Aviation International News

AIN PUBLICATIONS

Vol.50 | No.8

$9.00

AUGUST 2019 | ainonline.com

G600 prepping for service entry

by Curt Epstein

Gulfstream's newest addition to its lineup, the large-cabin, long-range G600, earned both its type and production certificates from the FAA on June 28, paving the way for deliveries to begin later this year. If the process follows Gulfstream's experience with the smaller sibling to the G600, the G500, those deliveries would likely start next month. The G500 received U.S. approval in July 2018 and Gulfstream delivered the first of the model on September 27. Through early March of this year, it had delivered 10 G500s. For Gulfstream, the G600 combined certificate awards represent its third model to receive both approvals simultaneously, joining the G550 in 2003 and the G500.

"Getting both authorizations on the same day is evidence of the maturity of our G600 production processes and speaks to the safety and reliability of the aircraft's design," said Mark Burns, the Georgia-based airframer's president. "Even more remarkable is the fact that we achieved these simultaneous certifications less than a year after completing another major program, certifying and delivering the Gulfstream G500." He added that the G600 program tallied nearly 100,000 hours of laboratory testing and more than 3,200 hours of flight testing.

The G600 has a cabin that is configurable for three living areas, with a range of 6,500 nm at its long-range cruise of Mach 0.85, and at its high-speed cruise of Mach 0.90 can travel 5,500 nm. "We can't wait to put the newest member of our aircraft family, one that spectacularly combines performance, efficiency, technology, and comfort

› continues on page 54

Read Our **SPECIAL REPORT**

Product Support Survey - Aircraft

The highest-performing business jet in the world is only as good as its dispatch reliability. **AIN**'s annual product support survey series starts off this month with readers' ratings of major OEMs and their customer-support networks.

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Textron places Hemisphere project 'on hold' once again

by Jerry Siebenmark

Textron Aviation is shelving development of the Hemisphere large-cabin business jet, Textron Inc. CEO Scott Donnelly announced July 17 during its second-quarter conference call. Hemisphere could be revived at a later date, Donnelly acknowledged, but for now it's "on hold" because the Wichita-based manufacturer isn't satisfied with progress on the development of the Safran Silvercrest engine that would power it.

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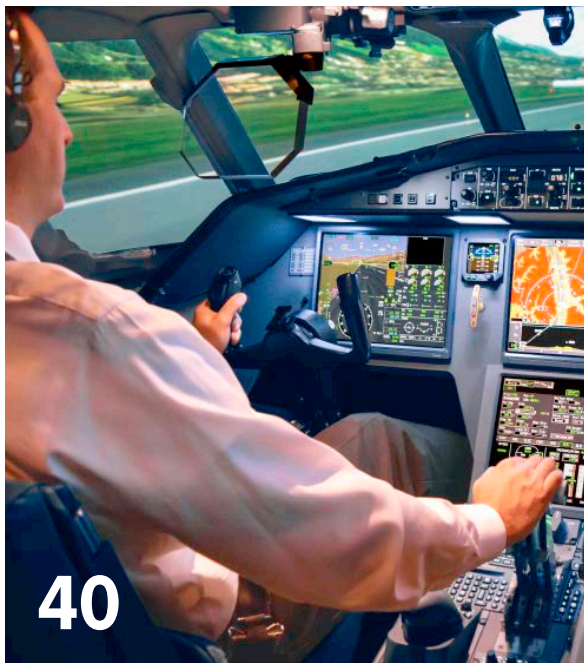

PILOT REPORT

Since it took a majority stake in the small narrowbody that was previously the Bombardier C Series, Airbus has taken the narrowbody A220 to the next level.

Aviation International News

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Aviation International News (ISSN 0887-9877) is published monthly. Periodicals postage paid at Midland Park, N.J., and additional mailing offices. **Postmaster:** Send address changes to Aviation International News, P.O. Box 8059, Lowell, MA 01853 USA. Allow at least eight weeks for processing. Include old address as well as new, and an address label from a recent issue if possible. Subscription inquiries: +1 (203) 798-2400 or email: subscriptions@ainonline.com.

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As We Go To Press

TEXTRON AVIATION Q2 DELIVERIES, REVENUE DROP

Textron Aviation delivered two fewer business jets and 14 fewer turboprops from second-quarter 2018, leading to a $153 million decline in revenue, to $1.1 billion, parent company Textron announced on July 17. Despite the lower deliveries—46 jets and 34 turboprops—its quarterly profit increased by $1 million from a year ago. The company saw lower order activity beginning in late May across its product line "largely attributable to the uncertainties around tariffs and concerns about economic growth," said Textron Inc. CEO Scott Donnelly. Those concerns have since eased and a combination of positive economic indicators, along with the Federal Reserve signaling a cut to interest rates, suggest a better quarter ahead, he added. Meanwhile, Donnelly said the super-midsize Cessna Citation Longitude is expected to receive type certification by October.

EBAA: RUSSIA'S BIZCRAFT RULE LACKS CLARITY

A new Russian regulation requires, among other things, that operators of non-Russian-certified business aircraft obtain approval five days before their intended flights to or from the country and that there is no "objection" determination by any of eight Russian airlines. EBAA said the rule was implemented without clear guidance or processes in place. EBAA has reached out to the Russian United Business Aviation Association (RUBAA), which initiated an emergency meeting with the Deputy Minister of Transport of the Russian Federation to get clarification of the requirements. "The authorities were receptive to the arguments RUBAA put forward on behalf of the business aviation industry regarding flights to and from Russia," EBAA said. "There is currently no date when or if any changes will take place."

COLUMBIA HELICOPTERS BEING SOLD TO PRIVATE EQUITY FIRM

Columbia Helicopters is being sold to private-equity firm AE Industrial Partners (AEI), the companies announced on July 18. Columbia CEO Steve Bandy will remain in his role, while majority owner Nancy Lematta will retain a "significant ownership position" in the company. Terms of the transaction, which is expected to close later this year, are not being disclosed. The sale announcement comes five months after now-bankrupt Bristow Group terminated a deal to acquire Columbia for $560 million.The company specializes in helicopter MRO and heavy-lift operations with tandem-rotor helicopters for missions that include military support, firefighting, and on-shore oil and gas.

NEW PROCEDURE FOR IFR CLEARANCES

The FAA's Clearance Relay Initiative has changed the way pilots obtain IFR clearances from non-tower airports. For pilots calling for a clearance on the telephone, they can now obtain their clearance by calling the overlying ARTCC Flight Data Units or an approach control facility. Previously, pilots would telephone Leidos Flight Service, the contractor that provides flight service information for pilots flying in the U.S., which would relay the request to FAA facilities. Leidos, however, will still relay clearances over remote-communications outlets located on the airport, as well as continue to provide full weather briefings and flight plan filing services, along with the relay and cancellation of IFR clearances, for medevac pilots via telephone. Pilots on normal flight plans can call ARTCC Flight Data Unit or approach control phone numbers to obtain their IFR clearance and also cancel clearances.

VISTA GLOBAL BLENDS XOJET, JETSMARTER INTO XO

Vista Global (VG) has unveiled XO, a "digital jet marketplace" that combines and replaces XOJet and JetSmarter, the respective charter fleet owner/operator and mobile booking app developer the Dubai-based group recently purchased in its bid to create a global charter offering. XO "addresses the shift toward digital solutions in the industry," VG said, creating a one-stop offering where "customers will be able to choose the best digital membership option, request a flight, or book a seat—instantly." It said XO will deliver "elevated services" by leveraging the "customer-centric expertise of XOJet with the speed and convenience of technology originally developed by JetSmarter."

FAA AC GUIDES ON CONTINUOUS AIRWORTHINESS MX PROGRAMS

The FAA has issued draft Advisory Circular AC 120-MPTP containing guidelines, recommendations and suggested means of compliance with a continuous airworthiness maintenance program (Camp). Under Camp, maintenance training, supervision, and activities must be tailored to the user's specific operation. Information in this draft AC includes "regulatory expectations" regarding the implementation of the program. Camp authorization is a requirement for all Part 121 aircraft and Part 135 aircraft that are certified with 10 or more passenger seats. It is an option for other Part 135 certificate holders and Part 91K fractional ownership operations. However, the FAA expects those who join the program to voluntarily follow all Camp requirements.

Canada's aircraft registry has its first Pilatus PC-24 after the airframer's exclusive distributor in the country delivered its first of the light jets, which can operate from unprepared runways, to a Canadian operator.

First PC-24 joins Canada's registry

Two weeks after the Pilatus PC-24 received certification from Transport Canada, the first of the versatile light jets has been delivered in the Great White North. According to Ontario-based Levaero, which has served as the airframer's exclusive Canadian distributor since 1997, this first C-registered PC-24 was handed over to an experienced operator and will further diversify its aircraft fleet.

The Swiss-made twinjet, which offers good short-field performance coupled with the ability to operate from unpaved surfaces, received FAA and EASA approval in December 2017 then entered service early last year.

"Since the PC-24 was first revealed to the public, pulled into the Swiss rollout event by 24 horses, Pilatus has delivered more than 35 aircraft, which have amassed more than 7,000 flight hours," said Stan Kuliavas, Levaero's vice president of sales. "This aircraft is extremely well-suited for operations in Canada, and we look forward to many more PC-24 aircraft gracing the Canadian skies." **C.E.**

CCX Technologies releases cybersecurity hardware

by Matt Thurber

Avionics test equipment and airborne networking manufacturer CCX Technologies has developed a "cybersecurity appliance" that is designed to prevent unauthorized access to onboard networks and electronic systems. The AP-250 "monitors airborne networks right on board, defending and protecting all aircraft systems—from the flight deck to the cabin," according to CCX.

Retailing for $14,850, the AP-250 connects to an aircraft's existing wide-area or local-area network (WAN or LAN), and it can also monitor databuses. Airborne connectivity is not required, but the AP-250 can interface with satcom terminals and routers.

Once installed, the AP-250 monitors the onboard network, and the operator can see alerts of potentially malicious activity using CCX's graphical user interface. Operators can also incorporate a CCX application programming interface in their own systems. Cybersecurity services supported by the AP-250 include advanced intrusion detection and prevention system protocols, log collection, monitoring, and storage.

The AP-250 can indirectly monitor wireless communications when installed downstream of the router, which allows it to monitor all traffic on the network. A future product release will include the ability to directly monitor wireless communications.

"As aircraft systems become increasingly interconnected through the onboard network, new capabilities are emerging and along with them, new threats," said Chris Bartlett, president of CCX Technologies. "Cybersecurity may once have focused on aeronautical communications systems, now it's clear that the aircraft itself and electronic systems must address increasing and evolving cybersecurity threats." ■

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Bombardier expects to begin deliveries of its "rescoped" Learjet 75 Liberty in 2020.

Learjet 75 Liberty 'rescoped' to compete in light-jet space

by Jerry Siebenmark

Bombardier on July 2 announced the Learjet 75 Liberty as its newest offering in the storied business jet brand. It's "a rescoped aircraft that's going to be cost-competitive with Part 23 light jets from an operating-cost perspective but also purchase-cost perspective," Bombardier Business Aircraft spokesman Mark Masluch told **AIN**. To accomplish this, the Liberty will have fewer seats and options than the original Learjet, shaving about $3 million off the price tag while keeping the performance, the Canadian airframer said.

Bombardier hopes the lower price tag will drive a new segment of buyers to the Wichita-assembled aircraft, which has seen steadily declining deliveries over the past five years to just a dozen last year, according to data from the General Aviation Manufacturers Association.

At $9.9 million, the Liberty sheds two seats in the forward cabin—for a total of six seats—replaced by two fold-down ottomans and fold-out tables, creating what it calls the "executive suite" for the two remaining seats in the forward section of the cabin, which is separated from the cockpit by a sliding pocket door. In the aft cabin, the four remaining seats are placed in a club configuration.

"You're getting a light jet that not only flies faster, flies farther but [also] has the largest seated room in the cabin [in the light-jet category]," Masluch added.

The jet retains its 51,000-foot ceiling and its two Honeywell TFE731-40BR engines, each with 3,850 pounds of thrust. High-speed cruise remains Mach 0.79 but range improves by 40 nm to 2,080 nm with NBAA IFR reserves. Also standard on the Liberty is the Bombardier Vision flight deck with the recently announced upgrade to the jet's Garmin G5000 avionics, as well as Gogo ATG 4G airborne connectivity. Deliveries are expected to begin in 2020.

What was standard on the Learjet 75 will be optional on the Liberty, such as the APU and external lights, Masluch explained. "It's a little bit more flexible approach to the program that allows us to get in the price range to more directly compete with light jets in the Part 23 realm," he said, noting that the Liberty will retain the Learjet 75's Part 25 certification. Liberty essentially replaces what the market has known as the Learjet 75. Customers who would want a Learjet 75 would simply order the options that come with the Liberty, as well as an eight-seat cabin.

"Having a product that's competitive and aligned with market demand is going to really help stabilize the long-term manufacturing part of the Wichita site," Masluch added. "This really provides a lot of leg room in terms of our production capacities for Learjet aircraft with a product that's rightly scoped for the market and competes more directly with light jets that are Part 23 certified." ■

Proposal would permit SST flight testing over U.S.

Recognizing the increased interest in supersonic aircraft development, the FAA has issued a notice of proposed rulemaking (NPRM) to include a procedure to request authorization under Part 91 for supersonic flights over the U.S. for testing and development of these new aircraft. Current regulations prohibit all overland supersonic civil flights in the U.S.

Specifically, the FAA is proposing to provide a "user-friendly" application procedure for these special flight authorizations by designating a single FAA office where applications and questions should be sent, consolidating the application requirements into a single list, and proposing a new reason for flight testing to accommodate future noise certification actions.

Each application must include: (1) The name of the operator; (2) The number and model(s) of the aircraft to be operated; (3) The number of proposed flights; (4) The date range during which the flights would be conducted; (5) The time of day the flights would be conducted; (6) A description of the flight area requested; (7) All conditions and limitations on the flights that will ensure that no measurable sonic boom overpressure will reach the surface outside of the proposed flight area; and (8) The reason(s) that operation at a speed greater than Mach 1 is necessary.

Furthermore, each applicant must indicate why its intended operation cannot be safely or properly accomplished over the ocean. Comments on the NPRM are due by August 27. **G.G.**

News Briefs

Mitsubishi To Acquire Bombardier's CRJ Program

Mitsubishi Heavy Industries and Bombardier have entered into a definitive agreement under which MHI will acquire the CRJ regional jet program for $550 million in cash and assume liabilities amounting to some $200 million. Under the deal, MHI will acquire the maintenance, support, refurbishment, marketing, and sales activities for the CRJ Series aircraft, including the related services and support network located in Montréal and Toronto, its service centers located in Bridgeport, West Virginia, and Tucson, Arizona, as well as the type certificates. The deal signals the impending end of CRJ production. The sides expect the transaction to close during the first half of 2020.

Honda Makes First Hawaiian Delivery

Honda Aircraft in late June handed over the first HondaJet Elites for a customer in Hawaii. Delivery of the two light jets to startup company Wing Spirit was marked at Daniel K. Inouye International Airport (HNL) in Honolulu, Oahu. Wing Spirit plans to operate the twinjets for inter-island charters, as well as exploring their use for air ambulance and aviation education opportunities throughout the Hawaiian islands. Globally, the HondaJet fleet now totals more than 125 with these latest deliveries, which also mark the first light jets to enter commercial service in Hawaii.

FAA Limits Certain Collins TCAS Use

The FAA issued an Airworthiness Directive that imposes operating limitations on TCAS used in Collins FDSA-6500 flight display systems installed on certain Bombardier Challenger 604, Cessna Citation CJ3, and Beechcraft King Air models. The agency warned of a potential conflict between TCAS display indications and aural alerts that can occur during a resolution advisory (RA). "While the aural alert will provide the pilot with accurate information to resolve the RA, that information is not accurately represented by the TCAS fly-to/avoidance cue display," the FAA said.

Sparfell Acquires LaudaMotion Executive

LaudaMotion Executive, whose namesake Niki Lauda passed away in May, has been acquired by Switzerland-based Sparfell Aviation Group, giving the latter a private charter operation with 13 primarily Bombardier business jets including the first Global 7500 delivered in Europe. "Niki Lauda's expertise, reputation, and precision were legendary, both in Formula One and in aviation," Sparfell Aviation Group chairman Philip Queffelec said. The acquisition builds on Sparfell's business jet operations, aircraft sales, corporate leasing, aircraft interior design, and aerospace and defense consulting.

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U.S. bizav operators see fatalities skyrocket in 1H19

by Gordon Gilbert

The high number of fatal accidents and fatalities involving U.S.-registered turbine business airplanes in the first half of this year might set an all-time record for a six-month period, with June clearly being the deadliest 30-day timeframe. According to preliminary statistics gathered by **AIN**, 21 people died in five business jet crashes and 36 lost their lives in eight turboprop crashes during the first half of this year. All but two of the fatal accidents occurred while operating under Part 91.

In the same six-month block last year, one died in a single business jet accident and seven perished in three turboprop mishaps. Indeed, historical data do not indicate any other first half where U.S. business jet fatalities topped 21 before the first six months of the year. However, bizjet fatalities did hit 27 in all of 2014. The last complete year in which turboprop fatalities climbed to more than 36 was in 2013.

To put this year's numbers in context, note that 13 people are believed to have been killed in the crash of an N-numbered Bombardier Challenger 601-3A that went missing May 5 over Mexico on a charter flight. Two died in the May 22 crash of a Cessna Citation SII and the sole-occupant pilot was killed just two days later when a Citation 560 overshot its planned destination and crashed into the sea. On April 12, three were killed in the crash of a Rockwell Sabreliner. Two perished in a March 18 landing accident of an Israel Aircraft Industries Westwind 1124.

Three bizjet nonfatal mishaps recorded as accidents in the first half of 2019 included "serious injury" to a passenger when a Citation 560 encountered severe turbulence en route on June 27. On January 12, a Challenger incurred substantial damage following a runway excursion on landing, and on March 9, a Gulfstream GIV was substantially damaged when it landed about 10 feet short of the runway threshold.

June Is Busting Out All Over

Two Beech King Air takeoff accidents resulted in 21 of the fatalities involving turboprops in this year's first half: 11 in the June 21 crash of a skydiving A90 and 10 on June 30 of a Model 350 that hit a hangar. Two more fatal accidents in the same month included a Cessna Conquest that crashed on June 10, killing the pilot and sole occupant, and the in-flight breakup on June 7 of a turboprop-converted Piper Malibu that resulted in four fatalities. In this case, IMC prevailed but the pilot was not instrument rated. A turboprop-converted Malibu was also involved in a fatal crash on February 28, killing the two people on board.

A May 13 midair between two tour aircraft took the life of one person in a de Havilland Turbine Otter and (not shown in the charts) all five people in a piston-powered de Havilland Beaver. On January 21, the four occupants on a turbine DC-3 died when their converted twin crashed, and three died in the January 29 accident of an air ambulance King Air 200.

No non-U.S.-registered business jets or turboprops suffered any fatal accidents in the first half of this year, compared to the same period in 2018, when 12 people died in two crashes of business jets and 15 people lost their lives in three crashes by turboprops. Additionally, both the non-N-numbered jet and turboprop segments experienced fewer nonfatal accidents in the first six months of this year compared with last year.

Although there were no fatalities involving non-N-numbered business jets, there was a "serious incident" resulting in the aircraft being "written off." On April 16, A Global 5000 departed Berlin-Schönefeld Airport on a functional check flight after having undergone heavy maintenance. The flight returned to Berlin after reaching 21,000 feet and experiencing "flight control problems." Both wing tips are said to have touched the runway on takeoff. "After inspection, substantial damage to the plane was assessed. The plane is possibly a write-off," said investigators. ■

AIN tables show "incidents" as well as "accidents" to distinguish mishaps based on their degree of severity. Investigators often draw fine distinctions between the two events, but, typically, incidents result in minor or no damage and their investigations are sometimes delegated to local officials.

Accidents are events that range from minor damage to destruction and/or injuries. Also, some incidents ultimately get upgraded to accident status during the investigative process.

Accidents/Incidents Worldwide (1H/2019 vs. 1H/2018)

U.S.-registered Business Jets and Turboprops

Business jets	Total		Part 91		Part 91K		Part 135		Public/Gov't		Mfr.	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Total accidents	**8**	**6**	**7**	**4**	**0**	**0**	**1**	**1**	**0**	**1**	**0**	**0**
Nonfatal accidents	3	5	3	3	0	0	0	1	0	1	0	0
Fatal accidents	5	1	4	1	0	0	1	0	0	0	0	0
Fatalities	21	1	8	1	0	0	13	0	0	0	0	0
Incidents	31	21	23	16	0	0	8	5	0	0	0	0

Business turboprops	Total		Part 91		Part 91K		Part 135		Public/Gov't		Mfr.	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Total accidents	**12**	**6**	**11**	**5**	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
Nonfatal accidents	4	3	4	2	0	0	0	1	0	0	0	0
Fatal accidents	8	3	7	3	0	0	1	0	0	0	0	0
Fatalities	36	7	35	7	0	0	1	0	0	0	0	0
Incidents	24	21	21	16	0	0	2	5	0	0	1	0

All data preliminary. Sources: FAA, NTSB, Aviation Safety Network, AIN research

Non-U.S.-registered Business Jets and Turboprops

Business jets	Total		Private		Charter		Other*		Unknown	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Total accidents	**6**	**8**	**3**	**5**	**1**	**1**	**2**	**1**	**0**	**1**
Nonfatal accidents	6	6	3	3	1	1	2	1	0	1
Fatal accidents	0	2	0	2	0	0	0	0	0	0
Fatalities	0	12	0	12	0	0	0	0	0	0
Incidents	10	5	5	3	2	1	1	1	1	0

Business turboprops	Total		Private		Charter		Other*		Unknown	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Total accidents	**9**	**13**	**3**	**2**	**1**	**7**	**3**	**3**	**3**	**1**
Nonfatal accidents	9	10	3	2	1	5	3	2	3	1
Fatal accidents	0	3	0	0	0	2	0	1	0	0
Fatalities	0	15	0	0	0	11	0	4	0	0
Incidents	7	4	3	0	1	1	2	3	1	0

**For example: ambulance, survey, ferry, training, testing, manufacturer, government (non-military), and head of state.*

News Briefs

CoolView Windows PMA'd for Beechjet

Lee Aerospace has received parts manufacturing approval (PMA) of its CoolView windows for the side cockpit windows on the Beechjet 400, 400A, and 400T. CoolView, which blocks up to 62 percent of infrared rays and virtually all UV rays via an internal metallic barrier. CoolView windows were previously PMA'd for Beechcraft King Airs and Hawkers. The windows were on display on a Beechcraft King Air C90 last month at EAA AirVenture.

Senator Suggests Implementing TFRs for Concerts

The ranking Democrat on the Senate Commerce Committee, Sen. Maria Cantwell (Washington) has expressed interest in expanding the scope of temporary flight restrictions (TFR) to include major events such as concerts. "It has been brought to my attention that FAA is unable to grant temporary flight restrictions for major events such as concerts, even when they are held in venues where TFRs are regularly granted for sporting events," Cantwell said. "These concerts often draw a similar and sometimes larger crowd than the sporting events that take place in these venues."

FAA Policy To Provide Relief During ADS-B Outage

The FAA is assuring operators that, in certain circumstances, a degradation of GPS performance will not be deemed as noncompliance with ADS-B Out requirements, including in cases where the properly-equipped operators conduct "due diligence." An operator might perform due diligence before a flight to ensure the availability of ADS-B service for an intended route, but experience a rerouting that results in encountering an unanticipated degradation of performance. Further, an operator might encounter GPS interference along the intended path or be unable to complete a preflight check of availability because the FAA's tool for such a check, the service availability prediction tool (SAPT), is out of service, the agency noted, and said it "will not consider these events to constitute noncompliance...due to the circumstances."

Flexjet Taps GE To Take FOQA to Next Level

Flexjet is taking its flight operations quality assurance (FOQA) program to the next level by marrying GE's flight safety analysis services with quick access recorders (QARs) with built-in cellular data services from GE joint-venture partner Avionica. The equipment will be used to monitor Flexjet's U.S. fleet of 150 aircraft, which includes the Embraer Phenom 300 and Legacy 450; Bombardier Challenger 300/350 and Global Express; and Gulfstream G450 and G650. Flexjet expects to have its entire fleet equipped with Avionica mini-QARs by the fourth quarter of next year.

