Rouge Metropolitan Airport will be gaining a third FBO with the announcement of groundbreaking by the Williams Jet Center. Aimed primarily at the owner-flown community, the new five-acre complex under construction on the northwest side of the airport will be the only source for fuel in that area of the airport. At the start, the facility will offer only self-serve jet-A and avgas.

"We're not going to initially have fuel trucks, but we might get into that down the road," said co-owner Luke Lewis, adding the company plans to offer its based customers a fuel discount incentive.

With a price tag of several million dollars, the location will include 34 hangars for based tenants only, the largest of which will be 8,000 sq ft, enough to shelter aircraft up to an Embraer Phenom 300. Most of the twelve available for purchase have already been pre-sold, while the remaining hangars will be available for lease. A 1,500-sq-ft terminal will be "lightly staffed," according to Lewis, and serve mainly as a clubhouse for the aircraft owners, with a stocked refreshment bar, pool table, lounge chairs, television, restrooms, computer terminal, and possibly a classic car from the company owner's personal collection.

The first phase—which includes three of the larger hangars, the terminal, and the fueling system—is expected to be finished by mid-2020.

Signature To Launch Pricing Transparency Tool

Signature Flight Support is looking toward the future with new approaches to its customer offerings, including a Trip Estimator Tool for pilots and schedulers conducting pre-flight planning. Scheduled to launch in early 2020, the new tool will deliver retail fuel pricing, along with handling and infrastructure fees, allowing users to review the estimated costs of their trip before they take off. "[Customers] enter their aircraft tail number, their destination, and the date that they are planning to fly up to seven days in advance, and we return the pricing information," said Matthew Carroll, the service provider chain's senior v-p of marketing.

"We know this is something that many of our customers have been asking for and I think we're probably going to be one of the first to deliver something like this. Carroll cautioned the tool is an "estimator," which will give the handling infrastructure information and alert users if there will be any other potential charges. "At this point, it would make sense for a customer to double-check that with the FBO," he told **AIN**, adding the system will be continually improved from its introduction. "I hope that in the next 12 to 18 months you will get to the point where you make a reservation, you click through, you get confirmation, and you don't even have to call the FBO," said Carroll. "We're looking at this in terms of what's going to add value to the customer and we think this is just the right way for us to do business in that respect."

BARRY AMBROSE

Signature Flight Support's new pricing transparency tool is designed to help customers estimate costs before takeoff. The company is also expanding its FBO network and MRO capabilities.

Modern Aviation Makes It Easy To Fly Green

FBO network Modern Aviation has partnered with carbon reduction and offset credit organization Carbonfund to offer its customers the ability to reduce their environmental impact by offsetting their carbon emissions as part of their fuel purchase.

The voluntary program, which began on November 1, will provide carbon offset credits through verified projects at a small surcharge per gallon of fuel. Initial environmental targets include the Russas-Valparaiso forest conservation projects in the Amazon, which are designed to protect 170,000 acres of tropical rainforest, mitigating the release of approximately 3 million tons of carbon dioxide emissions as well as preserving the biodiversity of the habitat.

CEO Mark Carmen said the company will fund 20 percent of its customers' contribution during the program's first year.

Swissport Rebrands Skycare FBO

The Skycare FBO at New Zealand's Auckland Airport has rebranded under the Swissport Executive Aviation name. Swissport International acquired the FBO's parent company, Aerocare, in March 2018. The Auckland facility includes a terminal with VIP lounge, concierge service, and in-house customs, immigration, and baggage screening.

Swissport handles more than 24,000 flights a year at more than 90 airports in 25 countries and has concierge staff at 32 airports in Australia and New Zealand. "Joining the global network and operating under the well known and trusted Swissport Executive Aviation brand will benefit our new and existing customers and set the benchmark for safety and seamless international service," said Rob D'Alessio, Swissport's senior v-p for the region.

Avflight, Pentastar Team on Michigan FBO

FBO chain operator Avflight, which plans open to its newest location at Michigan's Gerald R. Ford International Airport in the second quarter, will partner with local aviation services provider Pentastar Aviation to provide a full range of services at this facility. Pontiac, Michigan-based Pentastar, which was the highest-ranked FBO this year in **AIN**'s annual FBO survey, will

occupy an office in the 5,000-sq-ft terminal and provide charter, management, and MRO evaluation services there.

"While our facility includes all the amenities of a high-end FBO, we want to have comprehensive services for business aircraft customers," said Joe Meszaros, Avflight's v-p of operations. "Pentastar, also a Michigan-based company, has a long history of customer service excellence, and its expertise in charter, management, and maintenance make them the perfect partner."

For Avflight, an Avfuel-sister company, this new location will be its 22nd in the U.S. and Europe and its sixth in Michigan. In addition to a 30,000-sq-ft hangar, it will provide fueling, ground handling, deicing, and concierge services.

Vegas Hangar Complex Full Ahead of Opening

Ahead of its anticipated completion in February, a new hangar complex rising at Las Vegas-area Henderson Executive Airport (HND) is now fully leased. Scheduled to open in spring 2020, the facility, which will cater largely to the owner-flown aircraft sector, consists of 25 separate hangars—16 T-hangars that can accommodate small aircraft such as a Daher TBM or Citation Mustang and nine larger 4,500-sq-ft box hangars able to fit up to midsize business jets such as a Hawker 800.