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Orange County approves GA restructuring at SNA

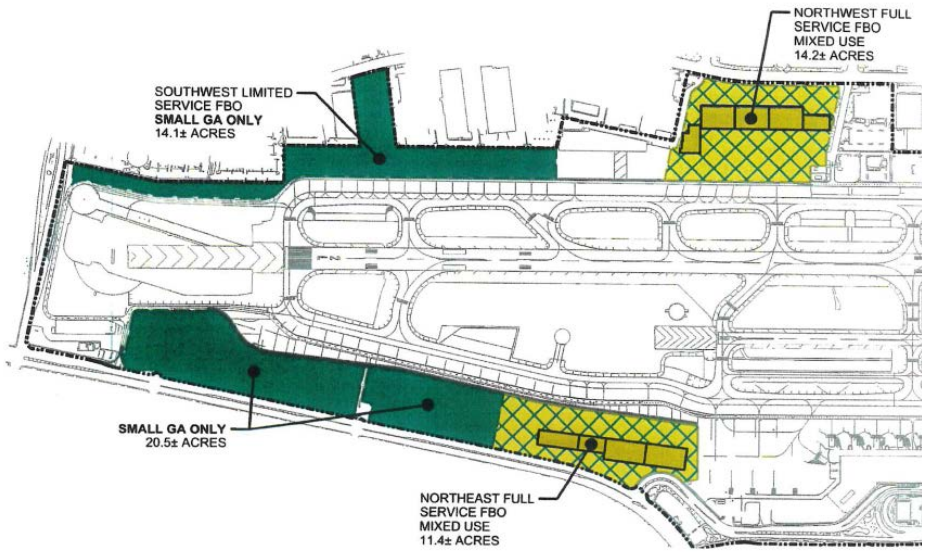
by Curt Epstein

California's Orange County Board of Supervisors has unanimously approved major alterations to the general aviation infrastructure at John Wayne-Orange County Airport (SNA). The 5-0 vote on the proposal put forward by vice-chair Second District supervisor Michelle Steel during a June 24 meeting will redefine the current acreage designated for smaller-aircraft operations and at the same time reduce the space available for larger business jets as part of the airport's General Aviation Improvement Plan (GAIP).

The airport is currently served by two full-service FBOs: Atlantic Aviation, which occupies a more-than-20-acre leasehold on the southeast corner of the airfield, and ACI Jet, which sits on 25.6 acres, with facilities on both sides of the airport. The two operate separated portions of a common fuel farm. There are also two limited-service FBOs that do not provide fueling. One, Martin Aviation, is still under a lengthy lease, while the other, Jay's Maintenance, is operating on a month-to-month lease, as are the two full-service companies.

Steel's approved proposal calls for the airport to issue an RFP for long-term leases for the two plots now occupied by ACI, which will exist as two separate FBOs, while the 20.5-acre plot currently occupied by Atlantic Aviation on the southeast corner of the airfield will be leveled and designated for light-aircraft use only. One limited-service FBO will be selected for the 14-acre southwest parcel, which will also be limited to small aircraft. Medium- and large-cabin business jets, which previously had the run of the more than 60 acres of GA space, will be restricted to the 25.6 acres of the two full-service FBO plots, according to the lease restrictions.

According to Steel, the move is intended to protect small general aviation at the airport. While GA accounts for around 70 percent of SNA's total aircraft operations, over the past approximately 25 years, there has been a nearly 20 percent decline in general aviation aircraft based at SNA, and according to the airport, the GA fleet mix has changed over the past several years. The number of single- and twin-engine piston airplanes has declined, while the number of business jets based there has increased to more than 100.



Approved changes to the general aviation space at John Wayne-Orange County Airport will split the space currently occupied by ACI Jet into two separate FBOs, while the Atlantic Aviation site will be leveled and reserved for light GA use only.

"I have worked closely with the City of Newport Beach, community groups, and individual residents to prepare this proposal that creates land restrictions to preserve small general aviation at the airport," said Steel. "I will continue to work with residents, cities, and community groups through the RFP process to preserve the mix of general aviation at John Wayne Airport."

According to one source, the decision was influenced by growing concerns from the local communities about the proliferation of business jet, air-taxi, and other operations, which they believe are responsible for noise and air quality problems. Indeed, since the program was announced, there have been protests in the area that mischaracterized the GA redevelopment as an expansion of the airport. SNA officials noted that there are already more jets on the airport than there is available hangar space, with many of the hangars unable to accommodate the latest big business jets with greater wingspans. The airport expects that under the GAIP, many of the existing GA structures will be torn down and replaced, with the possible exception of the terminal currently occupied by ACI Jet, as the company has made significant renovations to the facility since occupying it at the beginning of 2017. Development of new FBOs and new hangars could reduce the number of repositioning flights involved in dropping off local passengers and then relocating to other airports where the aircraft are based, the airport pointed out.

The RFP will also invite interested FBO operators to negotiate with U.S. Customs and Border Protection to include in their bid an international GA facility to operate from 5 a.m. until 12 a.m., which will allow private flights to use SNA as an entry point. According to an airport spokesperson, there was no time frame yet for issuing the RFP.

Even though the new plan provides less airport real estate for business jet operations, an NBAA spokesman told **AIN**: "the presence of business aviation at an airport means opportunities for job creation, economic growth, and the success of local companies, including in Orange County." Dan Hubbard, the organization's senior vice president of communications concluded: "While we always view more airport capacity as a good thing, we know that all interests must be considered, and the plan for growth at John Wayne Airport appears to take that approach, including an investment in additional accommodations for business aviation, and a consensus that the airport is and will remain a valuable community asset." ■

FDoT: GA airports generated $18.5B in 2017

According to a recent economic impact study by the Florida Department of Transportation, the state's 129 public airports accounted for nearly $175 billion in economic activity in 2017.

Of that amount, $91 billion was generated through commercial and general-aviation visitor spending, with more than half of the 110 million out-of-state visitors arriving in Florida by air. General-aviation passengers accounted for 5 percent of the passenger spending. Overall on-airport activity, including FBOs and other airport tenants and businesses totaling nearly 400,000 employees, accounted for $72 billion in economic output, with a payroll of $22 billion.

The study showed that the state's general aviation airports alone were estimated to generate a total economic impact of nearly $18.5 billion. Among the highest were Page Field in Fort Myers, Lakeland Linder International, Naples Municipal, Cecil Airport in Jacksonville, Lake City Gateway, Bob Sykes Airport in Crestview, Boca Raton Airport, Fort Lauderdale Executive, Treasure Coast International in Fort Pierce, Witham Field in Stuart, Vero Beach Regional Airport, Deland Municipal-Sidney H. Taylor Field, Orlando Executive, Miami Opa-Locka Executive, and Pilot Country Airport in Brooksville. **C.E.**

News Briefs

Gogo Plans U.S./Canada 5G ATG Network

Aviation connectivity products and services provider Gogo has announced plans to build a 5G air-to-ground network in the contiguous U.S. and Canada that would be available for business and commercial aviation customers in 2021. Gogo's 5G network will be built on its existing infrastructure of more than 250 towers and use unlicensed spectrum in the 2.4-GHz range, in addition to beamforming technology. The company said its 5G infrastructure will support all spectrum types and bands, allowing it to take advantage of new advances in technology. Meanwhile, the company will continue to employ its 3G and 4G networks throughout the continental U.S. and in Canada to provide backup to the 5G network.

Bombardier's Challenger 350 Tops 300 Deliveries

Bombardier Business Aircraft has achieved a milestone by delivering its 300th super-midsize Challenger 350 just five years after its entry into service, the Canadian airframer announced last month. Announced at EBACE in May 2013 and certified in June 2014, the Challenger 350 is powered by two Honeywell HTF7350s, each with 7,323 pounds of thrust, has a high-speed cruise of 0.82 Mach, and can fly 3,200 nm with NBAA IFR reserves. Recent enhancements include an available compact head-up display (HUD) and enhanced vision system (EVS), cabin-soundproofing technology, and improved cockpit aesthetics. A performance improvement package also enables the Challenger 350 to fly up to 1,500 nm out of short runways.

Bizcraft Financier Global Jet Raises $517M

Business aircraft financier Global Jet Capital has closed its third securitization in a little more than a year, raising $517 million. The "BJETS 2019-1" securitization was the company's third asset-backed security (ABS) offering with total assets securitized now reaching more than $2.1 billion. It concluded its first securitization for $608 million in late February 2018, followed by a second securitization in June 2018, raising $674 million. This latest ABS included a $417.4 million Class A tranche; a $62.3 million Class B tranche; and a $37.4 million Class C tranche, each of which was oversubscribed and attracted orders from a variety of investors, according to Global Jet Capital, which was established in 2014 by three global investment firms and industry veterans to offer financing options to the business aviation market. Global Jet Capital plans to continue using the ABS market in its funding strategy.

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Zuccaro plans to retire from HAI post

by Mark Huber

KASHEA KLOSS

A highly decorated Vietnam veteran, Matt Zuccaro has led HAI since November 2005.

Longstanding Helicopter Association International (HAI) president and CEO Matt Zuccaro will retire effective June 30, 2020 and a search for a replacement has been launched, the association announced on June 24. Zuccaro has led HAI since November 1, 2005.

"The HAI Board of Directors, on behalf of the entire industry, offers our deepest appreciation to Matt for his service," says outgoing HAI chair James Wisecup. "Through his leadership, HAI has been a leading advocate to improve the safety of helicopter operations worldwide. Matt has also been a forceful supporter for the industry in legislative and regulatory matters, saving our members and the industry at large from overburdensome legislation and regulations."

During his career, Zuccaro held several executive and operations management positions with commercial, corporate, air tour, scheduled airline, and public-service helicopter operations in the northeastern United States. At the Port Authority of New York and New Jersey, he served in operations management positions at John F. Kennedy International Airport and the Port Authority's public and private heliports. Before assuming the helm at HAI, Zuccaro served as the organization's chairman, vice chairman, treasurer, and assistant treasurer as well as a director for six years as well as a special advisor to HAI's board. He is a past president of the Eastern Region Helicopter Council (ERHC).

He received his initial helicopter flight training as a U.S. Army aviator and served with the 7/17 Air Calvary unit in Vietnam, for which he was awarded two Distinguished Flying Crosses, three Bronze Stars, and 19 Air Medals. He was subsequently assigned as a flight instructor at the Army Flight School at Fort Rucker, Alabama. He holds airline transport pilot and flight instructor-instrument certificates for both airplanes and helicopters.

He is a recipient of the HAI Pilot Safety Award for 10,000 hours of accident- and violation-free flight hours, the NBAA Pilot Safety award, and numerous other industry awards for his efforts and commitment to the helicopter industry. ■

First Embraer Praetor 600 enters service

by Curt Epstein

Embraer has delivered the first of its new Praetor 600 super-midsize twinjets in a ceremony at its São José dos Campos facility in Brazil. The aircraft, handed over to an undisclosed European customer, rolled off the hybrid assembly line that also produces the Legacy 450 and Legacy 500.

The first super-mid with full fly-by-wire and turbulence-reduction technology, the Praetor 600, which made its debut at NBAA's annual convention last year, received certification from ANAC, FAA, and EASA earlier this year, the first in its category to be certified since 2014.

With an intercontinental range of 4,018 nm (four passengers, NBAA IFR reserves), the Praetor 600 claims the longest legs in its class, able to link Dubai and London; Paris and New York; and São Paulo with Miami, nonstop.

The aircraft, which will also be assembled at the airframer's Melbourne, Florida, production facility, offers a 5,800-foot cabin altitude and a six-foot-high flat-floor cabin.

"We are thrilled to deliver the first Praetor 600 and we are confident that our customer will be fascinated with the most disruptive and technologically advanced super-midsize business jet to enter the market," said Michael Amalfitano, president and CEO of Embraer Executive Jets, adding that "the aircraft is certain to create a new value experience for its customers and help them outperform in their business and personal endeavors." ■

SERGIO FUJIKI

Brazilian airframer Embraer delivered the first of its Praetor 600 super-midsize jets in a ceremony at its São José dos Campos headquarters. The $20.95 million twinjet, an upgrade of the Legacy 500, boasts improved range and a number of upgrades to interior design and architecture.

News Briefs

Aeroméxico Launches Private Jet Partnership

Mexican flag carrier Aeroméxico has launched a private jet division that will cater to passengers in Mexico and the U.S. It has partnered with Mexican private jet operator Aerolíneas Ejecutivas and U.S.-based Delta Executive Jets. The Aeroméxico Jet Card program requires an approximate $125,000 base purchase, to be used on the company's fleet of Hawker 400XPs, Learjet 75s, and Challenger 604s at different tier pricing levels. Aeroméxico customers who wish to fly privately can use Aerolíneas Ejecutivas to fly within Mexico and to the U.S., Canada, and Latin and South America. Those wishing to fly between destinations in the U.S. will use Delta Private Jets aircraft and crews to avoid cabotage issues. Helicopter service within Mexico is also available to cardholders.

FAA Admin Nomination Comes Under Question

Steve Dickson's nomination to the FAA administrator post apparently has hit a stumbling block as the Senate Commerce Committee reviews reports regarding a legal complaint alleging moves on the part of Delta Air Lines management to retaliate against a pilot whistleblower who brought safety concerns to light. The moves allegedly took place while Dickson was senior v-p of flight operations for Delta. The complaint alleges that a pilot who raised safety questions to airline leadership was subsequently ordered to undergo a psychiatric evaluation that ultimately led to the loss of pilot privileges. Two subsequent evaluations disagreed with the initial evaluations and the pilot returned to duty. The White House announced its intention to nominate Dickson to the post in March, and the nomination initially had received rare support from nearly all corners of the industry.

SmartFly Launches Aggregated Bizav Buying Program

SmartFly, a new "global procurement agency" for the business aviation industry, has launched with the aims of saving operators money via its aggregated buying power. The company started as the outsourced procurement partner for Luxaviation Group and is now being run as an independent business. Thus, it said, SmartFly's customers have immediate access to high volumes of supply, offering increased buying power and negotiating leverage from a highly experienced team. For aircraft owners, SmartFly offers selected services—including training courses, web data, and fuel—at a "significant" discount thanks to its bulk purchases of services and commodities. Aircraft operators are also able to use SmartFly to negotiate across all services contracts, it said.

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Industry remains optimistic about the future of LABACE

by Richard Pedicini

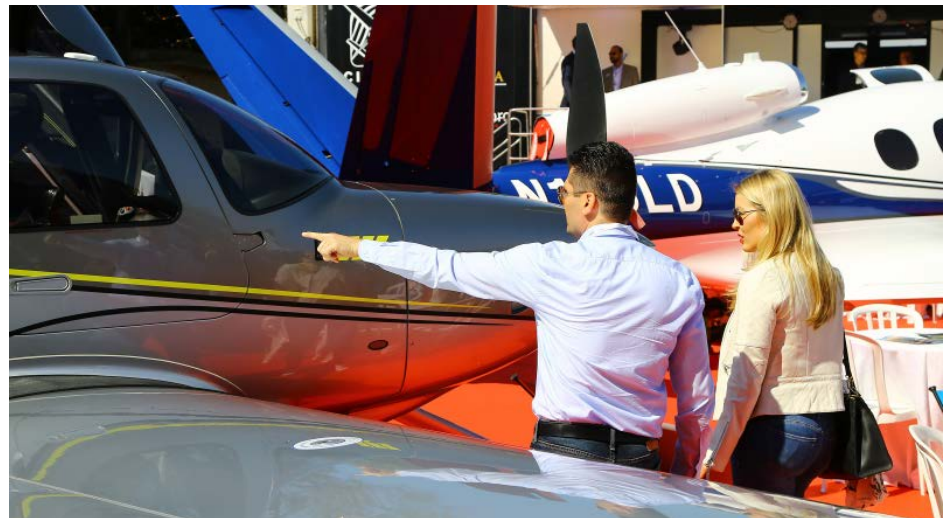
Exhibitor space is nearly sold out for LABACE, the Latin American Business Aviation Conference and Exhibition, taking place from August 13 to 15 at São Paulo's Congonhas airport in Brazil. Several of last year's innovations will be kept and expanded, including a tented area for rotary-wing static display. While Gulfstream closed its Sorocaba MRO facility in February, it's still exhibiting aircraft at LABACE. Most of the major business and GA manufacturers are expected to exhibit. And Bombardier's authorized maintenance facility Maga should again bring its customized bus with customer lounge in front and hoist capable of removing an engine at the back.

The political and economic stability expected when President Jair Bolsonaro was elected has so far remained just a promise, and investors are waiting for its fulfillment. In its first six months, the administration has been unable to pass a reform of the perpetually deficit-ridden public pension system, one of the structural causes of astonishingly expensive credit, and a barrier to growth. Several key officials have left or been pushed out. The World Bank's forecast annual GDP growth for Brazil was cut in June to 1.5 percent, from 2.2 percent in January.

Despite political turbulence, there are strong structural factors that have led Brazil to building the world's second-largest civil aviation fleet. The country and the aviation market have pockets of prosperity, such as agricultural producers whose products are priced in dollars and whose need for transportation from distant farms remains unchanged. Regulator ANAC, which aviation veterans have berated since its creation for its staff's inexperience (hardly surprising in a newly created agency), has shown greater maturity and sensitivity.

In an April meeting near Congonhas Airport, industry representatives were asked not only how the agency could smooth importation of aircraft and parts, but how it could coordinate with other agencies, such as customs, that are involved in the process. Bureaucratic fiefdoms working at cross-purposes are a long-standing ill.

For example, parts of the vast and, in part, roadless Amazon region rely on river and air transport, and air-taxi firms have been paid by health authorities for medical evacuations from uncertified airstrips; and then fined by aviation authorities for doing so. Congress and airspace control authorities have now made plans to improve radar and navigational aids; and to certify more airports in the region.



The market in Brazil is changing, and those changes might be reflected in the format of future shows, which could see an increased emphasis on utilitarian aircraft.

Another cloud on the political horizon is that the fight against corruption, symbolized by judge Sergio Moro, who cleared Bolsonaro's path to the presidency by jailing his chief rival, and was then made Minister of Justice, is being corroded by Glenn Greenwald (of the Snowden leaks). He continues to publish increasingly embarrassing promiscuous messages between prosecutors and the then-judge that challenge Moro's impartiality.

The Brazilian real remains weak, and dollar-priced products, including aircraft, remain expensive. The country's fourth-largest airline, Avianca Brasil, was driven into bankruptcy by rising dollar-valued costs, a poorly timed international expansion, problems in its controllers' other businesses, and weakened market demand.

Uncertainty faces the Brazilian aviation industry, with Embraer's regional aircraft operations becoming Boeing Brasil Commercial by year-end. That leaves a smaller Embraer, made up of the defense, business jet, agricultural, and service operations, along with the "disruptive" Embraer-X. Embraer is leaving a market it had conquered and where it is launching the last member of its E2 family. It's also leaving behind the facilities in São José dos Campos where it was founded but lacked space, and is phasing out the Legacy family of business jets, adapted from regional jets.

Business jet finishing is going to Melbourne, Florida; heavy manufacturing of the Phenom is already upstate in Botucatu, and the more highly roboticized Praetor line is moving to join the KC-390 and the future Gripen production in partnership with Saab. The established, more labor-intensive Super Tucano, at Embraer's Gavião Peixoto plant, has unrestricted room to grow. It also has the Western Hemisphere's longest paved runway, perhaps a sign that Embraer retains unrestricted room to dream.

LABACE also faces inevitable changes. Moving the fair from Congonhas is discussed almost annually, both because of the cramped and crumbling facilities of the former VASP base and the annual contract negotiations with airport administrator Infraero, which invariably encounter some snag that leaves too little planning time for fair manager ABAG and for exhibitors. The real estate the fair used to occupy has now been leased out for retail development, so LABACE must move. Among other possibilities, ABAG had explored a five-year contract at Campo de Marte airport, closer to the city center than Congonhas, but farther from the fashionable business district, probably requiring a change of hotels for exhibitors.

The business aviation market may gravitate toward the agricultural Central-West and embrace a more welcoming Amazon and may tilt toward more utilitarian aircraft, and LABACE may move across town.

The Brazil market remains one of the world's largest, and while decisions may be waiting on the political weather, the national climate has always been optimistic. The weak real means visitors' dollars go further, and the Bolsonaro administration has dropped the need for a visa for U.S. visitors. ■

PHOTOS: DAVID McINTOSH

This will be the last year Congonhas hosts the LABACE event, as the space the event occupies has been leased for real-estate development. Organizer ABAG has previously considered a move, and Campo de Marte is among the possible venues.

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Full-throttle opinion from former NTSB member John Goglia

The criminal element in aviation

I've been thinking about writing this article for several months, ever since we invited a special agent from the Department of Transportation's Office of Inspector General to speak to our students at Vaughn College of Aeronautics and Technology about the role of his office. One of the courses I co-teach at Vaughn College is aviation safety, and the OIG has a little-known but critical role in the aviation safety equation: investigating and helping U.S. Attorneys prosecute criminals whose conduct can affect air safety. Among its functions, the OIG investigates aviation crimes and works with the FBI and other federal, state, and local law enforcement to prosecute those crimes. According to the OIG's website, one of its roles is "conducting criminal, civil, and administrative investigations of fraud and a variety of other allegations affecting DOT, its operating administrations, programs, and grantees [grant funds]." Among its top priorities are crimes affecting public safety.

The students who heard the outstanding presentation that day were surprised at the number of criminal statutes that apply to aviation, but more than anything, they—and even some of the faculty—were shocked by the types of crimes committed by people who should have been trustworthy aviation professionals, some of which occurred in their own local area. Their reaction got me thinking that maybe others are not aware of the criminal statutes that apply to some aspects of aviation or of the criminal element that lurks among us. And if we're not aware of these criminal statutes, we may unwittingly get ourselves in more trouble than we anticipate. And if we're not aware of the criminal element, perhaps we're not doing enough to protect ourselves from them, when possible.

Pilots Prosecuted

One of the cases that hit particularly close to home for our students was the case of a pilot on Long Island—not too far from where our students do their flight training—who was providing flight instruction without a certified flight instructor (CFI) certificate and falsifying student pilot logbook entries. This pilot pled guilty this past January and is awaiting sentencing. Our students—many of whom are in training to become commercial pilots—were particularly shocked that someone could do this and get away with it for so long.

As it turns out, this was not an isolated case. Over just this past year alone, other pilots were similarly prosecuted for providing flight instruction to unsuspecting students without holding a CFI. A Florida man was sentenced to seven years in prison for a fraudulent scheme involving student pilot logbook certifications; a Mississippi pilot who gave unauthorized flight instruction for two years was sentenced in August 2018 to six months home confinement, three years supervised release, 100 hours of community service, and barred from working in the aviation industry in any capacity.

In addition to pilots providing flight instruction without CFIs, a number of other pilots were prosecuted in just the last 12 months for flying aircraft without holding appropriate airmen's certificates. Flying an aircraft without a required certificate is a crime. Those prosecuted include a Massachusetts man accused of flying a helicopter on more than 50 flights after the FAA revoked his pilot certificate; a former airline pilot who was sentenced to 15 months in jail in Vermont for flying after the FAA revoked his certificate for using an aircraft to transport more than 50 kilos of marijuana; a Florida man who was sentenced to 36 months of probation for "making false statements related to operating a commercial aircraft without a valid airman's certificate"; another Florida man who was sentenced to three years' probation and barred from any aviation-related entity for operating more than 100 sightseeing flights without a commercial certificate. These are just some of the cases from the past year.

Non-flying Crimes

And pilots are not the only ones involved in criminal activity. In May of this year, parts brokers in New Jersey were sentenced for a four-year scheme in which they took scrapped jet engine parts, took steps to conceal that they had been scrapped, and made sham sales to a company they controlled so that the parts could be sold to unsuspecting operators. The scheme was disrupted before the parts could be sold for installation in jet engines. Sentencing included five years' probation and an order of restitution totaling more than $4 million.

In another case, a repair station executive in South Florida was sentenced for bribing an FAA inspector to use his official position to "secure FAA's approval for repairs of sophisticated avionics equipment and commercial cockpit windows." She was sentenced to five years' probation and had to pay restitution of over $711,000. The inspector is now a former FAA inspector.

In another case involving bribing an FAA inspector, four helicopter company employees in Guam and an FAA inspector were charged in a conspiracy that included giving the inspector a free helicopter in return for his agreement to "sign, issue, and reissue airworthiness certificates for several helicopters…without inspecting them." The FAA inspector pled guilty and is awaiting sentencing; the helicopter employees have been indicted but not convicted. The investigation of the company began after a crash that killed the pilot. The helicopter company gave the FAA logbooks with falsified data. According to the OIG, for perhaps as many as 20 years the company used aircraft that had been "destroyed, scrapped, or otherwise deemed not airworthy—and concealed these facts in documents and records submitted to the FAA."

A similar case involves allegations against a parts broker—including falsely presenting himself as an Airframe and Powerplant mechanic although he never held an A&P certificate—for attempting to sell an aircraft bought at an insurance auction without disclosing its damage history. The status of those allegations is unclear, but the individual pled guilty to other unrelated charges and was sentenced to 10 years in jail in Arizona.

In another case, an FAA designated airworthiness representative was sentenced to six months home confinement, fined $5,000, and forfeited more than $38,000 for participating in a scheme in which he would certify aircraft parts as airworthy without physically inspecting them.

Among other criminal cases involving aviation: a former airline pilot was sentenced to a year in prison and fined $10,000 for operating two Alaska Airlines flights while under the influence of alcohol; several involve pilots falsifying medical records; a Florida Aviation Medical Examiner pled guilty to fraudulently certifying thousands of medical certifications for private and commercial pilots—with some of those pilots not passing material portions of their medicals; several cases against people for pointing lasers at aircraft; an airline president and state airport commission executive arrested for, among other things, misusing federal money; and even a parachute rigger for falsely writing in a logbook that he "inspected, serviced, and repacked an emergency parachute."

Two recent criminal cases involve drone pilots: one was charged in California with flying over two NFL games where flights were restricted by a TFR and another was charged in Georgia with owning and operating an unregistered drone weighing more than 0.55 pounds and for possession with intent to distribute a controlled substance. He is alleged to have intended to use the drone to fly the contraband to a Georgia state prison.

These cases have been criminally prosecuted. You can access the OIG's website to find more if you're interested. Hopefully, being aware that criminal statutes exist will make those in aviation more wary of violating federal aviation regulations and more careful about checking out the credentials of those they deal with. As a last point, if we haven't learned this from current events, learn it now: lying to federal investigators is a crime. While you have the right to remain silent, you do not have the right to lie on federally required documents or to federal agents. The latter includes FAA records and FAA inspectors.

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 e-mails at:
gogliaj@yahoo.com

FAA Establishes Duty/Rest ARC

A joint government/industry committee is set to tackle Part 135 pilot rest and duty requirements once again. At the behest of Congress, the FAA formally established the charter for a Part 135 Pilot Rest and Duty Rules Aviation Rulemaking Committee (ARC) that will review current regulations and make recommendations on any necessary changes.

In the FAA Reauthorization Act of 2018, Congress directed the FAA to establish a Part 135 rest and duty ARC that includes representatives of industry, labor (both from Part 135 and 91K), and safety experts. Congress further stipulated that the ARC is to review prior efforts to develop new rest and duty rules, accommodations that might be necessary for small business, scientific, and safety data and the need to accommodate the diversity of operation.

The charter for the new ARC calls for a committee comprising 20 members and stipulates that members should review current rules, review other commercial rest and duty rules—including for Part 121 and ICAO standards, identify deficiencies within the current regulations, consider aspects directed by Congress, and develop consensus recommendations. While the ARC's charter will last 24 months, the recommendations will be due within 16 months of the first meeting.

The ARC resurrects the decades-long efforts to update Part 135 pilot rest and duty rules. **K.L.**

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AIN Product Support Survey

Dassault Falcon takes the top spot for jets, while Mitsubishi maintains that position among turboprops

In a tight race for the top spot in the 2019 AIN Product Support Survey, Dassault jumped ahead by a slim margin of 0.1 to score this year's highest Combined Overall Average of Newer and Older Aircraft of 8.4, based on results of **AIN**'s survey of business jet operators, pilots, and maintainers.

The 8.4 Overall Average rating for Dassault vaults the company to first place in 2019, up from last year's second place, moving Gulfstream's mid-cabin jets to second place with an 8.3 overall average. Embraer and Gulfstream's large-cabin jets share third place with an 8.2, leaving a tight margin between the top-place finishers this year.

For this year's survey, there were 720 respondents who rated 2,220 aircraft, broken down into 151 models. The minimum number of respondents required to include an aircraft in the results is 20. (*For more details, see Survey Rules and Methodology, at right.*)

Survey Rules and Methodology

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

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

The survey website was open from May 1 to June 7. Respondents were asked to rate individual aircraft and provide the tail number, age (less than 10 years old or more than 10), primary region of service and whether they used factory-owned or authorized service centers, or both. Respondents were also asked to rate, on a scale from 1 to 10, the quality of service they received during the previous 12 months in the following categories:

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

Respondents were also asked to recognize individuals who have provided them with exceptional product support and service.

The 2019 AIN Product Support Survey results for aircraft are published in this issue, avionics will be featured next month, and engines will follow in October. ■

DASSAULT

The Results

Dassault and its Falcon jet series have made a steady climb in the **AIN** Product Support Survey in recent years, achieving first place this year with an 8.4 Combined Overall Average of Newer and Older Aircraft; last year the company was in second place with an 8.3 and the year prior it held third place at 8.1.

Dassault also scored well in the Newer Business Jets segment, sharing first place with Gulfstream's mid-cabin jets with an 8.7 Overall Average. For Dassault, this was a 0.2 rise from last year, when it also secured first place in this category, tied then with Gulfstream's large-cabin jets at 8.5.

In this segment, Dassault's strongest ratings were Overall Aircraft Reliability at 9.1, AOG Response 9.0, Cost of Parts 7.4, and Parts Availability 9.0. The latter two are significant because parts issues are among the most vexing for both aircraft operators and manufacturers, and strong scores in these are a positive indication.

For Older Business Jets, Dassault saw an improvement of 0.1, which put it in second place, up two levels from last year's fourth-place finish in this segment. None of the category ratings in this segment were highest for Dassault, but they averaged high enough to earn the second-place ranking.

The Improvements

Dassault has grown its factory-owned service center network dramatically during the past year by purchasing independent MRO providers. The most recent was Ruag's MRO and FBO activities in Geneva and Lugano. In late February, Dassault announced an agreement to buy TAG Aviation's European maintenance operations in Geneva and Sion, Switzerland, and Farnborough and Paris Le Bourget, as well as Lisbon. One month earlier, Luxaviation revealed that it would sell its ExecuJet MRO network to Dassault, which includes 15 MRO centers across Africa, Asia-Pacific, the Caribbean, Europe, Latin America, and the Middle East.

"The ExecuJet acquisition is mainly to develop a footprint in Asia-Pacific," said Jean Kayanakis, Dassault Aviation senior v-p of worldwide customer service and service center network. He added that the TAG purchase was "to secure capacity in Europe.

"Dassault wants to be more involved in the customer experience in MRO," he explained. "Not only because of profitability but more because of customer experience

› DASSAULT continued

and being responsible for the future of our customers."

While the facilities that Dassault purchased are Falcon MRO centers, some also service other manufacturers' aircraft. Kayanakis confirmed that these facilities will continue working on all of the aircraft for which they hold approvals. "But we want to be significantly bigger to better control through our own network the customer experience," he said. "Ultimately this is [all about] customer experience."

In January, Dassault opened a new parts warehouse near Charles de Gaulle Airport, replacing the facility near Le Bourget and speeding up shipments worldwide. While making parts more available helps, Dassault is also trying to lower costs for Falcon operators. This includes reducing parts costs but also improving availability of the aircraft by deploying technical personnel closer to where the operator is based and backing them up with Falcon Airborne Support Falcon 900s.

Dassault has a new MRO footprint in Kuala Lumpur, which will help support a new operator in Vietnam. In Brazil, Dassault is keeping its MRO facility in Sorocaba open despite a challenging operating environment with high costs for importing parts and maintaining regulatory compliance. "It's worth being there," Kayanakis said. "We have a strong

› continues on next page

Combined Overall Average Ratings of Newer and Older Aircraft	Overall Average 2019	Overall Average 2018	Rating Change from 2018 to 2019
Jets			
Dassault (Falcon)	8.4	8.3	0.1
Gulfstream (G100 - G280)	8.3	8.2	0.1
Embraer (Phenom, Legacy, Lineage)	8.2	8.3	-0.1
Gulfstream (GII-GV, G300-G650)	8.2	8.4	-0.2
Bombardier (Global)	7.9	8.0	-0.1
Bombardier (Challenger)	7.8	8.0	-0.2
Textron Aviation (Citation)	7.8	7.7	0.1
Bombardier (Learjet)	7.5	7.7	-0.2
Textron Aviation (Premier, Beechjet 400/400A, Hawker 400XP)	7.0	6.7	0.3
Textron Aviation (Hawker)	6.4	6.7	-0.3
Turboprops			
Mitsubishi (MU-2, Solitaire, Marquise)	9.1	9.1	0.0
Pilatus (PC-12)	8.3	8.2	0.1
Textron Aviation (King Air)	7.3	7.4	-0.1
Rotorcraft			
Bell	7.3	7.1	0.2
Leonardo	6.8	6.9	-0.1
Airbus Helicopters	6.7	7.0	-0.3
Sikorsky	6.6	6.8	-0.2

* Listed in order of the 2019 overall average. Ties are listed alphabetically. Bold indicates highest number in each catergory.

Category & Overall Average Ratings by Newer and Older Aircraft	Overall Average 2019	Overall Average 2018	Rating Change from 2018 to 2019	Factory Owned Service Centers	Authorized Service Centers	Parts Availability	Cost of Parts	AOG Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Overall Aircraft Reliability
Newer Business Jets												
Dassault (Falcon)	**8.7**	**8.5**	0.2	7.9	8.4	**9.0**	**7.4**	**9.0**	9.1	8.7	9.2	**9.1**
Gulfstream (G150 -G280)	**8.7**	8.2	0.5	**8.3**	**8.8**	8.4	**7.4**	8.9	**9.4**	8.7	**9.4**	8.8
Gulfstream (G300-G650)	8.4	8.5	-0.1	8.2	8.1	8.7	6.5	8.9	8.9	8.1	8.9	8.9
Embraer (Phenom, Legacy, Lineage)	8.1	8.4	-0.3	7.0	8.0	7.8	7.1	7.9	8.3	**8.8**	9.1	8.8
Bombardier (Challenger)	8.0	8.1	-0.1	7.3	8.1	8.0	6.3	8.0	8.5	8.2	8.9	8.7
Bombardier (Global)	8.0	8.0	0.0	7.9	7.7	7.9	6.7	8.1	8.2	8.5	8.5	8.7
Textron Aviation (Citation)	7.8	8.0	-0.2	7.3	7.2	7.7	6.4	8.0	8.7	8.1	8.2	8.5
Bombardier (Learjet)	7.7	7.6	0.1	7.2	8.4	5.1	5.4	8.2	8.6	8.6	8.8	8.6
Older Business Jets												
Embraer (Phenom, Legacy, Lineage)	**8.5**	8.1	0.4	**7.7**	7.4	**8.5**	**7.7**	**8.6**	**9.0**	**8.9**	**9.3**	**9.2**
Dassault (Falcon)	7.9	7.8	0.1	6.6	7.9	8.3	6.9	8.5	7.3	8.0	8.7	8.7
Gulfstream (GII-GV)	7.8	**8.2**	-0.4	7.3	8.0	7.9	5.3	8.4	8.0	8.0	8.8	8.6
Gulfstream (G100 - G280)	7.7	NA	NA	7.3	8.2	7.6	6.1	8.1	7.9	8.0	8.4	8.2
Textron Aviation (Citation)	7.7	7.3	0.4	7.0	7.3	8.0	6.7	7.6	8.1	8.0	8.0	8.7
Bombardier (Global)	7.5	8.0	-0.5	7.1	7.8	7.6	5.9	7.4	7.4	8.0	8.0	8.6
Bombardier (Learjet)	7.3	7.8	-0.5	6.7	7.9	6.3	5.6	7.4	7.9	8.1	8.4	8.2
Bombardier (Challenger)	7.2	7.7	-0.5	6.4	7.1	7.5	6.4	7.6	6.6	7.5	7.8	7.9
Textron Aviation (Premier, Beechjet 400/400A, Hawker 400XP)	6.9	6.6	0.3	5.8	**8.9**	7.9	5.2	7.3	5.1	6.9	6.3	8.9
Textron Aviation (Hawker)	6.6	6.4	0.2	6.4	8.0	6.0	4.2	6.9	6.6	7.4	6.1	7.8
Newer Turboprops												
Pilatus (PC-12)	**8.0**	**8.2**	-0.2	**8.3**	**8.1**	8.1	6.4	**7.3**	**8.7**	**9.2**	7.7	**9.1**
Textron Aviation (King Air)	7.4	8.0	-0.6	6.2	6.7	**8.3**	**6.6**	7.1	7.7	7.7	**7.8**	8.6
Older Turboprops												
Mitsubishi (MU-2, Solitaire, Marquise)	**9.1**	**9.1**	0.0	**9.1**	**9.3**	**8.8**	**7.4**	**8.8**	**9.8**	**9.7**	**9.9**	**9.8**
Textron Aviation (King Air)	7.1	7.2	-0.1	5.7	6.6	7.6	5.6	7.4	6.1	7.8	7.7	8.7
Rotorcraft (all age Rotorcraft)												
Bell	**7.3**	**7.1**	0.2	**9.0**	7.2	**6.7**	**6.4**	**6.5**	7.5	**7.9**	**7.8**	7.6
Leonardo	6.8	6.9	-0.1	6.4	**7.4**	6.4	5.2	6.4	**7.7**	6.9	7.4	**7.8**
Airbus Helicopters	6.7	7.0	-0.3	6.4	6.6	6.1	5.3	5.9	7.0	7.2	7.4	7.6
Sikorsky	6.6	6.8	-0.2	6.3	7.1	5.4	5.4	6.1	6.6	7.4	7.5	7.2

Listed in order of 2019 overall average. Ties are listed alphabetically. Bolder indicates highest number in each category.

One reason for Dassault's improved customer-service performance is the OEM's investment in ensuring worldwide parts availability.

GULFSTREAM

The Results

Gulfstream's mid-cabin jets earned a close second-place finish this year with an 8.3 Combined Overall Average of Newer and Older Aircraft rating (up 0.1 from last year), followed by its large-cabin jets in third place at 8.2 (shared with Embraer), down 0.2 from last year's first-place finish.

In the Newer Business Jets segment, Gulfstream took both first (shared with Dassault) and second place, with an 8.7 rating for mid-cabin jets and 8.4 for large-cabin jets. The mid-cabin first-place rating made a significant jump from last year's 8.2, and the categories where Gulfstream was rated at its best include a number of high scores, for Factory Owned Service Centers (8.3), Authorized Service Centers (8.8), Cost of Parts (7.4), Warranty Fulfillment (9.4), and Technical Reps (9.4). The large-cabin jets scored higher than the mid-cabin for Overall Average, at 8.9.

Gulfstream's large-cabin jets came in third place with a 7.8 in the Older Business Jets segment (not enough ratings were received for the mid-cabin jets in this segment), and this was down 0.4 from last year.

The Improvements

Gulfstream has also made large investments in MRO facilities worldwide, with some openings scheduled for later this year and more in 2020.

In the U.S., the airframer will open new MRO facilities in Savannah, Georgia; Appleton, Wisconsin; and Van Nuys, California, in this year's third quarter. A 115,000-sq-ft MRO facility will replace a smaller operation elsewhere at Palm Beach International Airport in Florida, and this is scheduled to open if the first quarter of 2020. Gulfstream began providing MRO services at TAG Farnborough Airport in the UK in May, but is also building a dedicated facility. At 220,060 sq ft, the Farnborough location will open in the third quarter of 2020, complementing Gulfstream's MRO operation at London Luton Airport to the northeast.

Gulfstream expects the new Palm Beach service center to serve the more than 400 Gulfstreams based in Florida and Latin America. Earlier this year, Gulfstream announced that it is closing its Sorocaba, Brazil service center, but it is offsetting that closure not only with the Palm Beach facility but also by expanding its Field and Airborne Support Teams (FAST) in the region and working with an authorized service provider in Brazil, in addition to its two field service representatives in Brazil and authorized service facilities in Venezuela and Mexico.

For Asia-Pacific operators, Gulfstream has added Shanghai Hawker Pacific as a Gulfstream-authorized warranty facility and added services and operating hours at the factory-owned Gulfstream Beijing service center.

In Europe, Gulfstream expanded MRO hangar space at Le Bourget Airport. And the company's MRO facility in St. Louis, Missouri, has transitioned into a dedicated Gulfstream MRO facility.

The company's MRO operations have added a net 120 direct full-time employees. For technician training, the Gulfstream On-The-Job Training Laboratory in the company's Technical Training Center in Savannah, Georgia, now has a G600 fuselage and wing and a G650 fuselage, wing, and interior, in addition to components from other Gulfstream models.

Gulfstream has added new managing director positions to work with customers in various regions and to coordinate support between Gulfstream, its sister company Jet Aviation, and Jet Aviation subsidiary Hawker Pacific, which it purchased in May 2018.

Gulfstream opened a new resource at its Savannah service center called the Maintenance Center in February, which "offers internal and external customers a single point of contact for scheduling maintenance within the worldwide Gulfstream service center network," according to Gulfstream. A team of experts from scheduling, planning, materials, and service center operations helps manage drop-in customers and with coordinating maintenance. "This team makes data-driven decisions based on service center capacity, resource availability, and site capability" all with the goal of reducing downtime, according to Gulfstream.

› DASSAULT continued

customer base." Dassault also employs three support personnel in Moscow to support Russia-based customers and visiting Falcons. "Our strategy is to have a worldwide network," he said.

Another key element for Dassault is training, and its Dassault Training Academy in Marignac, France, has already graduated 100 technicians in Europe, and training has started in Dallas.

For the next Falcon aircraft model program, the 6X, Dassault has tapped the expertise of its product support teams from early in the design process. The 6X will use the Falcon Broadcast data-sharing system to an even greater extent, adding artificial intelligence to analysts' efforts to put the extensive data gathered to work to anticipate the 6X's maintenance needs. "We're thinking ahead with artificial intelligence," Kayanakis said, "and how we could mix a different set of data to highlight critical situations."

Ultimately, support personnel at the three Dassault command centers (one in France and two in North America) wouldn't have to wait for a customer to call about a problem or download some data. "That is going to change," he said. "With the 6X, maybe we'll be able to tell the customer, 'don't touch your system anymore.' We can go into the system and do on a remote basis some analysis. This is the expectation."

EMBRAER

The Results

Embraer tied for third place (with Gulfstream mid-cabins) this year with an 8.2 Combined Overall Average of Newer and Older Aircraft, down 0.1 from last year's second-place rating. In the Newer Business Jets segment, Embraer's 8.1 Overall Average dropped from 8.4 last year, putting it in third place. Its highest category score was an 8.8 for technical manuals.

In the Older Business Jets segment, Embraer topped the list with a first-place Overall Average of 8.5, up 0.4 from last year. The company scored high marks in almost every category: Factory Owned Service Centers (7.7), Parts Availability (8.5), Cost of Parts (7.7), AOG Response (8.6), Warranty Fulfillment (9.0), Technical Manuals (8.9), Technical Reps (9.3), and Overall Aircraft Reliability (9.2).

The Improvements

Some big changes are in store for Embraer, which is selling its commercial airliner business to Boeing; the deal is expected to close by the end of this year. That leaves a smaller company that will include the defense, business jet, agricultural, and service operations, and the Embraer-X research lab. Business jet completions will be done at Embraer's Melbourne, Florida facility, while production of the Legacy 450/500 and Praetor 500/600 will move to Gavião Peixoto. Structural components will still be made in Brazil.

Embraer's support network includes more than 80 authorized and factory-owned service centers, including its own facility in Soracaba, Brazil, where earlier this year it refurbished a Legacy 600 with a

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BOMBARDIER

The Results

Both Bombardier's Globals and Challengers took the next two slots in the Combined Overall Average Ratings of Newer and Older Aircraft, with a rating of 7.9 for the Globals (fourth place) and 7.8 for the Challengers (fifth place, tied with Textron Aviation's Citations). The company's Learjet division was rated at 7.5, which put it in sixth place.

In the Newer Business Jets segment, Globals and Challengers share fourth place with an 8.0 rating, with Learjet rated at 7.6 and sixth place. For the Older Business Jets, the Globals scored a 7.5 rating (fifth place), Learjets 7.3 (sixth), and Challengers 7.2 (seventh).

The Improvements

Bombardier's worldwide service network is expanding and now includes nine factory-owned facilities. A new Bombardier Service Center is under construction at Florida's Miami-Opa Locka Executive Airport, to serve U.S. and Latin America-based customers. In Singapore, the company's Service Centre is growing to 400,000 sq ft from the current 100,000 sq ft. Since it was opened four years ago, the workforce has quadrupled.

Bombardier has opened eight line-maintenance stations worldwide, with the most recent in Paris and Tianjin, China. Engine manufacturers Rolls-Royce, GE, and Honeywell recently granted authorized service center status to the Tianjin facility. Jetex joined the Bombardier authorized service center network and launched a new line maintenance station in Dubai. At its Biggin Hill Service Centre, Bombardier has opened an enhanced interior repair and refurb shop and F/List and Bombardier are jointly opening a new 3,000-sq-ft interior shop at that facility.

Five more trucks have joined Bombardier's Mobile Response Team (MRT), and the total has reached 30. The flying MRT fleet consists of two jets, with a Challenger 300 based in Frankfurt, Germany, joining the Learjet 45 based in North America.

› EMBRAER continued

new interior, systems upgrades, and new paint plus landing gear overhaul and installation of ADS-B Out. The company has 24 warehouses globally that ensure fast delivery of parts.

For quick access to information on parts orders, engineering and technical documents, warranty, Embraer Executive Care program coverage, service information, and a customer forum, Embraer has developed the FlyEmbraer web portal.

The Embraer TechCare Center operates 24/7 and provides direct contact with qualified Embraer Technicians for swift problem resolution, all aimed at keeping the customer's aircraft flying.

By the Numbers 2019	
Respondents who rated aircraft	720
Respondents who completed the survey in its entirety	631
Aircraft rated	2220
Aircraft models receiving ratings	151
Minimum ratings required to be included in the data	20

TEXTRON AVIATION

The Results

Textron Aviation's Combined Overall Average for Newer and Older Aircraft for its Citation line climbed 0.1 to 7.8 this year, putting it in fifth place along with Bombardier Challengers and the same placement as last year.

In the Newer Business Jets segment, **AIN** readers rated Citations at 7.8, down 0.2 from last year, and fifth place.

In the Older Business Jets segment, Citations were rated 7.7 and fourth place, a significant 0.4 jump from last year's sixth place. The company's Premier, Beechjet 400/400A, and Hawker 400XP models were rated 6.9, up by 0.3 from last year. The Hawker line earned a 6.6 Overall Average, up 0.2 from last year.

On the turboprop side, Textron Aviation's King Air family came in third place in the Combined Overall Average with a 7.3, down 0.1 from last year. King Airs received second place in both the Newer and Older Turboprops segments, at 7.4 and 7.1 respectively. Top ratings for the King Airs include Parts Availability (8.3), Cost of Parts (6.6), and Technical Reps (7.8).

The Improvements

"Over the past year, the company has primarily focused on improving speed to resolution, duration of work, cost competitiveness, and access to quality service around the world," according to Textron Aviation.

Expansions to Textron Aviation's Global Service Network include the new Textron Aviation Canada, which was formed after it purchased assets of Calgary, Canada-based Aspect

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Above & Beyond

OEMs

Mike Zina (Bombardier)

Great FSR; one of the best in the business

Mike Zina is a tremendous resource for us, possesses great knowledge of the product that he represents, is outstanding in response & follow-up, and is generally just a very professional and pleasant guy to work with. Superior-caliber FSR for Bombardier. A+ support all around from Mike.

Randy Adams (Textron Aviation)

Our field rep Randy Adams has gone above and beyond to support the Citation X+. We have had many issues with this aircraft and Randy has always come through with support. On several occasions he has driven parts to us from Milwaukee to get us back in the air the next morning.

Nathan Jones (Dassault)

Nathan has a wide range of technical knowledge of the Falcon aircraft, but really stands out from the crowd for his aggressive response to customer needs. Nathan approaches every call or email with a sense of urgency and attention to detail that leaves me with a feeling of confidence that my problem will be resolved once I contact him.