Developed in a partnership between aircraft sales, rental, and Cirrus flight training provider All In Aviation and Part 145 aircraft maintenance company Lone Mountain Aviation, the complex—the first purpose-built, multi-use aviation facility at HND—will also include a 22,000-sq-ft maintenance hangar/two-story office building with 9,000 sq ft of office space, five training rooms, a classroom, library, conference room, avionics workshop, pilot shop, and parts department.

Cambridge UK FBO Reopens Under Airport Management

Cambridge Jet Centre, the newly rebranded FBO at the UK's Cambridge City Airport, recently reopened after a brief redesign. Marshall Aerospace and Defense Group, which owns and operates the airport, took over the facility following ExecuJet's departure after seven years. The rebranding included a new pink and blue color scheme for the location, which features an executive lounge with complimentary refreshments, a new private business center, pilot and crew lounge, 14-seat conference room, in-house customs and immigration services, and panoramic views of the airfield and surrounding countryside.

"The services we offer have been implemented specifically with our passengers front and center of our strategy, to provide up-to-the-minute comfort, safety, and relaxation and allow them to maximize their valuable time," said Kevan Craske, the airport's recently appointed director, adding the airport is an important facility that local businesses rely upon. 'They deserve the best facilities available, so we've worked hard to provide them."

Southwest Florida Airport Adds New Bizav Hangar

Florida's Fort Myers Page Field Airport has unveiled a new 24,000-sq-ft multi-use hangar that can accommodate aircraft up to a Gulfstream G650. The addition brings the airport-operated FBO, Base Operations at Page Field, to 74,000 sq ft of aircraft storage. Funded half by the Florida Department of Transportation (FDOT) and half by the Lee County Port Authority, the $7 million project also included an additional 58,000 sq ft of apron to help meet seasonal aircraft parking demand. According to an economic impact study earlier this year by FDOT, the airport saw more than 98,000 operations in 2018, contributes approximately $385 million a year to the region, and supports more than 3,300 jobs.

"Business at Page Field has continued to flourish, with more flight activity and an increased demand for space to house aircraft, as well as provide additional tenant support and services," explained Jeff Mulder, executive director of the Lee County Port Authority. "This new hangar contributes to positive development in Lee County and will meet future needs of business and general aviation in Southwest Florida." ■

The new multi-use hangar at Fort Myers' Page Field brings the airport-operated FBO there to 74,000 sq ft of aircraft storage.

FBO PROFILE: FlyAdvanced Wilmington, Del.

Celebrating five years under the FlyAdvanced brand, the FBO at Wilmington, Delaware's New Castle Airport has grown into a full-service FBO and FAA Part 145 repair station.

New Castle Airport facility sees steady activity

With Delaware's favorable corporate tax policies, it's little wonder that the state's business aviation traffic stands in contrast to its small size. Sixty-five percent of all Fortune 500 companies and more than half of all U.S. publicly traded companies are incorporated in the First State.

At New Castle Airport (ILG), Wilmington's dedicated general aviation gateway, FlyAdvanced has been providing aviation services since 2006 from a converted former corporate flight department hangar. Founded in 2001 as Aeroways, the one-airplane management operation took on more aircraft and eventually grew into a full-service FBO. The company was purchased in 2014 and rebranded FlyAdvanced, along with the company's second FBO at Philadelphia-area Wings Field Airport.

Through its flagship location at ILG, the company provides customers with a one-stop-shop offering: aircraft management, charter, sales, rentals, flight training, and an FAA Part 145 maintenance station with a mobile repair team.

The company has been a CAA-preferred provider at ILG for more than a decade, and its 2,100-sq-ft terminal features a passenger lounge/waiting area, refreshment bar, a business center/flight planning area, crew lounge, quiet room with massage recliners, showers, full kitchen, break room, crew car, onsite car rental, valet parking, and a pair of six-seat A/V-equipped conference rooms.

With a leasehold of more than seven acres, the location offers four heated 15,000-sq-ft hangars capable of sheltering aircraft up to a Bombardier Global 7500. They are home to 16 turbine-powered aircraft ranging from a pair of Dassault Falcon 900s down to a Daher TBM 700.

It is open from 6 a.m. until 11 p.m. every day, with after-hours call-out at a fee. U.S. Customs is available 24/7 with advance notice and will clear aircraft on the ramp.

The FBO sees approximately 10 operations a day, and pumps approximately 750,000 gallons of fuel a year from its Shell-branded tank farm which can store 20,000 gallons of jet-A and 12,000 gallons of avgas.

Business is steady throughout the year, according to Travis Baker, the FBO's assistant manager, attributing that to his state's tax incentives. During the summer, NASCAR races at the nearby Dover International Speedway, as well as the Firefly Music Festival, serve as a slight bump for business.

When it comes to customer service, Baker said the FBO sticks to the tried and true philosophy. "We treat every aircraft, whether it's a Cessna 172 or a G550, with the same level of service," he told **AIN**. "Especially for the little planes, because you never know if the guy stepping out has three jets they want to bring to you."