Renato Beltrao (Embraer)

Renato is very knowledgeable and usually has a solution at hand when contacted, otherwise he will go out of his way to find an answer to any question(s) that I might have. Renato is also extremely reliable and will always return a call within a very short time should I not be able to get hold of him directly. The aircraft's reliability since delivery has been due to solid engineering and Renato's excellent support.

Always available 24-7 to answer any queries and problems, 100 percent committed to the Embraer product, a valued asset for Embraer.

The Best FSR I have had dealing with.

Since Renato has been dealing with our aircraft, although we only have three, he has always gone out of his way to support us no matter how small the issue is. He makes a point to phone me to find out how our fleet is doing and if we have any issues. As mentioned, we are only a drop in the bucket, but he still treats us the same as an operator that has 10 or more aircraft. Renato is always available and makes it his business to support us 24/7. Thank you for that.

Dallas Gumm (Gulfstream)

Outstanding support from Dallas Gumm, especially his technical knowledge of the Gulfstream large-cabin product line.

Dallas applies all his experience and knowledge to every issue he faces and gets all resources to find a solution.

Juan Noles (Hawker)

Juan is a customer-support oriented person. Knowledgeable, experienced in his field and always willing to help the customer find options/solutions.

Raymond Steyn (Pilatus)

Great product knowlege and excellent customer relations.

Jim Agnew (Bell Helicopter)

Every time we need info on a specific inquiry, he'll reply at once. If he cannot answer it, he will connect us to the correct person. He visits our hangar every month like clockwork.

Carl Violette (Sikorsky)

Always going above and beyond to ensure customer support.

Service Centers

Christian Szupper (Aero Dienst)

Very knowledgeable, experienced and reliable technician.

Rick Branch
(Eagle Creek Aviation Services)

Rick supports the customer from first introduction through purchase, delivery, and anything required for the life of the aircraft. He always works to ensure Eagle Creek exceeds the customer's expectations.

John Arnett (Flightstar)

John is DOM at Flightstar. He and his team always go above and beyond to get any job out on time and, most of all, on budget.

Mr SUN, Ming Jun (Execujet Haite Aviation Services China Co. Ltd)

Full-spectrum technical knowledge and experience of Global 5000/6000. Active and timely support of customer requests. Service straight from the heart. Deliver outcome to meet customer expectations. Aircraft back to service ON TIME

Mark James
(Intercontinental Jet Services)

Mark always goes the extra mile to ensure quality and on-time work on our MU-2's. He oversees a group of very experienced and dedicated people at IJSC.

His can-do attitude and relationship with Mitsubishi will keep the MU-2 fleet flying for many years to come.

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› Textron Aviation continued

Aircraft Maintenance. The company also placed a mobile service unit (MSU) in Toronto, complementing one already located at the former Aspect facility. The Textron Aviation global MSU fleet now numbers 75.

At Biggin Hill in the London area, Textron Aviation opened a new line maintenance station for Citation, King Air, and Hawker customers. The factory-owned Singapore Service Center has added authorizations for select Citation, King Air, and Caravan models in Indonesia, the Philippines, Vietnam, Papua New Guinea and the U.S. In Australia, Premier Aviation Maintenance joined the Authorized Service Facility network, with maintenance services offered for the full line of Textron Aviation models.

Textron Aviation's Able Aerospace subsidiary is capable of more than rotorcraft component services and is providing additional "resourceful component repair, overhaul, and approved replacement parts solutions," for fixed-wing aircraft, according to Textron Aviation.

Customers can now access a new customer portal feature, the Aircraft Maintenance Data Hub, which shows a summary of upcoming or overdue maintenance for aircraft subscribed to a Textron Aviation-Recommended maintenance tracking provider.

At Textron Aviation's Düsseldorf, Germany, European Distribution Center, available part numbers have grown to nearly 35,000 for European customers, thanks to a doubling of the size of the center.

The company has added new resources to its 1Call support organization, including Go Teams at factory-owned service centers for rapid dispatch to handle customer issues quickly. The field service team has grown, with seven new representatives added globally.

To help customers get back in the air faster, Textron Aviation formed a task force to evaluate the duration of scheduled work in an effort to lower the standard downtime. Based on customer feedback, the company has been evaluating parts prices and lowered prices on 20 percent of commonly ordered Textron Aviation proprietary parts. Flat rate hours for CJ3 inspection documents have also been lowered.

MITSUBISHI

The Results

The MU-2 marque continues its domination of the turboprops in the Combined Overall Average for Newer and Older Aircraft and in the Older Turboprops segments, with a 9.1 for both. MU-2 owners and operators are a passionate and dedicated group, and this has long been reflected in the high-performance twin-turboprop's Product Support Survey Ratings, even though the airplane has long been out of production.

AIN readers gave top ratings for the MU-2 models in every category, with the highest for Authorized Service Centers (9.3), Warranty Fulfillment (9.8), Technical Manuals (9.7), Technical Reps (9.9), and Overall Aircraft Reliability (9.8).

The Improvements

Since production ended in 1986, Mitsubishi Heavy Industries America (MHIA) has continued to provide full factory support for the MU-2. The company maintains its Aircraft Product Support division in Addison, Texas.

A major factor in keeping the MU-2 community informed and flying safely is the company's Pilot's Review of Proficiency (PROP) program. The next PROP is scheduled for fall 2020, and attendance, as always, is free. MHIA also holds community events, such as the MU-2 Fly-In in July hosted by Jet Air Group in Green Bay, Wisconsin.

MHIA is working on localizing spare parts manufacturing in the U.S. and consolidating regulatory oversight to help sustain the MU-2 fleet. "These efforts should further the progress of both the parts supply chain and FAA coordination into the future," according to MHIA.

PILATUS

The Results

Pilatus retains its second place ranking in the Combined Overall Average of Newer and Older Aircraft in the turboprops segment, climbing 0.1 this year to 8.3. In the Newer Turboprops segment, its rating dropped to 8.0 from 8.2 last year, but still holding its first place ranking.

Pilatus's top scores from **AIN** readers were for Factory Owned Service Centers (8.3), Authorized Service Centers (8.1), AOG Response (7.3), Warranty Fulfillment (8.7), Technical Manuals (9.2), and Overall Aircraft Reliability (9.1).

The Improvements

Last year, Pilatus's U.S. operation moved into a new 118,000-sq-ft completions facility in Broomfield, Colorado, consolidating its numerous separate hangars and buildings at the airport into one modern new building. At Broomfield, Pilatus launched a new Electrical/Avionics Maintenance Training course for its service center technicians.

Both Pilatus's Stans, Switzerland headquarters and Broomfield facility house new 24/7/365 Customer Command Centers. The company has also added personnel to its global customer support team. The PC-12 fleet has flown more than 7.5 million flying hours and deliveries have surpassed 1,650.

ROTORCRAFT

The Results

Bell climbed 0.2 this year in the Combined Overall Average to 7.3, retaining its first-place finish in the rotorcraft segment. This year, Leonardo, while dropping 0.1, climbed to a second-place ranking, up from third last year. Airbus Helicopters scored 6.7, down from 7.0 last year and putting it in third place, followed by Sikorsky with a 6.6, down 0.2 from last year's 6.8. ■

AIN would like to thank MYGOFLIGHT for offering each survey respondent a 25% discount at MYGOFLIGHT.com. AIN also raffled off two flight bags donated by MYGOFLIGHT. The winners were:

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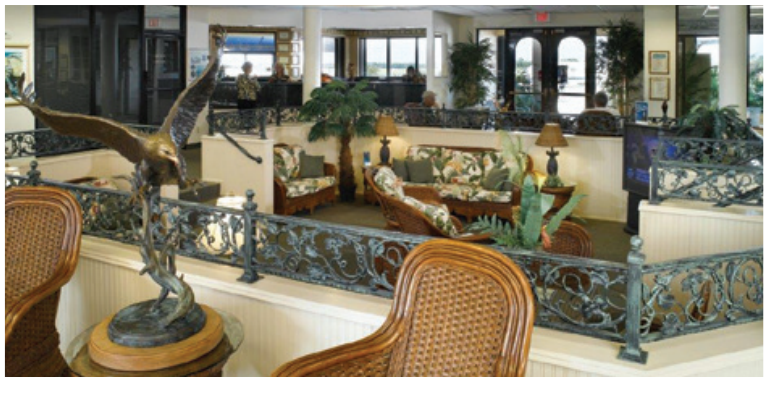

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Planet Nine Private Air announced in early June it took delivery of its fifth Dassault Falcon 7X.

Planet Nine takes fifth 7X, marks first anniversary

by Jerry Siebenmark

June was a big month for Planet Nine Private Air, which saw the delivery of its fifth Falcon jet and in the latter part of the month celebrated its first year in business. "We said at the outset our goal was to steadily grow to support a fleet of five company-owned ultra-long-range aircraft to complement our managed aircraft fleet, and we are delighted to have accomplished that inside of a year of revenue operations," Planet Nine co-founder and head of business development Matt Walter said.

The Van Nuys, California-based Part 135 operator and aircraft management company in early June announced delivery of its fifth Dassault Falcon 7X, with a 14-seat executive interior and Gogo SwiftBroadband satcom and in-flight entertainment. A 2012 model, the sale of which was brokered by Freestream Aviation, the jet joins four other 7Xs owned by Planet Nine. It will be positioned for global charters between Van Nuys, California; Teterboro; Miami, Florida; and London.

Owned Aircraft Fleet

Walter told **AIN** the company's focus is on what he said is a niche market for "premium, long-range charter" and complex, multi-leg international and domestic flights, and is the reason behind Planet Nine's fleet of large jets. "All our aircraft are less than 10 years old, and of the 2,000 or so [Part] 135 operators in North America perhaps only 10 could operate the complicated multi-leg flights we specialize in. And less than five have modern available aircraft that do not require owners' approval and have multiple crews," he explained.

Planet Nine favors the Falcon 7X because it tends to hold better value than its competitors in the class, according to Walter. "It is a true, 12-hour-range aircraft, and it is much more fuel efficient than its competitors," he explained. "By having just one aircraft at the core of our fleet, we can pool pilots and generate...savings on maintenance and parts."

Owning and managing aircraft for charter—including a Gulfstream G650 and Bombardier Global 5000—are the core parts of Planet Nine's business model. "We aim to own our aircraft for between two and eight years, and throughout an eight-year cycle we can fully depreciate the aircraft and expect there to be a residual value at the end," Walter said.

Its roots are with Advanced Air Management, which also was based in Van Nuys and specialized in managing long-range business jets. In 2016 it was acquired by Singapore-based Zetta Jet, which filed for bankruptcy protection in September 2017 and a little more than two months later ceased operations.

> **"We aim to own our aircraft for between two and eight years, and throughout an eight-year cycle we can fully depreciate the aircraft and expect there to be a residual value at the end"**
>
> – Planet Nine co-founder and head of business development Matt Walter

Some of Planet Nine's 63 staff, including Walter, have worked together for more than a decade, including at Advanced. It's those relationships that have created "a fantastic culture" at Planet Nine, which Walter views as a sort of replication of Advanced. "Rebuilding the business we created at Advanced Air Management, and earning the trust of our customers and suppliers was never going to be easy, and it could not have happened without the goodwill built up over multiple years of operating Advanced Air Management with total integrity and honesty," he explained. ■

NetJets receives its 100th Citation Latitude

by Kerry Lynch

NetJets has taken delivery of its 100th Cessna Citation Latitude, a milestone reached in just three years since the fractional ownership provider first took delivery of the midsize jet in June 2016. The Latitude fleet has become one of the fastest-growing in the NetJets livery, and Patrick Gallagher, president of sales and marketing, said even more satisfying is that every one has been sold to fractional customers.

"After three years and 100 airplanes, we still have people with advance deposits waiting on future airplanes to be delivered," Gallagher said. He added the airplane is available exclusively to fractional customers.

In 2012 NetJets ordered an initial tranche of 25 Latitudes, with options for up to 125 more. The company has now dipped well into those options—exercising 110 of them with 35 more ordered to join the fleet over the next year or so.

Gallagher said the Latitude is "the perfect combination of cabin volume and comfort, range, and economics. At the price point, you get a wonderfully comfortable cabin." The aircraft's customer base is an even mix of NetJets's overall customer base of private and business customers and it is selling throughout the U.S. and in Europe. The most popular Latitude segments are between Teterboro, New Jersey, and Palm Beach, Florida, in the U.S. and Paris and Geneva in Europe.

"We're looking forward to continuing our relationship with Textron Aviation with this milestone delivery," said Adam Johnson, NetJets chairman and CEO, noting that the company is "continuing to expand our industry-leading fleet."

The latest delivery increases NetJets's current Cessna fleet to more than 250 aircraft, which began with the Citation SII and also includes the Citation Excel/XLS, Citation Sovereign, and Citation X. NetJets is preparing to add the next Citation model, the Longitude, later this year.

The operator placed options for 175 of the super-midsize jet during the last NBAA convention and has exercised options for the first 15. "What we've proven with the Latitude speaks volumes for our credibility to take delivery of our orders and options," he said. Textron Aviation expects to certify the Longitude in the third quarter, and NetJets anticipates taking the first seven by the end of the year. ■

The Latitude has been one of the fastest-selling aircraft for NetJets, which has taken 100 in its first three years of operating the midsize jet.

Among a number of contracts in the works from the Italian government is one for nine new Piaggio P.180 Avanti Evos, as well as the upgrade for 19 already in the Italian Armed Force's fleet.

Italian govt confirms nearly $800M in Piaggio contracts

by Kerry Lynch

Financially beleaguered Piaggio Aerospace is getting a boost from the Italian Defense Ministry, which confirmed commitments amounting to about €700 million ($798 million). They include the acquisition of nine new Avanti Evo aircraft, the upgrade of 19 current Avantis, engine maintenance, and logistics support. In addition, the government reaffirmed plans to pave the way for the certification and acquisition of at least one P.1HH Hammerhead UAS system (two aircraft and one ground station) as a testbed.

The Italian Defense Ministry confirmed the commitments during a meeting on June 20 in Rome that included representatives of the Italian government, Piaggio Aerospace's extraordinary receiver, local authorities from the Liguria region, and the Piaggio Aerospace union.The confirmation followed the government's agreement in April on an initial plan that outlined the contracts and enabled the Italian manufacturer to restart production. Since that time, Piaggio, which entered receivership late last year, has sought bids for the sale of the company, which reportedly generated more than three dozen expressions of interest. The company is now asking for more detailed bids.

Included in the €700 million tally are two contracts valued at €33 million—already signed and funded—covering maintenance of the engines of the Italian armed forces' fleet. Two more contracts totaling €167 million for the work are anticipated by the end of the month. Contracts valued at €260 million for the Avanti Evo orders and Avanti upgrades, meanwhile, are anticipated shortly "and in any case by the end of the year," the company said. A €96 million logistics contract is anticipated by the end of September.

As for the Hammerhead program, the government plans to finalize the parliamentary approval process by mid-July for the certification and acquisition of at least one system, saying it will enable the company to proceed with design activity and preserve "company know-how." That work represents an investment of €160 million.

"The definition of the operational needs of the Italian armed forces and the availability of the relevant budgets, communicated yesterday by the Italian government in Rome, allows the company to restart," said Vincenzo Nicastro, extraordinary receiver of Piaggio Aerospace. "The timetable announced, which foresees the signing of the first new contracts as early as the end of this month, will support the company's commitment to regaining market share in all the sectors in which it operates."

While adding "there is still a lot to do," Nicastro said, "I believe that—just six months after the start of the extraordinary receivership—we are moving in the right direction. Our goal is to be in a good position after the summer, when the official tender for the sale of Piaggio Aerospace will hopefully start." ■

Specialist sees a heated Brazil market

by Richard Pedicini

The Brazilian aviation market has heated up in 2019, said aviation lawyer Felipe Bonsenso, with more work needing his specialty, "This year I've worked on delivery of two Global 6000s, three Phenoms, and a Praetor that's only waiting for certification," he said. "There have been a lot of Phenom 300 deliveries to clients," he added.

"I expect LABACE to be better [this year] than last year. Much has improved for business aviation, with the stock exchange up, the dollar down."

Bonsenso welcomed lenders returning to the Brazilian market, naming UBS and Global Jet Capital, among others. Local interest rates have declined, and buyers who prefer local financing have options, such as Bradesco.

Aircraft financing is growing more complex, Bonsenso noted, while Brazil is "a very informal market" in his view. "Some buyers will want to use their real estate lawyer" for an aviation transaction, but an aviation specialist is really needed, he maintains. He is also getting more complex requests. "I've seen more cases where a client will bring along two or three friends who plan to buy the aircraft together and share the use. It's not the same as fractional ownership, which, it's worth noting, Brazil still hasn't regulated."

Another step toward a more orderly market is the creation last year of AERA, an association of aircraft brokers. LABACE static exhibitors Gualter and TAG are founding members; the president is Rogério Marques, former Embraer business aviation sales manager for South America who is now with AirConsult. Marcos Furlan Lyra of CFLY Aviation is vice-president and Bonsenso is the association's legal director. "The purpose is to bring good practices to used aircraft sales, ethics, and a better relationship among brokers," he said, pointing to some market practices such as sellers disliking exclusive listings, which can lead to conflicts, "It's worked well, and has already mediated accusations between brokers."

Felipe Bonsenso, an aviation lawyer, encourages buyers to work with aviation specialists.

"Some buyers will want to use their real estate lawyer for an aviation transaction, but an aviation specialist is really needed."

Bonsenso, who deals with many clients, says that "Embraer is a good reference, because of the entry-level Phenoms. But one of the first questions buyers ask is 'How many stops to Europe or the U.S.?'" While the Phenom isn't made for intercontinental trips, he predicts, "The Praetor will revolutionize the market" for business jets in Brazil.

While Bonsenso has still not fulfilled a boyhood dream of earning a pilot's license, he credits good luck and coincidence for his opportunity to specialize in aviation law. He has served individuals, corporations, and banks in more than 50 corporate jet transactions and also worked with some commercial aircraft deals. ■

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The FAA's alternative method of compliance issued on July 10 lifts the restrictions of the FAA AD on Textron Aviation Model 525, 525A, and 525B light jets that comply with EASA service bulletin 1480.

Tamarack Atlas-equipped Citations cleared for service

by Rob Finfrock

Days after the European Union Aviation Safety Agency (EASA) lifted an emergency airworthiness directive (AD) on Cessna CitationJet models fitted with Tamarack Aerospace active load alleviation (Atlas) winglets, the FAA followed suit on July 10 with a path that will allow U.S. operators to resume normal flying.

The alternative method of compliance (AMOC) lifts restrictions of the FAA's AD on Textron Aviation Model 525, 525A, and 525B light jets that comply with EASA service bulletin (SB) 1480. That SB incorporates two previously issued Tamarack bulletins (SB1467 and SB1475) addressing the functionality of the active load-alleviation tabs—called Tamarack Active Camber Surfaces, or TACS—utilized to reduce aerodynamic loading on the winglets.

The AMOC marks a significant step forward for Tamarack, following allegations that TACS malfunctions could lead to inflight loss of control. "It's really satisfying to know our product has been validated by the authorities and the solutions we had available prior to the ADs have been accepted as their resolution," company president Jacob Klinginsmith told **AIN**.

The comment period on the FAA's May 25 AD closed shortly after the FAA approval of the AMOC, so the directive remained active until the process played out. According to Tamarack, 89 of 91 Atlas-equipped Citations worldwide already fulfilled the requirements of SB1480 at the time the AMOC was issued.

Also important to the company, which entered Chapter 11 bankruptcy in June, Klinginsmith noted Tamarack booked three deposits on new Atlas installations while the fleet was grounded, and those installations were to begin in July. "Our dealers are excited to get back to selling," he added, "and owners have already sent us photos showing them flying again."

The European Union Aviation Safety Agency initially approved fixes incorporated in the two Tamarack Aerospace service bulletins to resolve the emergency airworthiness directive that required deactivating Tamarack's active load-alleviation system on Cessna CitationJets.

Unlike conventional winglets, Atlas uses TACS to counter increased aerodynamic loading. In restricting the use of the winglet system, the EASA emergency directive issued April 19 had cited "occurrences...in which Atlas appears to have malfunctioned, causing upset events where, in some cases, the pilots had difficulty to recover the airplane to safe flight."

The fixes cited by the FAA and EASA require that Atlas-equipped Model 525, 525A, and 525B aircraft comply with the new SB1480 that encompasses two prior Tamarack SBs. Released in April 2018, SB1467 requires installation of a revised TACS control unit (TCU) to resolve instances of uncommanded TACS movement, while SB1475, issued earlier this year, calls for installation of aerodynamic centering strips to force those surfaces back in trail in the event of a TCU fault.

"I offer my sincere thanks to our loyal and supportive customers. They have been our staunchest advocates despite the inconvenience and hardship of having the use of their aircraft restricted," said Tamarack founder and CEO Nicholas Guida after EASA approved the return to service of Atlas-equipped aircraft.

At the time the EASA approval was granted, Klinginsmith praised the coordination between the European and U.S. regulatory agencies. "EASA and the FAA have been meeting regularly and we anticipate that the FAA will offer a solution to the limitations very shortly, in the spirit of the bilateral agreement in place between the agencies," he said. ■

Textron Aviation program grooms its own demo pilots

by Jerry Siebenmark

It used to be that if you were a demo pilot for Cessna's single, piston-engine airplanes assigned to its Independence, Kansas plant, there wasn't an easy way to transition to the company's turboprops and jets. Instead, the Wichita-based company was hiring pilots from the outside, who already had lots of experience flying turbine aircraft, many with 1,500 hours or more.

"There wasn't a defined pathway like we have today, intended on bringing in those lower-time pilots, developing the skills to move them into turbines," Textron Aviation manager of flight operations pilot development, and piston training Timothy Gerlach told **AIN**.

Three years ago, that changed, after the airframer had completely brought into the fold its former cross-town competitor Hawker Beechcraft—acquired by Textron Inc. in 2014—and realized that it, too, was facing increased competition for experienced pilots capable of commanding twinjets.

Hence, the Pilot Development Program (PDP) was born as a way to provide all of Textron Aviation's pilots a career track and also to counter the effects of a pilot shortage. "There's potential for them beyond the cockpit, and we've had pilots come through who have gone on to become very successful as production or flight-test pilots," Gerlach explained.

When Brian Roggenbaum joined Cessna's flight operations in Independence in 2004, there wasn't an easy way to cross over to turbine aircraft in Wichita. But a few years later he got the rare chance to make that leap to "join the turbine demo team, but with no particular path or plan," Roggenbaum, now Textron Aviation flight operations customer experience manager, told **AIN**. "It was just 'come over here and experience turbine flying and at some point you'll be ready to do this yourself.'"

At any given time, about 20 pilots are in the program at different phases—from pistons to turboprops to turbofans—of training. Each phase that's completed means the pilot is qualified as a demo pilot and pilot-in-command (PIC).

Some candidates for the PDP come from within the company though most are recruited from outside Textron Aviation. Hiring qualifications include a four-year degree, commercial license, and multi-engine and instructor ratings. "There is a time requirement, approximately 500 hours total flight time and approximately 200 hours of instruction given," said Gerlach, adding that the instructor rating is especially important for their role as demo pilots. "So we're looking for an early career aviator with some reasonable amount of instruction experience."

Recently, two pilots at different phases in the PDP program, Chelsea Carlin and Michaela Parisi, participated in the 2019 Air Race Classic.

Parisi, who graduated from Oklahoma State University with a bachelor's degree in aerospace administration and operations, joined Textron Aviation as an intern in May 2018 and was hired as a full-time employee in August. She is in the first phase of the PDP, which is piston qualification. "Eventually, I hope to become qualified to fly our turbine airplanes and be able to fly as a customer demonstration pilot," Parisi told **AIN**. "I also would love to get some flight time in the Cessna Caravan as well and do some international traveling."

Parisi's teammate Carlin has been with the company for more than 3.5 years and holds a bachelor's degree in aeronautical technology from Kansas State University-Salina. She is in the final phase of the PDP and recently received her second-in-command authorization in the Citation 525 series jets.

If she weren't in the PDP, Carlin would probably be an airline pilot. "That was always the goal in the back of my mind, although I never felt deep down that airline life would be the right fit for me," she told **AIN**. ■

Michaela Parisi, left, and Chelsea Carlin were recruited to Textron Aviation's Pilot Development Program, which has been in place since summer 2016.

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Alternative fuels are slowly but surely working their way into fuel supplies worldwide and many of the turbine-powered aircraft that will fly to Las Vegas for NBAA-BACE will burn some amount of sustainable aviation fuel.