Baker recalled one event this summer where a group of six passengers showed up at the FBO for a vacation charter flight to the Bahamas through a third-party operator. Upon the aircraft's arrival, it was determined to have a major mechanical issue, and the charter provider was notified to find a replacement aircraft. While they waited for its arrival, the FBO staff entertained the passengers, including ordering them hoagie sandwiches and beverages.

When the replacement aircraft arrived several hours later, it was quickly fueled and the luggage transferred, passengers boarded and ready for takeoff, before it, too, was stricken with a mechanical issue. The FBO has four similar 600-series Challengers based there, and its maintenance technicians inspected the aircraft to determine the problem, which was found to be a faulty baggage compartment door sensor. Drawing the appropriate part from the facility's Challenger spare parts supply, they soon repaired the aircraft, allowing the customers to finally head off. Though frustrated over the loss of nearly a day's vacation, Baker said, they were pleased with the care and attention they were shown at the FBO. **C.E.**

by David Jack Kenny

PRELIMINARY REPORTS

HondaJet and Hawker Have Nosegear Extension Failures on Same Day

OCTOBER 7, 2019, HONDA HA-420, CHARLESTON, SOUTH CAROLINA

A two-year-old HondaJet sustained serious damage to the underside of the forward section of its fuselage after its nose landing gear failed to extend. The pilot and all four passengers were uninjured. The pilot told NTSB investigators that he broke off the initial landing approach when the nose gear indicator light remained yellow and an audible "gear unsafe" warning sounded. After a fly-by past Charleston Air Force Base/International Airport's control tower, controllers advised that the gear doors "did not look right." The pilot attempted to cycle the gear twice before performing the emergency gear-down checklist without effect; the nosegear indicator light remained red. He then landed the jet on Runway 3, where it slid to a stop and all occupants evacuated the aircraft.

An FAA inspector who examined the airplane reported that "the underside of the forward portion of the fuselage was scraped completely through the hull" with damage to the pressure vessel. This accident is at least the eighth mishap suffered by HondaJets during landing attempts but the first caused by a documented mechanical anomaly; the others included one blown tire and six runway excursions.

RAYTHEON HAWKER 800XP, FORT MYERS, FLORIDA

In the second accident of its type on the same day, a Hawker 800XP had to land with its nosegear retracted following an extension failure. None of the four people on board (two pilots and two passengers) were injured. The pilot-in-command reported that the takeoff roll at the Naples (Florida) Municipal Airport was normal, but when he retracted the landing gear during initial climb he heard a thud and felt vibration from the direction of the nosegear well. The nosegear indicator light remained red, indicating that it was neither down and locked nor retracted. After the procedure listed in the emergency extension checklist proved unsuccessful, the crew diverted to Fort Myers to land on its 12,000-foot Runway 06 in dry weather. The airplane skidded to a stop on the runway, where the passengers and crew exited through the main cabin door.

Initial examination found the nosegear's actuator pushrod linkage detached from its attach point. The nut, bolt, and retaining pin were missing, with "deformation in the area where the nut, bolt, and pin assembly should be installed" that prevented installation of a replacement nut, bolt, and pin. The nosegear locked into place when extended by hand. Maintenance records showed that the airplane had been operated for 124 cycles since an overhaul of the main and nose landing gear in January 2019.

Seven Lost in Super Puma Ditching

AIRBUS HELICOPTERS H225 (EC 225LP) SUPER PUMA, OCTOBER 31, 2019, OFF THE DOKDO ISLANDS, SOUTH KOREA

A rescue helicopter crashed into the Sea of Japan just after takeoff, killing all seven on board (*see fuller story on page 46*). The aircraft, operated by South Korea's National 119 Rescue Headquarters, had boarded a patient reported to be an injured fisherman; the other casualties included two pilots and an aircraft mechanic, two rescue workers, and a friend of the patient. The helicopter lifted off just before midnight from the helipad on the larger of the two islets and crashed approximately two minutes later after what witnesses described as erratic low-altitude flight. Prevailing conditions included light winds with no moon.

Divers located the wreckage about 600 meters (2,000 feet) offshore at a depth of 72 meters (235 feet). Three bodies and fragmentary wreckage had been recovered as of November 5. The twin-engine helicopter had recently been returned to service after a 1,000-hour heavy inspection; its pilots are reported to have had a combined 40 years of professional experience.

South Korean President Moon Jae-in ordered immediate safety inspections of the nation's entire fleet of H225 helicopters. The widespread use of the Super Puma series for overwater transport in harsh environments has contributed to the relatively high fatality rate—close to 50 percent—in accidents involving these models.

Five Killed in Helicopter Crash off New South Wales

BELL UH-1H, SEPTEMBER 6, 2019, FIVE KM SOUTHWEST OF ANNA BAY, NEW SOUTH WALES, AUSTRALIA

The pilot and four passengers were killed when their helicopter crashed into the ocean about 5 km (3 miles) southwest of the coastal town of Anna Bay, New South Wales, just north of the port of Newcastle. The accident occurred more than 10 minutes after the end of civil evening twilight in weather that included reduced visibility and wind gusts up to 45 knots with a forecast of severe turbulence. Williamtown Approach Control lost radar contact with the helicopter after it made an unexpected left turn, departing the coastal VFR lane and heading southbound out to sea. ADS-B position data subsequently provided by Airservices Australia showed it continuing southbound for about one minute 20 seconds before entering a rapidly descending left turn, dropping from 3,400 feet to its last recorded altitude of 525 feet in just 22 seconds.

The helicopter had departed from Queensland's Archerfield Airport at about 2:30 p.m. local time on what was described as "a private flight...repositioning the helicopter to Bankstown Airport, New South Wales." It lifted off from a fuel stop at Coff's Harbor, N.S.W. at 4:48 and flew south. The pilot contacted Williamstown Approach at 5:55, six minutes before the forecast end of civil evening twilight, to coordinate the transition through its airspace using a block altitude of 3,000 to 3,500 feet. At 6:05 the controller lowered the block's floor to 2,400 feet after an abrupt descent to 2,700 that the pilot blamed on turbulence. Radar contact was lost at 6:11 as the helicopter began its turn south, and subsequent attempts to reach the pilot were unsuccessful.

Aerial searches the evening of the accident spotted three oil slicks. The wreckage field was finally located on September 26 after "an extensive sea search, hampered by poor sea and weather conditions." A large section of the helicopter's tail boom was eventually recovered from the sea floor at a depth of about 30 meters (100 feet). Small pieces of floating wreckage were also collected.

FINAL REPORTS

Loose Bag Struck Tail Rotor

AIRBUS HELICOPTERS AS350B2, DECEMBER 14, 2017, TWEED, ONTARIO, CANADA

An empty canvas bag not properly fastened to the helicopter's external platform came loose and struck the tail rotor, causing severe imbalance and resulting vibration that ultimately wrenched the tail rotor, its gearbox, and the vertical stabilizer from the airframe. The three powerline technicians being transported had not fastened their lap belts and were ejected from the aircraft during the crash sequence. The pilot also died one impact.

The flight was intended to carry the technicians back from worksites in the Tweed Industrial Park to their staging area for lunch. A large pulley and two soft-sided tool bags had been attached to the Air Stair platform with carabiners. About a quarter of a mile from their destination in the staging area, an empty canvas bag with attached carabiner came loose and struck the tail rotor, breaking the tip and balance weight off one blade and causing increasingly destructive vibrations. TSB investigators could not determine whether the bag had been harnessed onto the platform separately, or had come loose from inside another piece of stowed luggage.

The pilot was initially able to maintain control, but as the helicopter descended through 75 feet above ground level on its landing approach, the tail rotor, gearbox, and vertical stabilizer all departed the aircraft. It climbed briefly in a rapid left turn and then descended into the ground. No one outside the aircraft was hurt.

The TSB noted that the helicopter's operator had used electrical tape to immobilize the passengers' shoulder harness reels and that the technicians themselves were apt to skip fastening the lap belts on short flights to avoid the difficulty of fastening them over their bulky outdoor winter gear.

Nosegear Damage Traced to Misplaced Quick-release Pin

CESSNA 750 (CITATION X+), JULY 22, 2018, CORK, IRELAND

Failure to correctly mate the nosegear's upper and lower torque links and reinstall the torque link release pin caused the vibration that led the captain to abort the takeoff roll at 67 knots airspeed. The nosegear turned sideways during deceleration, shredding the tires and causing extensive damage to the nosegear assembly as well as to the fuselage nose structure. However, Ireland's Air Accident Investigation Unit was unable to determine who removed the pin, which was found on the runway in the course of the investigation.

The jet had arrived from Luton, England, four days earlier. Landing, taxi, and parking were uneventful. According to the Cork airport manager, the airplane was not moved after landing until the crew taxied to the runway for departure. The purpose of the torque link release pin is to disconnect the nose gear from the steering mechanism so it can turn freely while the aircraft is towed. It is secured to the airframe by a steel lanyard, leading some pilots to stow it in the cavity in the upper torque link while the aircraft is parked to prevent it from banging against other components in the wind. The upper end of the broken lanyard was still attached to the pin when found.

Neither pilot recalled having removed the pin, and both remembered having seen it "in place" during their preflight inspection. However, a photograph of the airplane while parked on the ramp clearly shows the upper and lower torque links disconnected with the pin stowed in the upper link. During the short taxi from the ramp to the runway, the pilot-in-command noted that the steering felt sluggish, which he attributed to the aircraft's weight after loading fuel for the transatlantic flight to Gander, Newfoundland. The AAIU cited other accidents in related models as showing that "stiction" between the upper and lower sections of the gear strut can provide limited steering control with the torque links disconnected. ■

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Technicians at Collins Aerospace's Landing Systems unit work on main landing gear assemblies in support of Gulfstream G650 production. Collins has long been a provider of brake components, including high-carbon-content discs, for a wide variety of business aircraft.

Business soars at Collins as investments amp up

by Kerry Lynch

Collins Aerospace is pouring millions into expanding facilities, machinery, and employee bases at its Landing Systems businesses as it works to keep up with growth across its markets. This has included an $80 million expansion at its carbon-brake center in Pueblo, Colorado; possible expansion at a second carbon site in Spokane, Washington; and increased personnel and machinery at landing gear sites in Poland and Canada.