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Airbus takes small narrowbody to next level

by Stuart "Kipp" Lau

When Airbus entered into a partnership with Bombardier to take a majority stake in the C Series program in October 2017, the European airframer added a brand-new 100-to-150-seat single-aisle aircraft to its lineup. Since its tie-up, Airbus has pushed the former C Series program beyond most observers' imagination. Closing in on 550 total orders, the rebranded Airbus A220 is now demonstrating its efficiency by surpassing its original fuel savings and direct operating cost estimates with operators around the world.

This clean-sheet design was developed to tackle the lower end of the Airbus and Boeing lines, the A318 and 737-600. The C Series program received the final green light when the Pratt & Whitney PurePower PW1000G geared turbofan family was introduced; this development offered an "out-of-the-box" fuel savings of 15 percent. Aerodynamic efficiencies and the use of advanced weight-saving material bumped the savings up to 20 percent over legacy airliners in this space.

Ironically, the C Series and geared turbofan technology also pushed Airbus and Boeing to launch the A320Neo and 737 Max programs; however, without the smallest members of each family, the A318 and 737-600, leaving a great opportunity for the A220.

As of June, there were 72 A220s in service with five operators. A number of these aircraft are being heavily utilized, flying up to 13 legs and in excess of 18 hours per day. Depending on configuration, the A220-100 seats between 100 and 130 passengers and the A220-300 130 to 160 passengers.

Among current operators, A220s have begun or soon will be replacing legacy Boeing 717s, 737-300/500s, Avro RJ100s, and MD80s. In addition to replacing older aircraft, some operators of the A220 see the aircraft's long range—up to 3,400 nm and 180 minutes ETOPS certification—enabling them to develop new markets. As an example, the A220-100 is the largest airliner certified for operations into London City Airport (a steep approach and short runway); from that airport, it can reach the U.S. East Coast, Russia, West Africa, and the Middle East. In the U.S., Delta plans on using the A220 to replace older aircraft and "up-gauge" routes currently served by regional jets to increase revenues.

Several key features differentiate the A220 from legacy airliners. Considering that most airliners in this class were certified 20 years ago or more, the A220 takes full advantage of advanced technologies including Fadec-controlled geared turbofan (GTF) engines, a fly-by-wire (FBW) flight control system, fully integrated avionics, and is constructed using composites (wing), titanium, and the latest aluminum-lithium alloys (fuselage), making for a lighter more cost-efficient aircraft. As a comparison, the A220-300 is six tonnes lighter than an A319neo and eight tonnes lighter than a Boeing 737-7 Max. For the pilot, the main purpose of this advanced technology is to reduce workload and enhance safety.

A220 Familiarization Course

To experience the aircraft firsthand, **AIN** was invited to Montreal to complete an A220 familiarization course and to Wichita to fly an A220 Flight Test Vehicle (FTV-2). The familiarization course included a complete computer-based training program and a four-hour session in the full-flight simulator. Throughout this entire experience, my goal was to view this flight through the lens of a line pilot and safety zealot.

The Airbus A220 flight deck features a five-panel Collins Pro Line Fusion avionics suite and sidestick fly-by-wire controls.

In Montreal, I met with A220 standards and training manager Pierre Francoeur for an in-depth introduction to aircraft systems, avionics, automation philosophy, normal procedures, and non-normal procedures. Francoeur, like any great instructor, had an infectious passion for teaching. His favorite topics were technology, upset-recovery training, and, of course, the A220. In addition to his training role, Francoeur is a production test pilot at the factory at Mirabel (CYXU), so he knows the aircraft well.

From the start, I learned that the A220 is light years ahead in technology, automation, and operating philosophies compared with the aircraft that I am most familiar with, primarily earlier third-generation jetliners (Airbus A300-600 and Boeing 757/767). In fact, the FBW system and Collins Pro Line Fusion avionics on the A220 are more closely related to the ultra-advanced Global 7500 than those on any other airliner. The main difference is a leap toward simplicity, safety, and highly integrated systems.

As an example, on the A220 there are no "boxed" memory items for emergencies and minimal use of flows to set up the flight deck. Bringing the A220 to life is simple: ensure that the parking brake is set, select both batteries to "auto," and select the electronic checklist. Then wait, and do not touch a thing. As the aircraft comes to life (and either external or APU electrical power is added), nearly all systems are self-tested (only the anti-ice system must be manually tested, a regulatory requirement), all inertial reference systems align, and the primary flight control computers become active. Within a couple of minutes, an electronic checklist (ECL) verifies that all systems are ready to go. The ECL is fantastic and is used for both normal and non-normal checklists and automatically "checks off" items that the system senses. As I gained more experience with the A220, I really began to appreciate learning an aircraft designed from a clean sheet with considerable input from pilots.

Simulators are useful to perform maneuvers that are difficult or too dangerous to perform in the actual aircraft. Francoeur created a training profile that exercises most systems, exploring low-visibility operations, in-flight upset- and windshear-recovery procedures, and engine failures at V1.

A lot of time was spent on upset-recovery training in the simulator. Francoeur pointed out that crew coordination is a primary element of this procedure; during the actual upset, the pilot monitoring will first call out "upset" followed by either "nose high" or "nose low." The pilot flying will then verify (by scanning the ADI and standby instruments), acknowledge, and announce the condition (either nose-high or -low) and begin the recovery. In a FBW aircraft, in addition to the flight crew comparing and confirming that all the flight instruments either agree or disagree, this two- to three-second exercise allows the aircraft—through its flight envelope protections—to begin the recovery process.

The Airbus A220 features relatively large cockpit windows and a top-center crew escape hatch.

Technical Flight Evaluation

A few days and 1,500 miles later, I would again find myself in an A220 cockpit. This time, however, I would visit the flight test center in Wichita to fly FTV-2 (S/N 50002), the second A220-100 prototype. This aircraft was used extensively during the certification process and continues to be used to test future enhancements, such as high-elevation-airport landings and RNP-AR (required navigation performance – authorization required) that will enable lower approach minimums.

The crew for our test flight consisted of experimental test pilots Dave Lewandowski and Andy Litavniks and flight-test engineer Mark King. Following our preflight briefing, we walked out to the flight line to begin preparing the A220 for the flight. As we exited the hangar door, my first impression was that the A220 is a big airplane; its ramp presence is far more mainline than regional jet. Once at the aircraft, Litavniks, King, and I would climb aboard, stow our gear and begin the interior safety briefing.

Next, I would join Lewandowski on the ramp to complete the walkaround preflight inspection. The walkaround, like that for any other airliner, begins with the typical clockwise pattern.

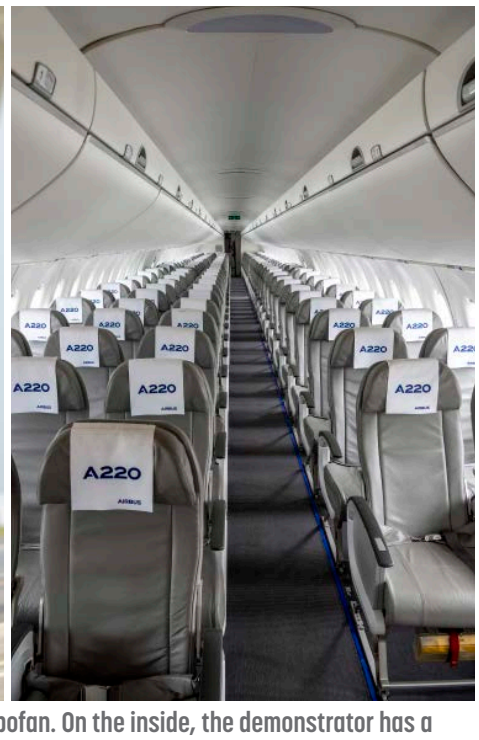
Most items, the probes, oxygen blowout disks, etc. are like most jets'; however, as we approached the PW1525G, the large fan section and beautifully contoured composite blades really stood out. The PW1525G is the highest-thrust variant available for the A220-100 and is rated at 23,300 pounds of thrust with an additional 5 percent reserve. There are a total of four engine configurations available on the A220-100 and three for the larger A220-300, each with slightly lower thrust ratings. According to Lewandowski, from the cockpit, there are very few operational differences in flight. Other unique items inspected during the preflight included electric brakes (advantages: no hydraulic leaks and lower weight) and a very quiet Honeywell 131-9C APU that is, as standard, configured for ETOPS.

With the preflight complete, we settled into the cockpit. The A220 flight deck is huge; it's clean, uncluttered, and provides a great workspace. Overhead, there are minimal systems controls. The flight deck uses the dark, quiet concept—all switches are in the 12 o'clock "auto" or "on" position and push buttons remain pressed in. Only during non-normal operations or configurations are there any changes.

The Collins Aerospace Pro Line Fusion avionics are the heart of this flight deck. Five large 15.1-inch LCD display units take center stage; each is configurable to meet a pilot's needs based on phase of flight. In the event of a display failure, that information automatically reverts to one of the remaining displays. The aircraft can be dispatched with up to two display units inop. An optional HUD for both the captain and first officer is available that replicates the symbology from the PFD, easing the transition to an outside view and reducing training requirements. To date, both Swiss International and Korean Airlines have ordered the HUD. In addition, there are two other airlines that will take delivery of HUD-equipped A220s later in 2019 and in 2020.

On this flight, Lewandowski would sit in the right seat and guide me through our test card; a profile that would include high-altitude airwork, low-speed maneuvering, an autoland, several additional landings, and a simulated engine failure after takeoff. Litavniks would serve as a safety pilot in the observer seat and provide input and valuable assistance throughout the flight. Smith—the flight-test engineer—would keep us all honest and provide additional performance data when needed. I would occupy the left seat for the next three hours.

During the exterior preflight, Litavniks stayed inside and performed most of the cockpit set-up duties. All that was left for Lewandowski and me was loading the flight plan into the FMS via datalink and completing the before-start checklist. Engine start on the A220 is fully automated. The start sequence is initiated by placing the engine start switch to "run" and everything from normal to non-normal starts is completed automatically. During one phase of the start, before ignition, the engine will motor to prevent rotor bowing to stabilize internal temperatures. Total start time for both engines was just under three minutes. The left engine EGT peaked at 780 degrees C, while the right engine peaked at 766 degrees C. Next, we shut down the APU, performed a flight control check, cleared the ground crew, and were ready to taxi. Taxiing the A220 out of the flight test center to Runway 19R took little effort. The aircraft taxied with idle thrust at a manageable speed and the electronic brakes and nosewheel steering were responsive but not too touchy.



The left nacelle and P&W PW1000G geared turbofan. On the inside, the demonstrator has a two-plus-three seating arrangement, with extra-wide center seats in the three-seat rows.

The weather for the flight was typical for Wichita in the spring; VFR with a high broken layer of clouds and strong winds from 180 degrees at 15 knots, with gusts to 24. Takeoff weight was 107,700 pounds (about 80 percent of mtow) with 20,950 pounds of fuel onboard. Speeds for a flaps 4 takeoff were V1-111, VR-111, V2-120, and VFTO of 190 knots.

Cleared for takeoff, I lined the aircraft up with the centerline and advanced the thrust levers to 55 percent N1. Once the N1 stabilized, I further advanced the thrust until the autothrottles engaged. Acceleration was brisk and the airspeed soon reached VR. I then increased back pressure on the sidestick—less than one-half-inch travel—and pitched towards the "pitch target marker" (during takeoff, displays are decluttered) on the ADI. After takeoff, we accelerated and retracted the flaps in accordance with the speed cues on the airspeed tape.

During the climb or any other phase of flight, when hand-flying (autopilot off), the pilot must adjust the pitch trim as speed increases or decreases. On the airspeed tape, there is a "FBW trim speed" bug that is the cue to identify the speed the aircraft is trimmed for in manual flight. When the autopilot is engaged, the pitch trim is automatically adjusted. This is different from larger Airbus aircraft; those types incorporate auto-trim during auto or manual flight. In general, depending on the airspeed, the maximum allowable pitch—according to the flight envelope protections—is 30 degrees nose up and 20 degrees nose down (this is further limited during takeoff, for tailstrike protection).

FBW Demos

In roll, the FBW system has neutral spiral stability up to 30 degrees of bank. These banks, once established, will maintain the angle once the sidestick is released. At steeper than 30 degrees of bank, the aircraft has positive spiral stability; meaning

that when the sidestick is released, the bank will return to 30 degrees. The maximum allowable bank angle is 80 degrees; controlled through the flight envelope protection system.

Hand flying the A220 is extremely precise. The Collins Pro Line Fusion system uses a flight director cue (a small circle with wings) for guidance; the pilot simply steers the flight path vector into the flight director cue. Once the aircraft is properly trimmed, the FBW system is rock solid. I hand flew the aircraft up to FL280 where we engaged the autopilot and set up for the next demo.

Level at FL280, the next item on our agenda was to demonstrate the emergency descent mode (EDM). EDM is an automatic function that is active above 25,000 feet. In the event of a rapid depressurization (cabin altitude above 14,500 feet), EDM activates. It automatically engages the autopilot and autothrottles (if not already engaged), selects 15,000 feet on the mode control panel (MCP) and resets "7700" (the emergency code) in the transponder. Next, the system will reduce the thrust levers to idle and begin a descent near VMO/MMO. The pilots only need to don oxygen mask and deploy the spoilers.

To demonstrate, Lewandowski lifted the guarded EDM switch and manually selected it. At this point, we simulated putting on the oxygen mask and I extended the spoilers to the maximum position; in less than a minute and a half we were level at 15,000 feet—the average descent rate was approximately 9,000 fpm.

Next, we would demonstrate the A220's low-speed handling characteristics and FBW high-alpha protections (HAP). To begin, the aircraft was configured with landing gear down and flaps 4. Smith—the flight-test engineer—provided data for a Vref of 124 knots in this configuration. I then began trimming the FWB trim speed bug and set the MCP speed to 124 knots. At 124 kias, I rolled the aircraft to the right and left at 45 degrees of bank. At this speed and configuration, the A220 was responsive, with no signs aerodynamic buffeting.

Continuing with the HAP demo, I next turned off the autothrottles and reduced the thrust levers to idle for a wings level approach to stall. In pitch, the A220's sidestick has a soft and hard stop. The main differences between the hard and soft are the level of angle of attack and load (g) protections provided. To reach the hard stop requires an additional 16 pounds of force to move past the soft stop. By design, HAP will reduce the angle of attack to maintain control, and regardless of what you throw at it (and I tried); it won't allow the aircraft to stall. During this demo, I would pull on the sidestick to the soft stop and then farther aft to the hard stop. The aircraft was not pleased with my actions. First, it provided a visual warning on the airspeed tape, followed by an aural warning ("Speed, Speed" and then "Stall, Stall") and finally a tactile nudge and lowering of the nose to decrease the angle of attack.

Additional demonstrations of the HAP included adding bank, a dynamic approach to stall with max thrust, and a final attempt in the clean configuration. In each case, I would pull aft on the sidestick to reach the hard stop and get the same result: no aerodynamic stall. During these demos the lowest indicated airspeed recorded was 101 knots; impressive for a 105,000-pound aircraft.

Recovering from the airwork portion of the flight, Lewandowski negotiated with ATC to obtain a clearance to Kansas City International Airport (KMCI) for an autoland demo. Kansas City Center accommodated the request with direct routing to MCI and a climb to FL290. ATC would soon re-clear us direct to the "JHAWK" intersection for the JHAWK 6 arrival (STAR) into MCI. This was a great opportunity to demonstrate a real-world route modification using the cursor control device (CCD) to manipulate the FMS. I was able to easily insert new waypoints and add in altitude constraints. Additionally, by inserting an arrival (JHAWK 6) and approach (ILS 19L at MCI) into the FMS, the system automatically placed the appropriate charts in a queue to be reviewed by the pilots.

Autoland

With the approach brief and checklist complete, we were prepared for the approach into MCI. The autoland function on the A220 provides approach tracking, runway alignment, de-crabbing (in a crosswind), landing flare, and runway tracking during rollout. Designed to provide the highest level of approach capability based on system status (automatic up-mode capability), there are no different actions required by the pilots when compared with a normal ILS approach.

Configured with landing gear down and at flaps 4, we calculated a Vapp of 130 knots (Vref of 123 + 5 knots for the autothrottle and an additional 2 knots for gusty conditions). The autopilot and autothrottles performed flawlessly during the entire approach, flare, landing, and rollout (even with a slight crosswind). Autobrakes and full thrust reversers were used to slow the aircraft. Once clear of the runway, we taxied back for another takeoff and return to ICT.

Holding short of Runway 19L at MCI, we set up for a NADP-1 (close-in noise abatement) departure with flaps 2. Speeds for a flaps 2 takeoff were V1-110, VR-110, and V2-122 knots. Following a normal takeoff and climb, we leveled off at FL230 for the quick trip back to ICT. Again, ATC would provide another route modification to gain more practice with the CCD and FMS.

Descending into ICT, we planned and set up for a normal hand-flown ILS to Runway 19R. The weather in Wichita was VFR with southeast winds from 160 degrees at 17 knots with gusts to 23. The calculated Vapp was 126 knots for another flaps 4 landing. During the approach, the autothrottle did a nice job maintaining speed in gusty conditions. Hand-flying an ILS using the HUD made it easy to track the localizer and glideslope. At 30 feet, the autothrottle commanded the thrust levers to idle and I began my flare. The touchdown was smooth, but a little long since I initiated the flare a bit too early (a habit from flying the larger A300-600).

After taxiing back to the departure end of Runway 19R, we set up for a Flaps 3 takeoff and discussed our planned simulated engine failure at 200 feet. Speeds for a Flaps 3 takeoff were V1-111, VR-111, and V2-123 knots. After takeoff at an airspeed of approximately V2 + 10 knots, Lewandowski reduced the right thrust lever to idle. The aircraft yawed slightly to the right, but I was quickly able to maintain runway heading. During this maneuver there was very little drama. First, I anticipated the engine failure and got a lot of help from the aircraft. During an engine failure, the FBW system will sense the change in yaw and apply rudder in the correct direction. The system applies about half the rudder required to maintain directional control and the pilot does the rest.

On downwind, back to Runway 19R, Lewandowski returned the right engine to normal and I continued around the pattern to perform my final landing without the aid of autopilot, autothrottles, or autobrakes. The approach was flown primarily using the HUD for guidance and the approach and touchdown were normal. Afterward, we taxied back to the flight test center and shut down. Total block time was 2.8 hours and we burned 11,000 pounds of fuel.

From a pilot's perspective, the A220 is a wonderful airplane that is safe, efficient, comfortable, and a joy to fly. A recent Airbus study comparing accident rates over the past 50 years shows that each generation of aircraft makes a substantial improvement over the preceding generation. This study points to fourth-generation FBW aircraft with flight envelope protection systems—like the A220—to reduce the likelihood of a loss of control in flight (LOC-I) by 75 percent. Another study identified the challenges of pilots managing operational complexity, such as environmental threats (ATC, weather, etc.) that cause distractions. The A220's automated features not only reduce workload, but systems like the electronic checklist will double-check "sensed" items (flaps, thrust settings, and other configurations) to ensure they match what the crew planned. From my view and the market's acceptance, Airbus got a winner with the A220. ■

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Embraer lands first KC-390 export order

by David Donald

On July 11 the Portuguese government announced a firm order for five Embraer KC-390 multi-mission transports. The deal, valued at €827 million ($932.6 million), also includes a flight simulator and logistics contracts. The first aircraft is due for delivery in February 2023, after which Portugal will receive one aircraft each year until the last is delivered in February 2027.

In Portuguese air force service, the KC-390s will replace the aging fleet of C-130 Hercules, which have been in use for around four decades. Speaking at a press conference following the announcement, Portugal's Minister of National Defense, João Gomes Cravinho, noted that the C-130s are "at the limit of their use" but that they "have a few years of useful life ahead. They are now undergoing a minor upgrade to continue flying until the new KC-390 fleet is complete."

The minister also commented that the KC-390 "fully satisfies the requirements defined by the Portuguese State, as well as those required for participation in military operations that may result from the alliances of which Portugal is a part." He praised "the unique characteristics of the KC-390, which set a new standard for strategic military transport, hitherto only possible to achieve with four-engine aircraft."

Cravinho also explained that the aircraft will be used for some government civilian missions, as well as carrying out military tanker/transport duties. They include medical evacuation and patient transport, search-and-rescue, and fire-fighting missions.

Having achieved Brazilian civil certification last year, the KC-390 is poised to enter Brazilian air force service in the third quarter of 2019.

For Embraer, Portugal's announcement—long expected—represents a welcome boost to the KC-390's sales campaign. "Today is a historic day for the KC-390 program...this is a very important step to consolidate the aircraft, which we believe will become another success for Embraer," said Jackson Schneider, president and CEO of Embraer Defense & Security. "The Portuguese KC-390 will meet new interoperability requirements in the areas of secure navigation, data and voice transmission that will allow the KC-390 to integrate into joint operations in multinational alliances. These requirements, developed in partnership with the Portuguese air force, will enable the KC-390 to meet the needs of many other nations around the world."

As the largest international partner in the KC-390 program, Portugal has a significant workshare. The industrial partnership between the country and Embraer represents "more than 300 million euros in exports each year and thousands of highly skilled jobs," according to Schneider.

João Gomes Cravinho also commented that the development of this aircraft represents "a very significant stimulus for our economy, not only for the companies that were already involved in the project but also for its future commercialization." ■

MQ-8C cleared for operations

The Northrop Grumman MQ-8C Fire Scout achieved initial operational capability on June 28, the U.S. Navy announced on July 8. With this hurdle cleared, the rotary-wing unmanned air system (RWUAS) can begin fleet operations and training.

"This milestone is a culmination of several years of hard work and dedication from our joint government and industry team," said Captain Eric Soderberg, the U.S. Navy's Fire Scout program manager. "We are excited to get this enhanced capability out to the fleet." The program is managed by the Multi-Mission Tactical Unmanned Aerial Systems office (PMA-266) in Naval Air Systems Command.

The MQ-8C is based on the Bell 407 airframe, and uses systems developed for the smaller, Schweizer 333-based MQ-8B, which currently serves aboard U.S. Navy Littoral Combat Ships (LCS) in the 5th and 7th Fleets. The role of the Fire Scout is to provide reconnaissance and precision targeting support for ground, sea, and air forces.

An MQ-8C undergoes trials at the Webster Field Annex.

Porting the system into a larger airframe permits heavier payloads and increases time-on-station to up to 12 hours, depending on sensor fit, compared with around eight hours for the MQ-8B. In addition to the nose-mounted electro-optic sensor ball, the MQ-8C will be equipped with a radar featuring a range of digital modes, including weather detection, air-to-air targeting, and ground moving target indication (GMTI). The RWUAS is intended to work closely with manned MH-60 Seahawk helicopters.

Shipborne operations began in December 2014 aboard the destroyer USS Jason Dunham and went on to include operations from an LCS (USS Montgomery) in April 2017. Initial operational test and evaluation trials were conducted in June 2018 by VX-1 aboard the LCS USS Coronado.

The Navy intends to purchase 38 MQ-8Cs, and the first operational deployment aboard an LCS is slated for 2021. **D.D.**

The VKS (Russian Aerospace Forces) continues to operate a dwindling number of aging An-12 transports.

Development underway on gunship for Russian military

by Eugene Gerden

Russia appears ready to start a project to build a gunship—an aircraft designed for the operational support of land forces—despite the skepticism of some local experts and cloudy prospects. Last month, the state-affiliated TASS news agency cited "sources in the Russian military-industrial complex," who said that work on the aircraft has already started.

It will be positioned as an analog of the U.S. Air Force's AC-130W Stinger II (modified MC-130) and will use a modified version of the Antonov An-12 "Cub" transport aircraft as its platform. The weapon system will include a 57mm automatic gun, as well as some smaller-caliber weapons (probably 30mm) and automatic grenade launchers.

The idea for building a similar type of aircraft was discussed in the Soviet Union as far back as the 1930s. The gunship was based on a Tupolev TB-3 heavy bomber and was equipped with 76mm and two 45mm guns. To compensate for their poor accuracy, the weapons fired shrapnel shells, which could target troops and lightly armored vehicles. The firing range of the main caliber weapon reached 18 km, which made the aircraft immune to anti-aircraft artillery. Despite certain successes achieved during the tests of that gunship, the project was terminated at the end of 1930s.

The reasons for the resumption of a gunship project have not been disclosed at the state level. Vasily Kashin, head of the department of international military-political and economic problems of the Russian Higher School of Economics, told **AIN** that the new aircraft could be suitable for counter-insurgency operations in the Northern Caucasus, Central Asia, and Syria, while Russia hopes to mirror the experience of the U.S. and its successful use of the AC-130.

However, a serious problem that may complicate implementation of the project is the lack of an adequate aircraft.

Representatives from the main command of the Russian Air Forces were unavailable for comment concerning the program. ■

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Rejecting the takeoff the FlightSafety way

by Matt Thurber

As the Falcon 2000 accelerated quickly through 80 knots on a clear sunny San Francisco day, first officer Joe Wolfer called out our speed, and then it wasn't long before he said, "V1." I moved my right hand from the power levers, then heard "rotate," and pulled on the yoke. That was when, suddenly, the emergency happened.

I slammed the power levers to idle and stood on the brakes while saying, "Stop, stop, stop" to signal Wolfer that he could help as much as possible to get the big Falcon slowed down. As it turned out, we sailed off the end of the runway into San Francisco Bay carrying 60 knots of airspeed, hopefully a survivable scenario and certainly a lot better than doing so at 150 knots.

By now you've probably figured out that Wolfer and I weren't flying a real airplane and that we didn't get our feet wet that day. What we were doing was one of 16 ultra-realistic scenarios in FlightSafety International's Go/No-Go Rejected Takeoff course, part of the training provider's Advanced Airmanship series.

I was invited to do the training at FlightSafety's Teterboro (New Jersey) Learning Center. The course takes about six hours and necessarily is done two students at a time. In my case, FlightSafety instructor Joe Wolfer hadn't yet done the Rejected Takeoff course, so we worked together under the tutelage of Michael Romeo, Dallas-based director of advanced training programs. Joe and I would each get to fly the 16 scenarios from the left and right seats to give us the maximum benefit of the training.

The curriculum began with a detailed discussion of the day's plan, but more important, a breakdown of the concept of rejected takeoffs and how pilots are trained to handle problems at critical times before and after reaching V1 (takeoff decision speed).

The need for this training was made abundantly clear after the NTSB published the final report about a runway overrun of an MD-83 on March 8, 2017, in Ypsilanti, Michigan. The pilots had no way of knowing that the airplane's elevators were damaged by strong winds while it was sitting on the ground days before the flight. Control checks were normal, but after reaching V1, then rotation speed, the pilot flying (PF) was unable to get the nose to rise and he called for an abort. The pilot not flying (PNF), also a check airman, immediately and effectively assisted in the abort instead of questioning the PF's judgment. Despite leaving the end of the runway at about 115 mph, none of the 110 passengers or six crew members were injured.

The NTSB credited the PF's decision to abort and the pilots' well-coordinated efforts with saving the lives of everyone on board.

"This is the kind of extreme scenario that most pilots never encounter: discovering that their plane won't fly only after they know they won't be able to stop it on the available runway," said NTSB chairman Robert Sumwalt. "These two pilots did everything right after things started to go very wrong."

Instituting a Standard Process

Development of the FlightSafety Go/No-Go Rejected Takeoff course began about six years ago, after an incident brought to light the need for specific training. In this case, the owner of a business jet was understandably upset when the pilots aborted a takeoff because of a cabin-door crew alerting system (CAS) message. Loose laptops and cellphones were sent crashing to the front of the cabin. When the owner asked the pilots why they had aborted the takeoff for such a minor issue, they told him that this is how they had been taught during FlightSafety training.

Further investigation found that some FlightSafety instructors were teaching pilots to always abort for any red CAS message, while others taught to abort only for more serious issues. "There was no standard," Romeo explained. "It was up to the individual pilot or instructor." In fact, the advice to abort for a red CAS message wasn't even in most flight manuals. This prompted a re-examination of takeoff procedures and ultimately development of the Go/No-Go Rejected Takeoff course. The goal was to replace "this is the way we've always done it" with a logical process that gives pilots tools to help make the proper decision during the critical and short time during takeoff when making the wrong the decision can be fatal.

"The whole purpose of this course is to prevent overrun accidents by helping you make a better go/no-go decision," he said. "The go/no-go phase of flight is the most dangerous thing that we do in the airplane. Bar none. Unlike other decisions we make in the airplane, if we decide to abort or continue to take off, we pretty much can't take it back."

It's important to understand that most business jet pilots get little comprehensive training on rejected takeoffs. Typically, during a recurrent training session, there are one or two V1 engine cuts during takeoff, just to meet regulatory requirements. "We don't have enough time to go into all the details and how we come up with the decision," Romeo said.

What FlightSafety teaches in this course is a much better way to conduct the pre-takeoff safety briefing, followed by putting this into practice in the simulator, not only to prove that it works better but also to help pilots build the muscle memory of handling takeoff emergencies in a fashion that delivers a much better chance of surviving. Finally, we would practice takeoffs where we get into the air and need to make an emergency return to the runway, something that would prove to be a lot of fun from a handling standpoint.

Each of us would get two hours in each pilot seat, and Romeo pointed out that the PNF's job would be much more than just takeoff callouts, lifting gear and flap handles, and making radio calls. A crew that trains together in the Go/No-Go Rejected Takeoff course soon learns that both pilots play an important role in the decision-making and, in fact, either pilot can make the call that either aborts or continues the takeoff.

Two Takeoff Scenarios

The key to the decision is to look at the situation in a different way than jet pilots are typically taught. The FlightSafety method is to split takeoffs into two types: where runway length is critical (very close to the balanced field length) and where the length is not critical (plenty of runway remaining versus runway required).

The difference between the two is that when length is critical, pilots must adopt a "go-minded" attitude. There is not much time to make a decision when runway length is critical, and stopping should be attempted only for a specific safety condition. With more runway available, the stop decision ("stop-minded") can include additional safety considerations.

In either case, however, for an emergency occurring after V1, the plan is always to "go"—take off, and then turn back to the airport.

FlightSafety's explanation of "go-minded for takeoff" and "stop-minded for takeoff" gives specific instruction on what this means in terms of aborting a takeoff. At the same time, the training gives pilots a much simpler but more effective pre-takeoff safety briefing that covers these critical issues and eliminates the confusing and often lengthy verbiage that pilots sometimes use.

It should be noted that FlightSafety teaches the use of the words "stop" and "go" instead of "abort" and "continue." The idea is to eliminate unnecessary syllables, which take longer to spit out in an emergency. It's far easier and faster to say, with urgency, "GO!" instead of "CONTI-NUE!" Likewise, "STOP!" comes out much faster than "A-BORT!"

The big difference between a go-minded and stop-minded takeoff is how to treat issues that occur between 80 kias and V1. The runway available is the key factor.

For both types of takeoffs, the briefing starts like this: "Between 80 kias and V1, we will abort on my callout of "STOP" for an engine failure, loss of directional control, external danger..."

Then the briefing continues, for a go-minded takeoff, as follows: "...or an emergency situation that makes the aircraft unsafe to fly."

For a stop-minded takeoff, this is the verbiage: "...or any situation that gives us a safety concern."

The difference between "unsafe to fly" and "safety concern" is significant. The former means unequivocally that the airplane will not make it into the air, or if it does lift off, that it will not keep flying. Or as Romeo put it, "When we say 'unsafe to fly,' what we're talking about is based on the situation [that] the airplane cannot sustain flight. We can't get it airborne; or it won't sustain flight."

CAS Interpretation Opportunity

When runway length is critical, the last thing the pilots have time for is to interpret CAS messages. In the Falcon 2000 simulator that we flew for the FlightSafety course, there are 25 red CAS messages that are not inhibited during takeoff, according to Romeo. But there are few circumstances where it isn't better to simply keep accelerating and take off, then either troubleshoot the problem from a safe altitude or return and land quickly. "A normal person cannot read the CAS message, interpret what it is, and decide what to do about it," he said. "For a critical runway, what we're talking about is the CAS messages have to be an all-or-nothing [decision]."

In any case, statistics support the "GO" decision. In the FAA's "Takeoff Training Safety Aid," a study of 97 air transport overrun rejected takeoff accidents and incidents through 2003 revealed that 52 percent could have been prevented by simply continuing the takeoff; more than 400 lives would have been saved.

The real meat of the training session was, of course, the simulator time. I usually like to describe in detail what I've done when writing about training, but in this case, I don't want to give it away. The surprise element is critically important. Obviously, because I started in the right seat, I had some knowledge of what to expect. But the session was even more valuable for my having experienced both the PF and PNF roles.

Romeo had explained how important it is for the PNF to look at more than just the airspeed tape during takeoff and call out the speeds and rotation. The engine gauges are designed analog-style to help make it easier to see differences between the way each engine is running, and I soon got into the habit of glancing at those while watching the airspeed, too.

For each takeoff, we assessed whether it was a go- or stop-minded takeoff and then mentally geared up for what that meant. It took Wolfer and me a few tries before we got comfortable working as a crew and both making "stop" or "go" callouts, but it soon became natural. And we both liked the brevity of the "go" and "stop" commands.

When we made mistakes, it was usually because one of us was thinking too much about what a CAS message meant instead of sticking with the original plan based on which kind of runway we were using. There were times where one of us as PNF called "GO" and the other aborted the takeoff, but that's why we were practicing in a simulator.

One example of a mistake it was good to learn about was during a go-minded takeoff on a length-constrained runway. With Wolfer at the controls, just before V1, the number two engine failed. I said, "Engine failure-STOP!" and Wolfer correctly aborted the takeoff. But we ended up overrunning because I didn't sing out quickly enough. I should have said "STOP" first instead of taking up valuable time saying "engine failure."

For those takeoffs where we made it into the air with an engine fire, electrical problem, or other serious issue, we had to figure out how to get back on the ground quickly. The target was two minutes, and we both got to try 90-270 returns and closed traffic patterns, which was a lot of fun in the Falcon 2000.

The scenarios kept getting harder and involved many more failures than simply engines quitting, for example, blown tires, thrust reverser deployment, rear compartment fires, etc. The icing on the cake was a scenario that replicated one of the worst business jet accidents in recent years—this was the one at the beginning of this article—but it was so dramatic and enlightening that I don't want to say more, so as not to diminish the value to pilots planning to take this training.

In the debrief, Romeo said that it is better for crews to take the course together so that during an emergency, each pilot knows what the other is doing. He doesn't recommend one pilot taking the training and teaching it to other pilots.

The beauty of Go/No-Go Rejected Takeoff course is that not only does it force pilots to think about what they will do in case of a problem during takeoff, but it gives them a realistic action plan that really works. In my opinion, this is an amazingly effective program and one of the best training events I've experienced at FlightSafety; this course is also something that all jet pilots should undergo. ■

L3Harris's London Training Centre at Crawley officially opened last month, but more than two dozen of the company's airline partners have already used the facility for training.

L3Harris opens new London training center

by Ian Sheppard

Prince Charles officially opened L3Harris's new $200 million London Training Centre at Crawley, near Gatwick Airport, on July 10. The center sits adjacent to its new simulator production facility and marks a move out of the nearby Thales facility; L3 (as it was then called) acquired Thales Civil Aircraft Simulation & Training in 2012 but rented a large section of the Thales building, while Thales continued its own military simulation and training activities behind a partition wall until the new L3Harris center was ready.

UK Aviation Minister Charlotte Vere also attended the ceremony, which involved Prince Charles unveiling a plaque after flying an L3Harris Reality Seven A320 full-flight simulator into Glasgow. Charles characterized flying in his day as "by the seat of your pants and by dead reckoning" during the ceremony.

"Our investment in this facility reflects our confidence in the growth opportunities in the UK and the aviation industry, illustrated clearly by the demand for new airline pilots across the world," said Alan Crawford, president of L3Harris Commercial Aviation. He added that the company built the facility on land where the original Rediffusion sat. "So we are coming back to our spiritual home," he proclaimed. Already 26 of the company's airline partners have used the facility, he said, noting the need for the industry to train 30,000 professional pilots over the next five years to satisfy fleet growth (based on aircraft orders) and pilot retirements.

During a tour of the production facility, Mitesh Patel, director of sales, marketing, and customer excellence, said that the company has delivered between 80 and 85 simulators in the past three years. He added that he based the figure on aircraft units only because the modular system mates with a motion system and a visual system at the customers' premises.

Patel said the production building holds 10 bays, some of which the company could use to supplement the training side of the business with its own simulators, adding additional flexibility. Last year, he said, the company built 22 simulators in Crawley, 18 of which went for customer use and the others for its in-house training business. L3Harris plans to send two simulators—an A320 and a 737—to Arlington, Texas, which previously has housed only military simulators.

Meanwhile, the company continues to expand its training capacity. Crawford told **AIN** that following the acquisition of CTC at Bournemouth, it has increased the number of pilots trained from 300 to 1,700 a year; it also maintains centers in Portugal, New Zealand, and now Cranfield in the UK, which opened recently. For the U.S. market and China it operates a training center in Sanford, Florida.

Finally, Crawford said the acquisition of Fareham-based Flight Data Services has given it in-depth flight data recorder analysis capabilities, which ties in both with its recorders joint venture with the Thales L3 joint venture ACSS and a new service for airlines to take their data and feed it back into training. With the company's Ethos software it has partnered with Delta Air Lines in a project to allow pilots to see their own performance on tablet devices. ■

PHOTOS: GETTY IMAGES FOR UBER ELEVATE

Jaunt Air Mobility was one of two companies that used the event to reveal details of a concept aircraft.

Uber Elevate lays out 2023 flight plan

by Jerry Siebenmark

Ridesharing giant Uber believes it can leverage its ground network of 93 million monthly platform users and move them into the air—and soon. At the two-day-long Uber Elevate Summit in mid-June in Washington, D.C., Uber revealed its plans for replicating its ground network in the sky, unveiling new electric vertical takeoff and landing (eVTOL) designs that could compose its fleet as well as early plans for where it would initially fly its aircraft and the infrastructure that would support its operations.

"The ever-elusive flying car future we have all imagined is one step closer," Uber Elevate head of product Nikhil Goel said at the opening of the summit on June 11. "It's closer than most people think."

What Uber made clear at the summit—attended by 1,500 people from 31 countries—was that it has spent a lot of time and money on the urban air mobility concept and has hundreds of people working to make Uber Air a reality in short order. It's got an ambitious timeline that calls for it to begin test flying its first eVTOLs in 2020 followed by operations in three pilot cities—Dallas; Los Angeles; and Melbourne, Australia—by 2023.

But even before then, it hopes to gain a better understanding of how its eVTOL ride-sharing service will work through the July launch of Uber Copter, which will transport Uber riders from Manhattan to JFK Airport in New York City using Part 135 operator HeliFlite. "Uber Copter proves out the multimodal stitching of ground and air trips together," Uber Elevate director of engineering Mark Moore said.

The service will be available through the Uber app and cost between $200 and $225 per person, carrying four to five passengers. It "is something we can start building today," Uber Elevate director of operations Stan Swaintek explained to attendees. "The aircraft infrastructure is already there," such as the heliport and established VFR routes.

Uber's also thinking about where its eVTOLs will pick up passengers, how it will keep their batteries charged between operations as well as the noise its craft will create and the sound parameters they'll need to operate within.

What's less clear is whether Uber's timeline will work with regulators' schedules. Regulators including FAA interim administrator Dan Elwell and Transportation Secretary Elaine Chao told attendees they don't want to stand in the way of progress, but safety—and community buy-in—is paramount to the development of a robust UAM system in the U.S.

Following UAS's Path

"Safety is always number one," Chao said. "It is the foundation of everything the department does." But even as the Department of Transportation and the regulators that fall under it, including the FAA, "address legitimate public concerns about safety, security, and privacy," Chao promised it won't hamper innovation and will strive to "avoid overly prescriptive rules. We want to be tech neutral, not command-and-control. We are not in the business of picking winners and losers."

FAA acting administrator Dan Elwell speaks at the 2019 Uber Elevate Summit.

There are a host of challenges to consider for creating that UAM system, regulators said, not the least of which is what part of the airspace eVTOLs will occupy, how will it be controlled, and, most important, how it will be rendered safe. It most likely will follow the same path as drones, or unmanned aerial systems (UAS). "Integrating UAS into the national airspace system is a good example," the FAA's Elwell explained. "Our process is simple: get the data to assess our risks and then create useful regulation and policies where needed. As a point of reference for how fast this industry is moving, the FAA has been registering manned aircraft for 92 years, and after only four years of registering drones, we now have four times as many drones as we have in all the rest of legacy aircraft."

He likened the pace of UAM integration to the natural progression of a child's mobility. "Let's begin this [urban air mobility] integration by working with industry to start crawling with low-risk operations in remote areas gathering data and evaluating safety all the while," Elwell said. "When we're ready, we'll systematically graduate to high-density urban areas with semi-autonomous operations, which will be the walking phase, and eventually the system will mature to fully autonomous operations in busy urban airspace. And we'll be running.

"And that's where we cannot fail. Achieving this final state for a radically different new entrant will be an evolutionary process, and it won't occur overnight. But it also won't take as long as it used to with yesterday's FAA."

During a panel session on low-altitude airspace operations in which much of the conversation focused on the work underway for the safe integration of UAS—unmanned air system traffic management (UTM), remote identification of UAS, and detect-and-avoid anti-collision

News Update

Trapp Takes the Lead at Airbus

Romain Trapp has been appointed president of Airbus Helicopters' U.S. subsidiary, Airbus Helicopters Inc., and head of the North America region for helicopters. He succeeds Chris Emerson, who is assuming the role of president of Airbus Defense and Space. Trapp previously served as CFO of Airbus Helicopters Inc. in Grand Prairie, Texas, beginning in 2008. He became Airbus Helicopters COO in 2016 and has also been president of Airbus Helicopters Canada since 2013.

Trapp began his Airbus career in 1999 and has held various positions in finance, program management, and general management.

LCI Secures $75M in Financing

Libra Group's helicopter lessor unit, Lease Corporation International (LCI), has successfully closed a new asset-backed helicopter financing facility in excess of $75 million, led by CaixaBank along with a consortium of financial institutions. The new arrangement is CaixaBank's first with LCI and follows the successful closing of a similar facility earlier this year with Close Brothers Aviation and Marine. It will be used to support the continuing growth of LCI's helicopter fleet for civilian use.

LCI's fleet, which comprises approximately $1 billion of assets in service, on order, and under management, is focused on the latest technology light-twin, medium, and super-medium helicopters manufactured by Leonardo, Airbus, and Sikorsky.

Leonardo Gets Part 145 Nod for Gulf Facility

Leonardo's new Gulf of Mexico Helicopter Support Center has gained Part 145 repair station approval from the U.S. FAA. The 21,000-sq-ft facility in Broussard, Louisiana, opened in January and initially was limited to providing customers with spares and support. Part 145 authorization allows it to provide full helicopter blade repair, spare parts, and technical support to customers across the Americas for all AW109, AW119, and AW139 models.

More than 700 Leonardo helicopters are in service across the Americas.

Mi-38 Completes High/Hot Trials

Russian Helicopters has completed a series of Mil Mi-38 high/hot and IFR test flights designed to expand the aircraft's approved flight envelope. The helicopter made more than 50 flights in the Southern Russian city of Astrakhan, confirming its ability to operate at ambient temperatures of up to 113 degrees F. High-altitude tests at Mount Elbrus (15,554 feet) validated the Mi-38's ability to fly at altitudes of up to 9,843 feet mean sea level. Another 50 IFR flights were made. Test results were delivered to the Federal Air Transport Agency Rosaviatsiya to make additions to the helicopter type certificate.

systems—the FAA official responsible for overseeing that effort also underscored the need for the UAM industry to begin laying the groundwork for public engagement in acceptance of urban air transport systems. "Community outreach is going to be vital," explained FAA executive director of the UAS integration office Jay Merkle. "We have to have a public that is confident the operations are safe, secure, but also to understand operations and what benefits it brings to their communities. Our experience is, the sooner you engage, the more frequently you engage, the better the interaction with the community."

'When the Real Fun Begins'

Uber Elevate's Moore laid out some basic specifications for what his company is looking for in its eVTOL fleet: four passengers with the fifth seat for a pilot until autonomous flight is proven out; a cruise speed of 150 mph or 130 knots; a 25-mile (22 nm) "sprint" range; and a 60-mile (52 nm) maximum range. In terms of noise produced by the eVTOLs, Uber has set a near-term community noise goal of 15 decibels lower than the Stage 3 limit and an electric powerplant that is 3.5 times as efficient than a traditional gas turbine engine used in a helicopter.

> **"Safety is always number one, it is the foundation of everything the department does."**
>
> – Transportation Secretary Elaine Chao

"[The year] 2020 is when the real fun begins, when we actually start testing these aircraft," he added, "when we prove to the world just how safe, quiet, and how great performing these vehicles are." Additionally, Moore thinks eVTOLs with wings will be a more efficient design. "High-drag, non-wing multirotors make a great test bed to prove out the technology, but they really don't have characteristics we want," he said, which is faster and higher-productivity aircraft.

Bell Flight, Boeing's Aurora Flight Sciences, Karem Aircraft, Pipistrel Vertical Solutions, Jaunt Air Mobility and EmbraerX were Uber's eVTOL partners and OEMs exhibiting at the summit, the latter two of which used the event to unveil details of their concept aircraft.

Separately, Uber partner Safran Cabin brought a full-scale mockup of what an eVTOL cabin "needed to be to support the overall ecosystem they are trying to create," Safran Cabin executive v-p Scott Savian told **AIN**. Its passenger seats are angled slightly outward for ease of ingress and egress as well as a cabin height that's comfortable for a 6-foot-4-inch passenger. "We ultimately settled here, which we think is a real smart combination of optimizing the size for the aerodynamics of the vehicle, optimizing the operations, how easy it is to get on and off, and stow your luggage," Savian added.

While eVTOL makers weren't willingly sharing details of their development timelines such as anticipated first flight, certification, and full-scale production, Moore expects Uber will have its "first handful of certified products" in 2023, when it can begin Uber Air service in its three pilot cities. By 2028, it plans to begin scaled operations. And between 2028 and 2030, "we believe that's when autonomy will be ready to be certified," he said. By then, Uber will have its first 50 to 75 million trips completed. "That will give us the statistical basis to prove autonomous flight and free up the fifth [pilot] seat, which gets us to an even better revenue stream with these vehicles," Moore stated.

Ground-air Transition

Uber Air will need multiple locations to drop off and pick up passengers, and they will likely serve as a sort of multimodal transportation hub that Uber is calling its Skyport Mobility Hubs for its ground-ridesharing network as well as its electric-powered Jump scooters and e-bikes. These skyports, which Uber envisions as repurposed existing buildings or new construction, also will provide access to public transportation, and be outfitted to provide electric-vehicle (EV) charging—including for its eVTOLs. Working with local governments as well as mining its own data collected from its ground ridesharing network will help Uber identify the best locations for its skyports.

Uber's vision for the skyports was demonstrated at the summit through 16 different designs that the company said are "the first fully considered and technically feasible skyports" for a 2023 launch of Uber Air. Eight architecture firms—Beck, BOKA Powell, Corgan, Gensler, Humphreys & Partners Architects, Mithun, Pickard Chilton + ARUP, and SHoP—were invited to unveil their skyport designs at the summit. "With the first launch of Uber Air just a few short years away, this collection of Skyport Mobility Hub concepts establishes a practical, sustainable vision for the infrastructure needed in the communities we plan to serve," Uber Elevate head of design John Badalamenti said. "These designs represent a synergy of purpose, orchestrating a seamless transition between ground transit like Uber Pool and eVTOL aircraft on the roof tarmac, all while contributing to the surrounding neighborhood."

The expansiveness of the UAM network Uber hopes to create is making for enticing investment opportunities, private equity firms noted. "If you look at an urban parking lot, a few years ago we actually viewed that as a threatened opportunity," Oaktree transportation infrastructure fund managing director and co-portfolio manager Josh Connor said during a panel session on UAM investment. "Now we're taking a different view of it."

Boeing HorizonX Ventures managing director Brain Schettler added: "It's an

Helo Safety Team: 'too many lives being lost'

The U.S. Helicopter Safety Team (USHST) warned last month that the U.S. helicopter industry is heading toward its highest annual fatal accident total in more than a decade, already recording 15 fatal accidents with 27 fatalities in the first six months of 2019. The USHST notes that is already on par with all of 2013 when 30 fatal helicopter accidents were recorded, but cautioned that the number could go even higher, as July historically posts the highest number of rotorcraft accidents during the calendar year.