"It's a very good time to be in aerospace these days," said Ajay Mahajan, vice president of the Landing Systems unit.

Collins has produced wheels and brakes and/or landing gear for the spectrum of commercial aircraft, including from a Dash 8 turboprop up to the largest Airbus and Boeing airliners. Executives agree much of the growth the Landing Systems business unit is experiencing is driven by healthy airliner order books. However, the company also sees a steady business and new opportunities in the business aviation market, as well as increasing interest in the military side, particularly with strategic programs such as the F-35.

A major focus of investment has been increasing carbon capacity as its brakes business has soared. "Everything to us is landings, landings, and landings. They're building more [aircraft] than they're retiring," said Tony Wurmel, executive director of Wheels and Brakes operations, based at the Pueblo site.

In response, Collins has engaged in a multi-year expansion of the facilities at the plant in Pueblo, Colorado, where raw materials are transformed into pure carbon and then into a brake disc designed to withstand landings of the heaviest aircraft. That expansion, which began in 2015 and is expected to be completed late next year, has resulted in a footprint spanning 325,000 sq ft, provided additional furnace and machinery capabilities, and increased employment by some 25 percent to 250. The net result is a 50 percent increase in production capacity.

These investments build on the advanced technologies that Pueblo has been gradually bringing online as it evolves the process. This includes machinery to do the basic weaving of the raw materials that arrive primarily from two main suppliers (both in Japan). As it arrives, that material has the appearance of soft "horsehair" and machines shape it into soft, thick blocks that are then cut into brake disc shapes before they are baked multiple times in furnaces.

A significant amount of investment has been made in bringing several more large furnaces online that are the key to carbonization (purification) and densification of the discs. The furnaces run around the clock for weeks at a time as they bake racks carrying hundreds of carbon brake discs at temperatures that can reach more than 2,000 degrees centigrade.

Other investments have involved robots to help with the oxidization process, a protective coating step to ensure the discs can withstand exposure to weather elements over time. Collins further has brought online machinery to quality-test the brakes. Each batch must have discs tested for rejected-takeoff stresses on an in-house dynamometer.

Multiple Sites

Pueblo is just one of three carbon plants that Collins operates. Another major center is Spokane, where Mahajan said Collins is considering a similar investment.

A third, smaller site is in Santa Fe Springs, California, that makes the carbon brakes for the smaller-run programs, including some military and newer business aviation platforms.

On the landing gear side, Collins is focusing on the growth of facilities outside of the U.S. in an effort to be closer to customers, said Mahajan. "We now have a huge footprint in Poland," he said, adding that with manufacturing plants at Krosno and Rzeszow, Poland, is becoming one of its largest gear manufacturing hubs.

Another growth area is its plant in Oakville, Ontario, Canada. ■

by Gordon Gilbert

Within 6 Months

Dec. 31, 2019

U.S.: NAT MNPS Compliance

U.S. operators with older minimum navigation performance specifications (MNPS) approvals have until December 31 to get these updated if they want to keep flying in the North Atlantic Tracks under new operations specification management letter of authorization (LOA) B039. These requirements have been in effect for nearly two years.

Jan. 1, 2020 **31 Days to Deadline**

U.S./Taiwan/Mexico: 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, and in Taiwan IFR airspace above FL290. Mexico: requirements are proposed for a start date of Jan. 1, 2020, in Class A, B, C, E above 10,000 feet, and other specified airspace. The requirement could take effect earlier in some airspace over the Gulf of Mexico.

Jan. 1, 2020

Aircraft CO_2 Emissions

The first international standards for carbon dioxide (CO_2) aircraft emissions have been enacted by ICAO and initially apply to large subsonic jets, including business jets, for which the application for a type certificate was submitted on or after Jan. 1, 2020.

Jan. 8, 2020 **NEW**

EASA: Helicopter Human Factors

A notice of proposed amendment moves to introduce specific provisions into the rotorcraft certification specifications to ensure that human facors are systematically taken into account during the design and approval processes of rotorcraft cockpits. The proposed amendments are expected to "moderately increase safety." Comments are due on Jan. 8, 2020.

Jan. 30, 2020

Datalink Com in North Atlantic

Aircraft flying within the North Atlantic Tracks between FL290 and FL410 must be equipped with FANS-1/A controller-pilot datalink communications and ADS-C starting on Jan. 30, 2020. Aircraft that are not FANS-equipped will be able to operate at cruise altitudes of FL430 and above.

Feb. 18, 2020

EASA: Halon Banned

Under EASA rules, operators of large airplanes and large helicopters shall ensure that built-in lavatory extinguishers on aircraft newly certified on or after Feb. 18, 2020 do not use Halon as the extinguishing agent. The goal is to gradually mitigate the environmental impact that Halon extinguishing agents in firefighting equipment have on the ozone and climate. The requirement applied to portable extinguishers on these classes of aircraft starting last May.

June 7, 2020 **6 Months to Deadline**

Europe: ADS-B Out Mandate

The ADS-B Out retrofit requirement in Europe takes effect June 7, 2020. This mandate applies only to aircraft with a mtow exceeding 5,700 kg (12,566 pounds) or having a maximum cruising speed greater than 250 knots, and received its individual certificate of airworthiness before June 8, 2016.