Figuring in that history, the USHST warns that "the industry also is at risk to reach the total from 2008, when there were 35 fatal helicopter accidents. With half of 2019 completed and another six months to go, the U.S. helicopter industry is experiencing a year of tragic accidents with too many lives being lost."

The USHST is calling on operators, pilots, instructors, and mechanics to "rely on safety basics and place a stronger emphasis on identifying and managing risk." The USHST is calling on the industry to focus on basics, including fuel management, adequate pre-flight inspections, adherence to checklists, understanding the impact of over-the-counter medications, avoiding flying VFR in IFR conditions (scud running), not succumbing to "get-there-itis," and learning when to abort missions en route **M.H.**

From lifesaving defibrilators to pizzas, drones are lining up to take over a wide range of delivery missions. Launched in 2013, U.S.-based Flirtey is on track to launch commercial operations next year. Founder Matthew Sweeney draws parallels between today's drone technology and the Wright Brothers.

Flirtey to launch U.S. drone delivery service in 2020

by Mark Huber

U.S.-based drone delivery company Flirtey will begin commercial service in 2020, the company said. Flirtey was the first drone delivery company to conduct FAA-approved commercial drone delivery demonstrations, a series of deliveries of medications and supplies. The July 2015 demonstrations were conducted in Virginia. The drone used for those demonstrations will soon be on display at the Smithsonian National Air and Space Museum in Washington D.C.

The company is also participating in the FAA's Unmanned Aircraft System (UAS) Integration Pilot Program (IPP) in partnership with the City of Reno (Nevada). Flirtey has received FAA approval for multi-drone, single-pilot operations, as well as for beyond visual line of sight operations (BVLOS). Since its founding in 2013, Flirtey launched the first pizza-by-drone delivery model (Domino's in New Zealand), conducted the first autonomous drone home delivery (with 7-Eleven stores in the U.S.), and completed the first FAA-approved ship-to-shore drone delivery (with Johns Hopkins University).

To date, the company has received $16 million in funding from investors including Menlo Ventures and Qualcomm Ventures. "Flirtey's Kitty Hawk moment on July 17, 2015 pioneered the commercial drone delivery industry, just as the Wright Brother's flight at Kitty Hawk on December 17, 1903, pioneered the commercial aviation industry," said Matthew Sweeny, Flirtey founder and CEO. "Flirtey is now on the fast-track to begin lifesaving AED [automatic electronic defibrillator] delivery and commercial package delivery to homes in the U.S. in 2020." ■

Drone maker DJI launches 'Government Edition' model

by Mark Huber

DJI claims its "Government Edition" drone has multiple safeguards to prevent misuse.

The world's largest maker of light civilian drones, DJI, last month unveiled a special "Government Edition" designed to safeguard sensitive data. The architecture of the new drones 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.

"DJI Government Edition allows government agencies to serve the public more efficiently and effectively using the industry's most widely adopted drone technology while maintaining total control over their data," said Mario Rebello, vice-president and regional manager of North America at DJI. "This is DJI's most secure drone solution to date, because it prevents users from accidentally or even intentionally transferring data off of the drone to other parties. By incorporating these assurances into its architecture, the Government Edition solution meets the rigorous data security expectations of government agencies, and provides them the safety, reliability, and ease of operation that DJI's products are respected for by commercial drone pilots around the world."

DJI's release of Government Edition comes a week after the company issued a fiery rebuttal to fresh charges emanating from Capitol Hill that intercepted data could be misused by foreign governments and/or bad actors. In a letter to the U.S. Senate's Committee on Commerce, Science, and Transportation written in late June, DJI's Rebello pointed out that DJI drones have multiple safeguards to ensure against such activities including embedded passwords, data encryption, and internet disconnect. He also said, "DJI drones do not share flight logs, photos or videos unless the drone pilot deliberately chooses to do so. They do not automatically send flight data to China or anywhere else. They do not automatically transmit photos or videos over the internet. This data stays solely on the drone and on the pilot's mobile device. DJI cannot share customer data it never receives." Rebello said additional protections include that when "U.S. drone users do choose to share their data, it is only uploaded to U.S. cloud servers" and that the company operates a global "Bug Bounty Program" to encourage identifying security issues.

Features of DJI's new Government Edition drones include: No data transmission, a permanently enabled Local Data Mode within the custom DJI Pilot application prevents data transfer from the mobile application over the internet to third parties or to DJI; firmware update reviews, government agency aviation and IT departments can review firmware updates in electronic isolation before applying them to their fleets and have full control over how to validate them and when to install them on DJI drones; and restricted hardware pairing, drones and remote controllers running Government Edition solution firmware can only be linked with each other and are not compatible with other DJI products, preventing the use of unsecure hardware and unauthorized third-party applications.

The Government Edition drone can be purchased through select authorized DJI Enterprise resellers worldwide.

In his letter to the Senate committee last month, Rebello said that DJI had worked closely with U.S. government agencies, including the departments of Interior and Homeland Security, in developing the Government Edition package and that the practical safeguards it incorporates would prevent even accidental data sharing.

"If a government employee were to make a mistake in data management protocol, or even intentionally try to send drone data to DJI or elsewhere, no data will be transmitted. This is our most secure drone system and is designed to meet the U.S. government's rigorous security expectations," he said. "Our global team of engineers proactively implemented these measures based on our partnerships with public safety agencies, private operators of critical infrastructure, and even the U.S. federal government. We have publicly called on all manufacturers to adopt the measures outlined by DHS and remain open to any further recommendations that will help us continue to empower our end users to better safeguard their data." ■

NTSB cites cell phone use, meds in two CFIT crashes

The National Transportation Safety Board (NTSB) has found that two separate fatal New Mexico helicopter crashes in 2017 and 2018 were the result of controlled flight into terrain (CFIT) in areas of rising terrain.

The first occurred on September 16, 2017, when a 1989 Bell 206 L3 operated by KQRE TV of Albuquerque crashed in Ancho during daylight VFR with reported visibility of 10 miles on a flight from Roswell to its home base. A flight plan was not filed. Pilot/reporter Bob Martin, the sole occupant, was killed. Data from the helicopter's GPS unit indicated that the helicopter was flying at altitudes between 6,200 and 6,456 feet msl shortly before it hit terrain described as "ranch land" at an elevation of 6,330 feet. The NTSB described the impact as "slight, nose low" creating a 300-foot-long wreckage path "indicative of controlled flight into terrain." While much of the wreckage was consumed by a post-crash fire, the NTSB said it did not find any evidence to suggest a mechanical failure.

Twenty-three minutes before the crash, the pilot initiated a cell phone call to a car rental agency, the NTSB's final report stated, adding that the employee who took the call thought the pilot seemed "busy or distracted." The call lasted one minute, forty-seven seconds, with the car rental employee reporting it was cut off mid-sentence. The pilot held a second class medical with near-vision limitation, had a total of 8,800 flight hours, and held a variety of ratings including commercial rotorcraft and rotorcraft certified flight instructor. He had flown 150 hours in the six months prior to the accident. The NTSB concluded that the probable cause of the accident was "the pilot's distraction by a cell-phone during low-altitude flight, which resulted in controlled flight into terrain."

On January 17, 2018, a privately-owned 1969 Bell UH-1H crashed in an area of rising terrain and was consumed by a post-impact fire during a night VFR flight from Raton, New Mexico, to Folsom, New Mexico, killing five of six aboard including both the pilot and a pilot-rated passenger. The surviving passenger reported hearing a loud bang as the helicopter hit the ground in level flight. The helicopter then rolled forward and came to rest upside down. She was able to get out of the helicopter before it exploded and called 911. The pilot flying initially survived but died en route to the hospital. Before he died, the pilot told a witness that the accident was his fault and that he had flown into terrain.

The NTSB described the crash site as "unpopulated ranchland grass and sparse, low brush." Imagery showed "a reduced amount of visual terrain features in the area of the accident during night conditions and there were no sources of ground lighting or illumination in the vicinity," the Board added. The wreckage was located on a near-level mesa that rose 100 feet above the surrounding mountainous terrain. Post-accident investigation revealed no abnormalities with the helicopter.

Toxicology tests performed on the pilot found a therapeutic amount of diphenhydramine in his blood, "which likely impaired him to some degree," according to the NTSB. But the agency could not determine "if psychomotor slowing from the diphenhydramine contributed to his inability to recognize and/or avoid the terrain." The drug, marketed under the name Benadryl, is a popular antihistamine, which may impair mental and physical abilities.

In its final report on the accident, the NTSB cited an FAA Advisory Circular (AC 61-134) that deals with CFIT awareness. The AC notes that during night conditions, height above terrain can be misperceived by even experienced pilots, leading to CFIT. The 57-year-old pilot in this accident held a helicopter instrument rating and had reported 6,416 total hours of flight time. The pilot-rated passenger, 67, held a helicopter rating and reported 3,140 total hours of flight time. The NTSB found the probable cause of the accident to be "the pilot's failure to maintain adequate altitude above mountainous terrain during cruise flight in dark night conditions, which resulted in controlled flight into terrain." M.H.

IS&S chief pilot Eric Smedberg demonstrates the company's ThrustSense autothrottle system in the King Air B200.

ThrustSense autothrottle ok'd for King Airs

by Matt Thurber

Two years ago, Innovative Solutions & Support (IS&S) certified the first autothrottle designed for Pratt & Whitney Canada PT6A-powered light turboprops, the ThrustSense system in the Pilatus PC-12. In May, IS&S received FAA approval for installation of ThrustSense autothrottles in King Airs, the first such system available for the Beechcraft twin turboprops. **AIN** recently got the chance to observe the system in flight.

While pilots who haven't flown with an autothrottle might not fully appreciate its benefits, the King Air ThrustSense system adds more than just easier speed control and engine management. In the King Air, the IS&S autothrottles also offer a significant safety benefit in case of failure of one engine, especially on takeoff. This hazard has come under the microscope as a result of a pair of King Air takeoff accidents: in Wichita in 2014 and Addison, Texas, on July 1 this year.

Multiengine propeller-driven airplanes are vulnerable to asymmetric thrust when one engine fails. Unlike jets, where engines can be mounted closer to the airplane's centerline, propellers need more space, so the engines are mounted farther out on the wing. When one engine fails, pilots have to be careful not to slow the airplane too far while using too much power on the remaining engine. With full power on the good engine, the airplane will roll uncontrollably towards the inoperative engine once it slows to a specific airspeed and that wing stalls. The critical speed is called "velocity: minimum control (air)" or Vmca. The loss of control is commonly called Vmc rollover.

If, however, the pilot pulls back the power lever on the good engine, the airplane won't roll. If the airspeed does continue to drop too far, the airplane will stall, but straight ahead instead of rolling out of control.

With ThrustSense, if one engine quits and the pilot lets the speed get too slow, the system's Vmca-mitigation feature automatically reduces the power on the good engine to prevent Vmc rollover. It does this by monitoring engine parameters. When it detects loss of power on one engine, it "computes the amount of rudder authority loss due to the reduction of airflow over the rudder," according to IS&S. "It uses this to calculate the reduction in thrust from the remaining engine to prevent hazardous yaw…" which would ultimately cause the wing of the failed engine to stall and roll the airplane.

Pilots might think they have the skills to prevent loss of control due to Vmc rollover, but there are plenty of accidents over the years that have occurred because of this phenomenon. In the heat of the moment, it's not hard to imagine a pilot inadvertently pulling back on the yoke in an attempt to avoid hitting the ground, thus allowing the airspeed to slow below Vmca and losing control. ThrustSense can prevent that.

During the recent **AIN** demonstration flight in IS&S's King Air B200, chief pilot Eric Smedberg showed me how ThrustSense works, including how it reduces

The autothrottle disengage button is located on the right power lever.

power on the good engine to prevent Vmc rollover. The IS&S autothrottles are different from traditional autothrottles in that they use a motorized actuator with a clutchless drive mechanism instead of an actuator with a clutch.

Smedberg met me at Essex County Airport in northern New Jersey for the demo flight. After a briefing on the system, I climbed into the right seat, and he flew the King Air from the left seat.

The IS&S King Air is equipped with a full suite of IS&S avionics, including the Autothrottle Control Panel (ATCP) that manages the autothrottle system. The only other visible differences are an autothrottle disconnect button on the right power lever and a status indicator mounted between the primary-flight and multifunction displays. The ATCP also doubles as a full backup instrument. There are two modes: torque and airspeed, plus sub-modes under each of those. If the pilot pushes a power lever too far forward and is about to exceed a torque or temperature limit, the autothrottle warns the pilot by shaking the throttle.

Before takeoff, Smedberg set the King Air's takeoff weight in the ATCP, so the system can determine airspeed performance limitations. It automatically adjusts gross weight downward during the flight to account for fuel burn.

Lined up on Runway 4, Smedberg pushed the go-around button on the left power lever, and the autothrottles moved automatically to set maximum torque, in this case, 2,180 ft lb, which was displayed on the ATCP. A big advantage that the autothrottles provide for King Air pilots is that they maintain balanced torque between the two engines on takeoff, so there is no need for fine adjustments to the power levers while accelerating along the runway. "You don't need to look at the torque beyond glancing at it," Smedberg said.

After 2.5 minutes, the ATCP automatically reduced thrust to the climb-power setting. After selecting speed mode then setting airspeed to 190 knots, we flew north and climbed to 5,500 feet. When we leveled off, the autothrottles pulled the power back as needed to maintain the set airspeed, illustrating the main benefit of autothrottles, which is helping the pilot fly a particular airspeed, including during climbs and descents, without having to constantly manipulate the power levers.

Smedberg demonstrated the built-in protections in the IS&S autothrottle system, first with a low-speed demo. He dialed the airspeed setting to the minimum (109 knots on the IS&S avionics, but it goes to 99 knots in Collins Pro Line 21-equipped King Airs). With the autopilot in heading and altitude hold, the King Air slowed down as the nose pitched up then at just above the minimum—at 111 knots—the autothrottles held power to maintain that speed.

Next was an overspeed demo, and in this case, the autothrottles maintain three knots below the Vmo of 258 knots. Smedberg set a 3,000 fpm descent on the autopilot with maximum torque, and the autothrottles stabilized the speed at 255 knots.

For the Vmca demo, we had to tap into an engineering test mode in the ATCP, which obviously isn't available in normal installations. Vmca was 86 knots. Level at 5,500 feet with full flaps and landing gear down, the test mode "failed" the left engine by pulling power back to idle, then the right engine advanced to full power, 2,250 ft lb. As the King Air slowed to Vmca, the right engine power automatically reduced to 2,070 ft lb, and the airspeed stabilized at about 89 knots, with zero rolling tendency.

After restoring power to the left engine, we returned to the airport, flying the Localizer 22 approach with the ATCP set in airspeed mode at 115 knots. Then we broke off and flew the lefthand pattern to land on Runway 10. The autothrottle isn't coupled to the autopilot during the approach, and the pilot will have to set the desired speed during IFR approaches. The autothrottles still reduce pilot workload in IFR flying, however, because the pilot doesn't have to think about power settings and can focus more on flying the airplane, which is especially useful in busy airspace.

Other benefits of the system include engine protection in all regimes, including hot-start prevention, an auto-speed setting for turbulence penetration, and RNP speed management including in-trail spacing.

IS&S is planning to certify the autothrottle system next in the King Air 300/350 then the C90 as well as additional single-engine turboprops such as the Cessna Caravan and Daher TBM series.

Installing the autothrottles in the King Air takes about 110 hours of labor. The complete system with installation kit retails for $68,000 for Pro Line 21-equipped King Airs, not including labor. ■

PHOTOS: MATT THURBER

Hands On

Garmin brings G3X Touch to Part 23 sector

by Matt Thurber

The benefits of the FAA's new policy on approving lower-cost modern avionics for Part 23-certified airplanes become even more clear when flying an airplane with Garmin's G3X Touch displays.

The new policy sets some limits, including a 6,000-pound maximum takeoff weight and six seats or fewer, but it allows avionics that haven't been certified to FAA technical standard order (TSO) standards to be installed in nearly 600 Class I airplane models, under an approved model list supplemental type certificate (AML-STC). This isn't to say that the products can't meet TSOs, just that they aren't required to be certified to meet the TSOs. They still must undergo system-level testing, but, in fact, they are tested to basically the same hardware, environmental, and software standards as certified avionics—just without obtaining a TSO sticker.

"The net result is enhanced safety for the fleet [of older airplanes]," said Joe Gepner, manager of Garmin's Team X, which designed the G3X avionics. These modern low-cost avionics give pilots far more situational awareness at an affordable price. "That was our pitch to the FAA, and they got behind it," he said.

Garmin director of aircraft certification Robert Murray further explained that the FAA understood the fundamental issue; few owners of older aircraft with low hull values are going to spend tens of thousands of dollars on TSO'd avionics, but the vacuum-driven instruments in these aircraft are a major weak point, safety-wise. For example, one failure sequence of vacuum-driven attitude indicators is that they slowly roll away from the proper attitude without displaying a failure flag. Detecting a failed vacuum pump is difficult, and vacuum pumps themselves have limited lifespans but give pilots no indication that failure is imminent. A modern, even non-TSO'd glass display is far more reliable than the vacuum system and mechanical instruments it replaces, and there is no safety downside to removing the vacuum system in favor of low-cost FAA-approved modern avionics from Garmin and other manufacturers such as Aspen Avionics, Dynon, and others.

"That's where the argument came from," added Gepner. "The stuff [the FAA] won't let [be installed] today is leaps and bounds better than the avionics from the 1970s. [Avionics] in experimental aircraft are so much better. The certified stuff doesn't compare. Old analog components, when the spinning mass gyro fails and winds down, it can't tell it's failing. Now, there are so many fault warnings.

"Garmin has a unique advantage," he continued. "We have all of this tech in-house, it goes all the way to Part 25 aircraft. If it's software, there's no reason we can't reuse it. We can bring high-quality safety-enhancing features and support down into the GA market for less cost."

Garmin manufactures attitude and heading reference systems (AHRS) for sophisticated Part 25 business jets, and for products like G3X Touch, it can run the exact same testing regimen without the burdensome documentation required by certification rules. "Products get tested and designed in the same way," Gepner said, "and this helped make our argument to the FAA easier. We're just missing a huge pile of paper. But it doesn't matter what you're flying, we want them to be safe."

Gepner pointed out another advantage of G3X Touch, and that is as a display for ADS-B In traffic and weather, which eliminates the need for a portable ADS-B In receiver with its extra wires for charging and a tablet to view the information. "This lets you have the option to see ADS-B In on avionics permanently installed on the aircraft," he said. With ADS-B In, Garmin's TargetTrend and TerminalTraffic can be displayed on the G3X Touch. SiriusXM weather and audio

The focal point of the Grumman Tiger AIN flew in was its two G3X Touch units, a 10.6-inch GDU 460 in landscape orientation and a 7-inch GDU 470 in portrait mode.

News Update

FAA Issues STC with More Options for Part 25 ADS-B

FreeFlight Systems has received FAA approval for a new ADS-B Out-compliant upgrade for Part 25 jets that include Hawkers, Challengers, Falcons, Gulfstreams, Learjets, and Citations equipped with the Honeywell MST 67A transponder. The STC was developed in partnership with Becker Avionics and Peregrine and can also include ADS-B In capability.For ADS-B Out, the STC replaces dual MST 67As with Becker's BXT6533 Mode S transponder paired to FreeFlight's 1203C SBAS/GNSS sensor. To add ADS-B In, the FreeFlight Rangr RX ADS-B receiver is also installed. The STC'd ADS-B upgrade can be installed in aircraft with TCAS I and II and is diversity-capable (a requirement for Canada's upcoming ADS-B mandate). The system is available in single or dual configurations.

FAA TSOs ADS-B Out TailBeacon

The uAvionix tailBeacon ADS-B Out system has received FAA technical standard order (TSO) authorization, and the company expects supplemental type certification shortly. The tailBeacon is a 978 MHz ADS-B Out system that fits in a standard rear position light fixture, making installation relatively simple. The tailBeacon includes an integrated antenna and 40 candela white position light, and it works with the existing Mode C or S transponder, with no new wiring required. The tailBeacon meets the following TSOs: ADS-B (TSO-C154c, Class B1S); GPS (TSO-C145e, Class Beta 1); barometric altitude sensor (TSO-C88b); and position light (TSO-C30c, Type III).

GE, Lufthansa Systems Synch FMS with EFB

At the EFB Users Forum in June, GE Aviation and Lufthansa demonstrated the first solution that allows synchronization of a flight plan between a GE flight management system (FMS) and Lufthansa Systems electronic flight bag (EFB) application for airline customers. Airlines will be able to add this capability after installing a GE FMS software update.

While this capability has been available for many years in general aviation aircraft, this is the first time it will be available for airlines as an on-aircraft capability. It promises to reduce input errors when flight plans are manually entered into FMSs, by uploading information that has already been created in the EFB using Lufthansa Systems' Lido Pilot Solutions app. The new capability is bi-directional and can be used to update the Lido app when changes are made in flight to the FMS flight plan.

"Utilizing capabilities of a connected FMS...automates the daily manual data entry processes of pilots, which are quite prone to error, and enables the data flow between different applications," said Bernd Jurisch, head of Flight & Navigation Products & Solutions at Lufthansa Systems.

Garmin's 7-inch G3X Touch can act as a full backup with PFD, MFD, and engine information as well as the ability to continue working with the GFC 500 autopilot after a main display failure.

is available, too, when using the Garmin GDL 51R/52R receivers. The Touch displays also can show VFR sectional and IFR en route charts as well as geo-referenced instrument approach charts.

G3X Touch received FAA approval for installation under the AML-STC in March 2019. Plans call for adding more aircraft to the AML, basically most models in which at least a 7-inch G3X Touch display can fit in the panel. Composite airplanes will require additional testing to meet HIRF and lightning standards. Garmin is also working with EASA on European certification. The 10.6-inch display retails for $9,995 and the 7-inch display for $7,995. These prices include GPS antenna, installation kit, AHRS sensor, and magnetometer.

Flying with the G3X Touch

To demonstrate the improvements available with G3X Touch, Garmin installed a full panel of G3X Touch and other avionics in a Grumman Tiger. I traveled to Garmin's Olathe, Kansas headquarters in late April to see what it was like to fly with G3X Touch, which was formerly available only for experimental-amateur-built aircraft.

The Tiger's panel is stuffed with Garmin products, and clearly this is going to be one happy owner. The focal point starts with two G3X Touch units, a 10.6-inch GDU 460 in landscape orientation and 7-inch GDU 470 in portrait mode. For navigation and com, there is a GTN 650 GPS/com/navigator and a GNC 225 navcom. A GFC 500 autopilot is installed, along with a G5 instrument providing backup attitude, a remote-mount transponder, and a GMA 345 audio panel. The G5 is what allows removal of the vacuum system.

A difference between G3X Touch and more expensive TSO'd avionics is that it doesn't offer interoperability with third-party radios and autopilots. "It doesn't have analog input/output," and this helps keep costs down, explained Gepner. G3X Touch also can't display flight director bars from third-party autopilots. To get that third-party functionality and not have to replace existing non-Garmin radios and autopilot, a buyer would have to step up to the G500 TXi display. G3X Touch also doesn't offer angle-of-attack display, but these features will likely be added in later software updates.

Garmin's engine indicating instruments (EIS) are optional for G3X Touch and were installed on the Tiger. The GTN provides the necessary navigation information, but Garmin's new GPS 175 or GNX 375 navigators can also serve the same function. "It's kind of neat how you can piece together what you want," Murray said.

During the demo flight (I was in the left seat so I could interact with the G3X Touch units, and Garmin media relations specialist Jessica Koss flew from the right side), I got a good feel for the utility and ease of use of the G3X and the GFC 500 autopilot.

Compared to the typical analog instruments and basic navcoms that are usual in this type of airplane, the new panel is a remarkable improvement. The primary flight display (PFD) on the 10-inch TXi can be set to cover all of the screen, or split with the optional EIS in a strip on one side. The EIS can also be displayed on the 7-inch GDU 470 multifunction display (MFD). Synthetic vision enhances the PFD, as does the flight path marker symbol. Helpfully, traffic is shown on the PFD in the right perspective to help make spotting other aircraft easier.

Changing the split screens on the displays is easy, just touch the mode button on the top left or right to select between "Split" or "Full" screen, or press and hold the back key on the display's bevel. The larger GDU 460 includes an inset view, and touching the inset pulls up options to display various information, such as map zoom, traffic, flight plan, nearest airports, and g-meter reset.