Within 12 Months

Aug. 14, 2020

EU: Pilot Mental Fitness

The European Union has published revised air operations safety rules to incorporate provisions to better identify, assess, and treat the psychological fitness of air crew. The rules, applicable to commercial air transport operators, go into effect Aug. 14, 2020. The requirements include mandatory alcohol testing of flight crews during ramp checks.

Oct 1, 2020

Australia: Rest and Duty Times

New fatigue rules apply to holders of commercial air operator certificates (AOCs), including charter, on-demand air taxis, and Part 141 flight schools. Operators who select the prescribed limits must be in compliance by June 30, 2020. Operators who develop their own fatigue risk management system (FRMS) must be in compliance starting Oct. 1, 2020.

Beyond 12 Months

Feb. 25, 2021 and Jan. 27, 2022

14 Months to Deadline

Canada: ADS-B Out Mandate

The implementation date of Feb. 25, 2021 is proposed for ADS-B use in Canadian domestic airspace, initially limited to Class A airspace. The mandate would be expanded to include Class B airspace above 12,500 feet on Jan. 27, 2022. Beyond this date, expansion of ADS-B requirements to other Canadian domestic airspace will be based on an assessment of the safety and efficiency requirements for specific airports. ■

Compiled by Kerry Lynch

JACK TUFANO

PETER VASCONCELOS

EVERETTE MASH

DEBBI LAUX

GODFREY HIGGS III

Long-time *Honeywell Aerospace* executive **Mike Madsen** was selected to take over the Phoenix, Arizona-based manufacturer as president and CEO. He succeeds **Tim Mahoney**, who held the role for 10 years and is moving to the position of senior v-p of enterprise transformation for Honeywell Digital. Most recently v-p of integrated supply chain, Madsen has more than three decades with the organization, also holding the roles as president of Honeywell Aerospace Defense and Space and leadership positions within the Air Transport and Regional business. Mahoney joined Honeywell in 1997 following a 20-year career with Sikorsky Aircraft.

Sheltair Aviation has announced changes in its executive suite. **Lisa Holland**, daughter of company founder, chairman, and CEO Gerald Holland, was named to the newly created position of president of corporate strategies, providing high-level leadership for the future growth and organizational development of the company. Also, **Jack Tufano**, formerly v-p of design and development with Cisneros Real Estate, has joined the company as v-p of design and construction.

Elevate Jet hired **Scott LaForge** to lead the aircraft management and consultancy firm as president. LaForge brings 40 years of experience to his new role, previously holding leadership positions with Keystone Aviation, XOJet, M&N Aviation, Island Airlines, and Cape Air/Nantucket Airlines. The company also hired **Patti Ann Sullivan** to serve as executive v-p of aircraft management. Sullivan has 30 years of aircraft finance and aircraft management experience, previously holding executive and consulting roles with Key Bank, Textron Financial, Debis, Aviation Resource Group, and Executive Jet Management.

The *Aeronautical Repair Station Association* (ARSA) board of directors elected **W. Ian Cheyne** to the association's senior volunteer leadership role of president. Cheyne, who has served as a director of ARSA since 2002, is chief technical and regulatory officer for *Dallas Airmotive*. **David Latimer**, senior v-p of regulatory compliance for *Haeco Americas* and the association's immediate past president, will continue to serve on the board. Also, **Gary Fortner**, v-p of engineering and quality control for *Fortner Engineering*, was elected v-p and **Terrell Seigfreid**, assistant general counsel for the *Nordam Group*, is treasurer.

Piper Aircraft added former NASA astronaut and aeronautical engineer **Winston Scott** to its board of directors. A retired U.S. Navy captain and aviator, Scott served as a pilot of the Kaman SH-2F Seasprite helicopter and Grumman F-14 Tomcat, in addition to his NASA career.

O'Melveny added **Jason Kaplan** as a partner in its corporate finance practice in New York. Kaplan, who will focus on all aspects of aviation and equipment finance at O'Melveny, formerly was with the equipment finance group of another international law firm, specializing in negotiating and drafting complex agreements for the transfer, use, and financing of aircraft and other transportation equipment.

George Galanopoulos was appointed head of charter sales in Europe for the *Luxaviation Group*. In addition to his new duties overseeing sales in Europe, Galanopoulos will continue as managing director of Luxaviation UK.

Gulfstream Aerospace named **Peter Vasconcelos** regional senior v-p of sales for the northeastern U.S. and eastern Canada. Vasconcelos, who will be based at Gulfstream's Manhattan sales and design center, brings 20 years of sales experience to his new role, including with a business aircraft manufacturer.

C&L Aerospace appointed **Everette Mash** senior v-p of aircraft sales. Mash previously led Twin Otter Holdings for 13 years and also has served with Jet Aviation and Embraer.

FlightSafety International promoted **Michele Posey** to executive director of sales, responsible for business aviation sales activities in North America. Posey has served with FlightSafety since 1998 in marketing and sales positions of increasing responsibility, most recently as director of sales.

Dave Yip rejoined Hong Kong-based *Metrojet* as director of business development. Yip, who has 20 years of business and commercial aviation experience, served as a maintenance planner with Haeco, before joining Metrojet in 2006, first as an engineering support manager and later taking roles including COO with Hongkong Jet.

Private Jets, Inc. hired **Denver Craddock** as director of maintenance, based at Wiley Post Airport in Bethany, Oklahoma, and **Stephanie Zepeda** as director of charter sales, primarily at Naples Municipal Airport in Florida. Craddock, who previously has held maintenance supervisory roles, will be responsible for the maintenance of Private Jets' fleet of 19 aircraft. Zepeda will develop relationships with new and existing clients across Florida.

West Star Aviation promoted **Eric Valdes** to Gulfstream program director at its East Alton, Illinois facility. Serving as Gulfstream program manager for the past 12 years, Valdes has 26 years of aviation experience, also including with Midcoast and the U.S. Air Force. Also at East Alton, the company appointed **Robert Wood** paint program assistant manager. Wood previously held positions with Gulfstream, Jet Aviation, and Midcoast, and served as a structural repair and corrosion control specialist in the U.S. Air Force. At its Grand Junction (GJT) facility in Colorado, the company promoted **Jason Cohen** to Bombardier Global program manager. At its facility in Chattanooga, Tennessee, **Mike Ditmeyer** has been appointed Gulfstream operations manager and **Brian Jansen** named Falcon program manager. Formerly a lead and maintenance technician for West Star, Jansen has 29 years of aviation experience, including as Falcon program manager at Avmats and director of maintenance at Barry-Wehmiller.

Weston Aviation hired **Ruth Tootill** as aviation fuel manager. Tootill formerly was account manager of GA fuel sales in the UK for Air BP and has 23 years of oil industry experience.

Jim Katopodis joined *C&L Engineering Services* as a design engineer. Katopodis has more than 26 years of experience in aviation engineering specializing in avionics, most recently with BizJet International.

Rachael Weverka is transitioning to *Duncan Aviation*'s modifications sales team in Lincoln, Nebraska, responsible for paint and interior sales for Gulfstream and Embraer aircraft.

Jacek Baranowski is joining *Heli-One's* MRO operation in Rzeszow, Poland as general manager. Baranowski previously held positions with Bodycote Aerospace & Defense, Seco/Warwick Retech Thermal Equipment Manufacturing China, Wallair Engine Components (Velatia Group), GE Aviation, and Listemann Group.

C&L Aerospace hired **Ian Hilton** as director of business development for Europe/Africa. He has more than 20 years of aviation experience consisting of parts sales, inventory management, procurement, logistics, and power-by-the-hour program management.

Aviation Personnel International promoted **Jennifer Pickerel** to director of client and candidate services and **Jenny Showalter** to client services manager. The firm also named **Debbi Laux** candidate services manager. Pickerel has provided talent identification and placement services to API's clients and more recently assumed responsibility and oversight of the company's Candidate Services division. Showalter is transitioning to client service delivery, where she will assist with project management, including the intake of a new search project, candidate identification and selection, and the offer and placement of a hired candidate within a Part 91 or 135 flight department. Laux joined API in a part-time capacity as a candidate specialist and is expanding her role to full-time.

Cutter Aviation promoted **Godfrey Higgs III** to manager of aircraft services at its Centennial Airport facility in Denver, Colorado. Higgs formerly was maintenance supervisor at its Part 145 repair station in Addison, Texas,

Airworthy Inc. named **Del Hebert** general manager for the Cabin Solutions Division in Anaheim, California. ■

AWARDS and HONORS

The Air Charter Association honored the late Marshall Group chairman, **Sir Michael Marshall**, with The Chairman's Award, recognizing his lifelong service to the aviation industry. Air Charter Association chairman Nick Weston and deputy chair Julie Black presented the posthumous award during the recent 17th annual Air Charter Excellence Awards ceremony at the Guildhall in London. Cambridge City airport director Kevan Craske accepted on behalf of Marshall's widow, Sibyl.

Marshall passed away in July while on vacation in Spain with his wife and friends. He was 87. A former Royal Air Force pilot, Marshall was in his early 20s when he joined the company founded by his grandfather in 1909. By 1965, he was appointed deputy chairman and took over as chairman and CEO after his father retired in 1989. He led the group over nearly the next three decades, helping expand the company into a multi-faceted aerospace organization with £2.5 billion in annual sales and almost 6,000 employees. Before he died, he was planning a flight to Morocco this year to celebrate the 70th anniversary of earning his pilot's license.

Weston praised Marshall's advocacy for women in aerospace engineering, STEM education, and career development of youth. "He was truly a force for good in the industry, and it is fitting, therefore, that we celebrate his contribution to the industry here and honor him with this award." ■

Fund an Angel Cocktail Reception

On behalf of the Corporate Angel Network (CAN) team and Fund an Angel Planning Committee, thank you to the sponsors, auction donors and attendees who helped to make the 2019 cocktail reception an evening to remember. The event raised significant funds to support CAN's mission of transporting cancer patients to treatment through the use of corporate aircraft. The generosity of the business aviation community at this event and throughout the year helps to provide over 250 patient flights every month.

Save the date for next year's reception: Wednesday, October 7 in Orlando, FL.

Thank you

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To learn more about Corporate Angel Network and future events, visit corpangelnetwork.org.

SINGAPORE 2017

DAVID McINTOSH

DECEMBER

MASSACHUSETTS BUSINESS AVIATION ASSOCIATION SAFETY DAY... December 4, Marriott Burlington. Info: massbizav.org.

JANUARY 2020

THE PRINCIPLES OF AIRCRAFT VALUATIONS AND APPRAISALS... January 10, Fort Lauderdale, Florida. Info: aeropodium.com/valuation.html

HAI HELI-EXPO... January 27-30, Anaheim Convention Center, Anaheim, CA. Info: rotor.org.

NBAA WEST PALM BEACH REGIONAL FORUM... January 29, Palm Beach International Airport, West Palm Beach, FL. Info: nbaa.org.

FEBRUARY 2020

SINGAPORE AIRSHOW... February 11-16, Changi Exhibition Center, Singapore. Info: singaporeairshow.com.

MARCH 2020

AIR CHARTER SAFETY SYMPOSIUM... March 3-4, NTSB Training Center, Ashburn, VA. Info: acsf.aero/symposium/.

NBAA SAN JOSE REGIONAL FORUM... March 5, San Jose International Airport, San Jose, California. Info: nbaa.org.

INTERNATIONAL WOMEN IN AVIATION CONFERENCE... March 5-7, Disney's Coronado Springs Resort, Lake Buena Vista, FL. Info: wai.org/conference.

NBAA INTERNATIONAL OPERATORS CONFERENCE... March 16-19, Charlotte, North Carolina. Info: nbaa.org/events/2020-international-operators-conference/.

FSF 6TH ANNUAL SINGAPORE AVIATION SAFETY SEMINAR... March 17-20, Singapore Aviation Academy, Singapore. Info: flightsafety.org/summit-seminar/6th-annual-singapore-aviation-safety-seminar/

AIRCRAFT ELECTRONICS ASSOCIATION INTERNATIONAL CONVENTION AND TRADE SHOW... March 24-27, Nashville, TN. Info: aea.net.

OPERATING LEASE SEMINAR... March 24-26, Doubletree by Hilton Sawgrass Mills, Fort Lauderdale, Florida. Info: everestevents.co.uk/event/operating-lease-aviation-finance-seminar-2020/

APRIL 2020

TECHNICAL ASPECTS OF A LEASED ASSET... April 21, NH Amsterdam Centre, Amsterdam, Netherlands. Info: 31 (0) 206841351; nhamsterdamcentre@nh-hotels.com; everestevents.co.uk/event/technical-aspects-of-a-leased-asset-2020/.

MAINTENANCE RESERVES SEMINAR... April 22, NH Amsterdam Centre, Amsterdam, Netherlands. Info: 31 (0) 206841351; nhamsterdamcentre@nh-hotels.com; everestevents.co.uk/event/maintenance-reserves-seminar-2020/.

EURASIAN BUSINESS AVIATION SUMMIT AND EXHIBITION... April 28-30, Gostiny Dvor Exhibition Complex, Moscow, Russia. Info: +7 9372 757 085; email: info@eabaa.show; eabaa.show.

FSF 65TH ANNUAL BUSINESS AVIATION SAFETY SUMMIT... April 29, 30, Savannah Convention Center, Savannah, Georgia. Info: +1 703 739 6700; flightsafety.org/event/65th-annual-business-aviation-safety-summit/.

MAY 2020

EUROPEAN BUSINESS AVIATION CONVENTION & EXHIBITION... May 26-28, Palexpo Convention Center, Geneva, Switzerland. Info: info@ebace.aero; ebace.aero/2020/

JUNE 2020

NBAA WHITE PLAINS REGIONAL FORUM... June 10, Westchester County Airport, White Plains, New York. Info: nbaa.org.

CBAA CONVENTION... June 16-18,-Toronto, Canada. Info: Tel: (613) 236-5611; cbaa-acaa.ca/CBAA/Events/Convention_2020/CBAA/Convention_links/CBAA_2020/2020_Homepage.aspx?hkey=af0a107e-4899-4657-a087-e19cfc67dee8.

JULY 2020

FARNBOROUGH INTERNATIONAL AIRSHOW... July 20-24, Show Centre, ETPS Rd, Farnborough, England. Info: +44 (0) 1252 532800; enquiries@farnborough.com; farnboroughairshow.com.

OCTOBER 2020

NBAA BUSINESS AVIATION CONVENTION & EXHIBITION... October 6-8, Orange County Convention Center Orlando Executive Airport, Orlando, FL. Info: 202-783-9000; nbaa.org/events/2020-nbaa-business-aviation-convention-exhibition/.

NOVEMBER 2020

BAHRAIN INTERNATIONAL AIRSHOW... November 18-20, Sakhir Air Base, Kingdom of Bahrain. Info: +44 1252 532800; bahraininternationalairshow@farnborough.com; bahraininternationalairshow.com.

DECEMBER 2020

MEBAA SHOW... December 8,-10, DWC South, Dubai, UAE. Info: mebaa.aero.

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