Old-school pilots might want to look at traditional instruments, so the GDU 460 can be set up with a "six-pack" display of round gages instead of linear tapes. There is a surprising amount of customization available in the G3X Touch displays, from selection of data fields to changing knob actions and where the EIS shows up. Below the HSI is a blue pointer that indicates the best diversion airport, and this can also be customized for criteria such as runway length, type, and whether it's within gliding distance.

The G3X Touch displays' customization features also include virtual keyboards in Qwerty or ABCDE format to audio alerts, airspace alarms, fuel timers and reminders, etc.

In the setup in the Tiger, there are three AHRS sources (G5, and both G3Xs), and the GFC 500 autopilot automatically selects the best source. Even better, if either or both G3X units fail, the autopilot can be re-engaged using the G5 as the AHRS source, and it's still possible to fly a fully coupled approach with the G5. The G5 and G3X Touches synchronize altimeter baro settings, so there's no need to set each one separately.

We tried some maneuvers that engaged the GFC 500 autopilot's Electronic Stability & Protection (ESP) system, something that is a real help for pilots flying single-pilot IFR in airplanes like the Tiger. When I banked above the roll limit for more than 10 seconds, which engages ESP, the system automatically returned the airplane to level flight. I tried that with the pitch limit and again after 10 seconds of ESP engagement, the airplane returned to straight-and-level. Next, I slowed down but maintained altitude, and as the Tiger neared stall speed, the autopilot lowered the nose to maintain at least five knots above stall.

Returning to New Century Aircenter, I set up the visual approach to Runway 22 and Koss brought us in for a smooth landing in the gusty Kansas winds while I shot photos of the G3X displays.

None of the many G3X Touch features are new for builders and flyers of experimental aircraft that have been flying with G3X Touch avionics for many years, but now the safety and operational benefits of these products are available for tens of thousands of certified airplanes. ■

Garmin adds turbine engine monitoring on TXi displays

Garmin G500 and G600 TXi touchscreen displays can now be used for engine indication system (EIS) information for single-engine turboprops powered by Pratt & Whitney Canada PT6A engines. The TXi displays' EIS capability is compatible with the Cessna 208 series, Daher TBM 700 through 850, and Piper PA46s modified by JetProp. Prices for a standalone EIS TXi for these airplanes start at $14,800.

GARMIN

Garmin's EIS TXi display can now serve as a replacement for old engine gauges on certain PT6A-powered single-engine turboprops.

In addition to standard turboprop engine indications such as torque, prop rpm, gas generator rpm, ITT, and oil pressure and temperature, fuel flow, and electrical system status, the EIS TXi can be configured for dynamic indications, for example, limitation markings that change depending on pressure altitude, OAT, and other factors. Limitations can also be timed, and the EIS will warn the pilot with a countdown timer next to the associated gauge when a parameter is being exceeded. The EIS will also record any exceedances when the time-based limit is exceeded, including the parameter, duration, highest value recorded, time, date, and other information.

All normal and exceedance information is stored on an SD card in the TXi, including aircraft performance, engine data logging, and engine and flight cycles. The data can be downloaded from the SD card or wirelessly sent to the Garmin Pilot app on a tablet computer when the TXi display or GTN 650/750 navigators are paired with a Garmin Flight Stream 510 wireless gateway.

The TXi displays are available in a 10.6-inch version, which can show primary flight display, multifunction display, and EIS information, as well as on a dedicated EIS on a 7-inch display in portrait format. The displays include an integrated fuel computer for monitoring fuel burn and using GPS to calculate fuel range, endurance, and fuel-at-destination. **M.T.**

Norwegian turns page as CEO Kjos steps down

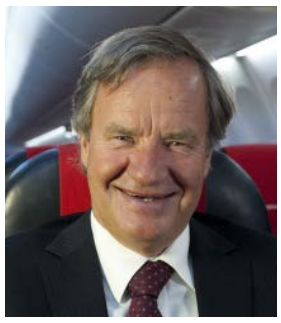
by Cathy Buyck

Norwegian Air Shuttle is accelerating the pace of its restructuring with a further reduction of its capacity growth and the start of a search for a new CEO to replace Bjorn Kjos, who stepped down July 11 after 17 years in the role. Kjos, a former fighter pilot and co-founder of Europe's third largest low-cost carrier (LCC) by passenger numbers and the continent's largest long-haul LCC, will become an advisor to the chairman. Kjos called his retirement "way overdue" during a news conference on Thursday. "You shouldn't run an airline past your seventies," he said. Kjos, 72, last year indicated his readiness to hand over the reins of the company he built from a small domestic operation with 130 employees and four aircraft to a global LCC with more than 11,000 employees and 162 aircraft. "I look forward to spending more time working on specific strategic projects that are crucial to the future success of Norwegian," said Kjos, who insisted he is "very happy" with the new arrangement.

CFO and deputy CEO Geir Karlsen will act as interim CEO.

Kjos's retirement from Norwegian follows the resignation of Bjorn Kise as chairman in May. Kise participated in the founding of the company in 1993 and served as chairman since 2010. Kjos and Kise are Norwegian's largest shareholders, holding a near 20 percent stake though their joint investment vehicle, HBK Holding.

Niels Smedegaard, who became chairman in May, said the new CEO's main mission will center on running a profitable



Outgoing Norwegian CEO Bjorn Kjos will now serve as an advisor to the chairman.

business and boosting company value for shareholders, customers, and employees. On the back of an unstainable level of debt due to its rapid expansion, Norwegian in 2018 changed its strategy from growth to profitability. "We have to ensure that Norwegian is well prepared and positioned to handle volatile markets and unexpected events," Smedegaard emphasized. "It is crucial that we continue to deliver on our cost reduction initiatives and that we constantly ensure that we have a route portfolio that yields profit."

The airline plans to further reduce capacity growth, to between 0- and 5 percent for 2019 compared with previous guidance of 5- to 10 percent.

The LCC will receive one new Boeing 787-9 in the second half—it added four examples in the first half ending June 30—as expected, though the narrowbody fleet will remain largely stable in part thanks to the ongoing problems with the Boeing 737 Max 8. Norwegian now expects to add only "up to" six Max aircraft this year, or 10 less than initially planned. "For 2019 to 2021 the delivery schedule for the Max fleet is uncertain," Norwegian cautioned in its second quarter results presentation on Thursday. It revised downward the number of expected Max deliveries by seven in 2020 and by 16 units in 2021.

The lower number of Max deliveries reduces the contractually committed capital expenditure estimate from $1.7 billion to $1.2 billion this year. The model's grounding, however, cost the operator 400 million Norwegian kroner ($46.4 million) in the second quarter and it expects that effect will rise to NOK700 million for the full year. Norwegian has 18 Max jets sitting idle. Negative effects include reduced revenue from cancellations and other disruptions as well as increased expenses from crew inefficiencies, increased fuel consumption, and passenger compensation, Norwegian noted.

The airline anticipates its 18 grounded Max airplanes to return to service in October, after previously targeting a return to service in August.

Norwegian reported a net profit of NOK82.8 million in the three months ending June 30, down from a NOK300.3 million net profit during the same period a year earlier. It carried 10 million passengers, on par with the previous year's corresponding quarter, and load factor averaged 88 percent, a gain of 1.2 percentage points. Available seat kilometers (ASKs) rose 6 percent, down from the peak growth of 48 percent in the second quarter of 2018; unit revenue rose 13 percent and yield increased 11 percent year-over-year. The second quarter results showed the company is delivering on its strategy of moving from growth to profitability, said Kjos. "Despite operational issues outside of our control, like the grounding of our 737 Max fleet, we are delivering the highest second quarter operating revenue in the history of Norwegian," he declared. ■

Rolls-Royce allots more hybrid-electric resources to Germany

Hard on the heels of last month's proposed acquisition of Siemens's electric and hybrid-electric aerospace propulsion "eAircraft" business, Rolls-Royce on July 8 inked an agreement with the state of Brandenburg to create a so-called ecosystem for hybrid-electric drive systems for aircraft in the German region. The arrangement, which still needs to be formalized, marks another step in the UK engine manufacturer's electrification strategy and its ambition to play a major role in what it describes as the "third era" of aviation.

The initiative aims to pioneer the development of hybrid-electric 400 to 1,000 kW propulsion systems and builds on Rolls-Royce's existing cooperation with the Brandenburg Technical University (BTU) in Cottbus-Senftenberg, one of the four Rolls-Royce technology university centers in Germany. The OEM maintains a global network of 24 technology university centers and seven research centers, each addressing a key technology.

The state of Brandenburg and Rolls-Royce committed to co-fund the initiative over the next six years, though they did not disclose the terms of the proposed investment and cooperation. The formal launch of a program stands subject to appropriate approvals and regulatory clearances. The partners said they will agree on the program details before the end of 2019.

"Developing world-class hybrid electric power and propulsion systems represents a significant opportunity for Rolls-Royce, which we are pursuing globally with vigor and focus," said Dirk Geisinger, director of business aviation and chairman of Rolls-Royce Deutschland. "With the acquisition of the Siemens eAircraft business, we are investing in Germany and Hungary already. Adding Brandenburg with the BTU and regional partners to that effort would be an exciting next step."

For Dietmar Woidke, prime minister of the state of Brandenburg, "Establishing one of the most promising technologies of our time right here would represent a quantum leap for Brandenburg."

Rolls-Royce is concentrating on three pillars to make aviation more sustainable: developing advances in the gas turbine engine; collaborating on the use of sustainable alternative fuel; and exploring radical alternatives such as electrification. Developing Brandenburg's hybrid-electric capabilities, Rolls-Royce noted, would complement its electrical projects in the UK, as well as electrical interests in the U.S. and Singapore and the activities of the Siemens eAircraft business. **C.B.**

News Update

American Sets Retirement Date for MD-80s

American Airlines will retire its last 26 McDonnell Douglas MD-80s on September 4, the airline announced in late June. The retirements will leave Delta Air Lines as the MD-80 family's last U.S. operator. Allegiant Air retired the last of its MD-80s last autumn. American planned to replace the venerable narrowbodies with Boeing 737 Max jets, whose worldwide grounding raised speculation that the airline would delay its MD-80 retirement plans. In a statement to AIN, American said it would adjust its schedule if the Max does not return to service by September 4, but that the MD-80 retirement plans would not change. In April, American canceled flights operated with its 24 Max jets through August 19, and recently extended the cancellations through September.

Tarom Renews Turboprop Fleet with Nine ATR 72-600s

Romanian flag carrier Tarom will lease nine new ATR 72-600s from Copenhagen-based Nordic Aviation Capital (NAC) to gradually replace its existing fleet of seven ATR 42-500s and two ATR 72-500s, the companies announced on June 26. Schedules call for deliveries to begin in October, with four examples set to arrive this year and the remaining five in 2020. According to ATR, the new turboprops will offer Tarom "an additional 330,000 seats every year at the same operating cost as its previous seat level." Tarom's -600s will feature 72 seats, compared with 48 seats in its ATR 42-500s and 68 in its ATR 72-500s. The company's ATR 42s, which it owns, average 21 years of age.

777 EcoDemonstrator to Fly This Fall

The latest iteration of Boeing's EcoDemonstrator program will use a 777 airliner to serve as a flying test bed for some 50 projects this fall, the company announced on July 1. During this latest phase of the EcoDemonstrator program, Boeing plans to test technologies dedicated to sharing digital information between air traffic control, the flight deck, and an airline's operations center to aid routing efficiency and safety. Other tests involve an electronic flight bag application to automatically provide rerouting information to pilots when weather conditions warrant; so-called connected cabin technologies that monitor cabin conditions such as temperature and humidity to facilitate automatic adjustments; and cameras to provide more passengers with a view outside the airplane.

More than a dozen partners participate in the 2019 program. Flights will include a trip to Frankfurt, where Boeing will present the EcoDemonstrator's technology mission to government officials, industry representatives, and STEM students.

Flybe last year indicated that its Embraer E195s no longer fit into its network plans, but Connect Airways hasn't yet detailed its own plans for the narrowbodies.

EC approves Flybe sale to Connect Airways

by Gregory Polek

The European Commission has issued merger control clearance for Connect Airways' acquisition of Flybe and Propius Holdings as well as its investment in Stobart Aviation unit Stobart Air, Connect Airways said in a statement released on July 5. The sale of Flybe to Connect Airways—a UK limited company of which Stobart Aviation owns 30 percent; Virgin Travel Group another 30 percent; and DLP Holdings, a Luxembourg company wholly-owned by funds managed by Cyrus Capital Partners, the remaining 40 percent—closed on February 21.

Originally announced on January 15, the sale includes Flybe Limited and Flybe Aviation Services Limited. Connect Airways and Flybe will operate under the Virgin brand while retaining the existing AOCs.

In a statement, the EC said it investigated the effect of the proposed transaction on the market for air transport of passengers on routes from British airports to other European airports as well as some intra-UK routes. The commission said it found that the transaction, as initially proposed, would have led to quasi-monopolies on two direct European routes, namely Birmingham-Amsterdam and Birmingham-Paris.

This quasi-monopoly situation would result from Air France-KLM acquiring indirect control over Flybe, via its joint control over Virgin Atlantic. The Commission approved the joint acquisition of Virgin Atlantic by Air France-KLM, Delta, and Virgin Group in February. The Commission also noted that entry of competitors into those routes would prove difficult, considering the congestion at both Amsterdam Schiphol and Paris Charles de Gaulle airports.

To address the EC's competition concerns regarding the Birmingham routes, Connect Airways will release five daily slot pairs at Amsterdam Schiphol and three daily slot pairs at Paris Charles de Gaulle to competing airlines.

With Connect Airways assuming full management control of the business, the company's CEO, Mark Anderson, and the leadership teams from Flybe and Stobart Air will now concentrate on implementing plans to expand Flybe's regional network and Stobart Air's franchise business, it added.

The combination of Flybe with Stobart Air results in a fleet of almost 100 aircraft, mainly De Havilland Dash 8-400s, of which Flybe stood as the world's largest operator. The rest of the combined fleet consists of Embraer 195s, 190s, and 175s, several ATR 72-600s and a single ATR 42-600. ■

Embraer picks China as starting point for E195-E2 demonstration tour of Asia

Embraer launched a global demonstration tour of its E195-E2 early last month with a stop in Xiamen, China. The tour follows what Embraer called a successful debut of the airplane at June's Paris Air Show, where the company displayed its largest jet in its "TechLion" livery. Embraer planned to fly the airplane to several destinations in China and the Asia-Pacific region—what the company sees as the model's most promising markets—during July and August.

Last year, passenger volume within China grew by a 10.9 percent rate over the year before, thanks largely to the help of favorable government policies to support regional air transport and the emergence of local requirements directed at developing second- and third-tier cities.

"This will create great market potential for aircraft with up to 150 seats," said Guan Dongyuan, senior vice president of Embraer and president of Embraer China. "We're proud to keep pace with the growing industry, leading the regional market here with a nearly 70 percent share.

Today, eight airlines operate 105 Embraer commercial aircraft in Greater China and Mongolia, which laid a solid foundation for adding the E2s to the market."

Last November, Embraer's baseline E190-E2 traveled almost half of China, visiting 11 cities, including Ulaanbaatar in Mongolia, in 20 days. The aircraft returned in May of this year and flew from Xining to Yushu Batang Airport, which sits at an elevation of 13,000 feet above sea level.

The E195-E2 in April received type certification simultaneously from three regulatory authorities: ANAC (the Brazilian civil aviation agency), the FAA and EASA.

Plans call for the airplane to enter service with Brazil's Azul Airlines in the second half of 2019. Spanish airline Binter will also receive its first E195-E2 later this year.

While featuring similar performance figures to those of the original E195, the E195-E2 carries more payload and burns 25.4 percent less fuel per seat, according to Embraer calculations. Its maximum range extends 2,600 nm with a full passenger load, or 600 nm more than the E195, and it carries three more rows of seats, bringing its single-aisle capacity to 146. **G.P.**

The largest A380 operator in the world, Emirates flies 111 of the superjumbos.

Emirates launches world's shortest A380 flights

Emirates Airline on July 2 marked the launch of the world's shortest revenue flight with an Airbus A380 with the arrival of the first twice-daily service to Muscat. Flights EK 862 and EK 864 from Dubai International Airport stretch just 185 nautical miles each way, a distance shorter than the internal wiring of a single A380.

Both A380s flying to Muscat operate in a three-class configuration, carrying 429 seats in economy class on the lower deck, 76 flat-bed seats in business class, and 14 first-class private suites on the upper deck. Flight time between Dubai and Muscat lasts about 40 minutes, or five minutes longer than the time a team of 42 people takes to clean an A380.

The world's largest operator of the A380 with 111 in service, Emirates hasn't expressed total satisfaction with the economics of the superjumbo on the more traditional routes it typically flies. In fact, Emirates' decision to reduce its outstanding order by 39 airplanes proved a tipping point in Airbus's decision in February to cancel the program.

At the time of the announcement Emirates chairman and CEO Ahmed bin Saeed Al Maktoum joined then-Airbus CEO Tom Enders in describing the end of the program as disappointing and noted he accepted the reality of the situation following months of failed negotiations with Airbus and engine maker Rolls-Royce over price concessions and performance improvements.

While Engine Alliance GP7200 turbofans power most of Emirates' 111 A380s, the airline held outstanding delivery positions on firm orders for another 52 airplanes that would have come with Rolls-Royce Trent 900s. Its most recent contract involving the superjumbos, signed in February 2018, included a firm order for 20 Rolls-Royce-powered airplanes and options on another 16.

As part of the agreement to cancel the A380 orders, Emirates signed a deal for 40 A330-900s and 30 A350-900s, deliveries of which will start in 2021 and 2024, respectively. The airline plans to deploy the A330neos on regional routes, where the re-engined widebodies can serve smaller airports and open new destinations in its global network, the carrier said. Plans call for the A350s to supplement Emirates' long-haul operations, providing the carrier with added flexibility in terms of capacity deployment on 8- to 12-hour missions from its Dubai hub. **G.P.**

With this latest purchase, Dassault Aviation acquired Ruag's maintenance and FBO operations at Geneva and Lugano airports, strengthening the OEM's presence in Switzerland.

Dassault Buys Ruag's Geneva and Lugano Sites

Dassault is continuing the recent expansion of its customer service offerings with the purchase of Ruag's operations in Geneva and Lugano, the companies announced. This move follows similar deals earlier this year when Dassault purchased ExecuJet's global aircraft maintenance business and TAG Aviation's European aircraft maintenance operations, and strengthens the manufacturer's presence at Geneva, one of Europe's top business aviation hubs.

"The acquisition of the business aviation activities of Ruag is part of our strategy to develop a worldwide MRO network of excellence and will allow Dassault Aviation to reinforce its footprint in Switzerland," said Eric Trappier, the French airframer's chairman and CEO, adding that Ruag has been a longtime authorized Falcon service center.

While Ruag will retain its maintenance operation and FBO at Germany's Munich-Oberpfaffenhofen Airport, the deal with Dassault also includes its FBOs at Geneva-Meyrin and Lugano-Agno airports.

Ontic Takes On More Meggitt Legacy Parts Work

Ontic will support Meggitt's OEM legacy manufacturing of signal conditioners, military chip detectors, cockpit indicators, and connector harnesses under a new license agreement. Those parts are used on a variety of legacy commercial, business and general aviation, and military aircraft, according to Ontic, a unit of BBA Aviation.

Manufacturing and maintenance support of those products will be provided to the installed base through the new agreement, which calls for Ontic to continue Part 21 new-build manufacturing as well as comprehensive Part 145 repairs and spares. It builds on a Meggitt license Ontic acquired earlier for engine pressure and fuel-flow transmitters, and fluid-monitoring chip detectors.

Duncan Sees Growth in Mx Internship Program

Duncan Aviation's opening of a maintenance hangar in Provo, Utah, earlier this year means the MRO provider has seen its summer avionics and maintenance internship program grow by 23 percent, to 37 interns. The paid interns are spread between Provo and Duncan's other main facilities in Lincoln, Nebraska, and Battle Creek, Michigan.

"Over the last two years, we've put a lot more focus on our internship program, and it will continue to grow with the expansion of our third full-service MRO facility in Provo," Duncan human resource team lead Jennifer Monroe said.

Since 2017, the program has proved especially valuable in recruiting new hires at a time when the availability of maintenance and avionics technicians is tightening. Last year, Duncan made full-time job offers to 12 of its 30 interns.

StandardAero Reveals Five-year Growth Ambition

Having doubled annual revenues and expanded its business dramatically over the past five years by combining organic growth with the new work brought by four strategic acquisitions, StandardAero aims to double its size and revenues again in the next five years.

Founded in 1911 and now owned by The Carlyle Group, Scottsdale, Arizona-headquartered StandardAero has grown in the past five years to become "one of the largest, if not the largest, independent jet-engine maintenance companies on the planet," CEO Russell Ford told **AIN**. "The company is much larger, broader, and greater in scope and capacity than it ever has been in the last 100 years."

During the past five years, StandardAero has added 23 primary repair and manufacturing facilities to broaden its presence to 37 facilities in 10 countries on five continents. It has boosted its employee base from 3,500 people to more than 6,000 and increased from 25 to 41 the number of turbine engine families it services.

Now, "my goal is to double the size of the company again in the next five years," said Ford. He intends to do so by adding more engine families to StandardAero's repair portfolio; by continuing to expand its business with existing customers; and by pursuing additional corporate acquisitions to boost its ability to offer engine and component MRO turnaround times shorter than its competitors can achieve.

Global Aviation Technologies Expands with New Work

Global Aviation Technologies (GAT) has expanded its operations with the addition of a 14,000-sq-ft building near Wichita Eisenhower National Airport (ICT) for its electrical production work such as harness manufacturing, electrical subassembly, component qualifications, and repairs and PMA approvals. The new space will support its work on avionics upgrades for the Air Force C-21A (Learjet 35A), as well as wire harness work for the service's F-16 fleet.

"Due to the volume of F-16 harness work, the team needed additional space to work comfortably and deliver a quality product," GAT v-p of business development Woody Cottner said.

Additionally, GAT expects to receive certification for its Premier Elite upgrade program in the fourth quarter of 2020, it announced in late May. New winglets, auxiliary fuel tanks, and fuel system for the Beechcraft Premier are included in the upgrade program that's expected to increase the airplane's operating altitude and gross weight.

Leonardo's Louisiana Support Facility Gets Part 145 OK

Leonardo's new Gulf of Mexico Helicopter Support Center has gained Part 145 repair station approval from the U.S. FAA. The 21,000-sq-ft facility in Broussard, Louisiana, opened in January and initially was limited to providing customers with spares and support. Part 145 authorization allows it to provide full helicopter blade repair, spare parts, and technical support to customers across the Americas for all AW109, AW119, and AW139 models.

According to Leonardo, the Gulf of Mexico Support Center is part of its commitment to expand material and technical assistance across the Americas and aligns with its industrial plan aimed at strengthening the level of service worldwide Additional Leonardo Helicopter Support Centers in the Americas are located in Philadelphia, Pennsylvania; Las Vegas; and São Paulo, Brazil.

A significant proportion of StandardAero's work involves large airliner powerplant maintenance. The company tripled its CFM56 activity over the last three years and also inked a 10-year contract with Rolls-Royce to supply MRO support for the RB.211 family of turbofans

Textron Aviation Gives Thumbs Up to Traxxall Mx Tracker

Textron Aviation named Traxxall a recommended maintenance-tracking provider. Under the recognition, customers of new and preowned factory-delivered Cessna and Beechcraft aircraft will have the option of receiving the first year of Traxxall maintenance-tracking services for free.

"Textron Aviation models account for a majority of all business aircraft in service today. We look forward to working with a growing number of new and existing Cessna, Hawker, and Beechcraft owners worldwide," said Traxxall president Mark Steinbeck. In addition to Cessna and Beechcraft aircraft, Traxxall programs also support in-service Hawkers.

Traxxall said its programs will provide aircraft owners with operational efficiencies, reduction in downtimes, and strengthened residual values.

Aviation Orgs Urge FAA To Revamp Mx School Proposal

Fourteen aviation groups are appealing to the FAA to take a less prescriptive approach as it updates standards for aviation maintenance technician schools under Part 147. Instead, the groups pushed for an outcomes-based approach in their jointly submitted comments to a supplemental notice of proposed rulemaking (SNPRM) that was released in April.

The agency originally issued a proposed rulemaking in 2015, saying current regulations and requirements are outdated and do not meet industry needs. After reviewing the initial comments, the FAA followed with the SNPRM to incorporate two changes requested by industry: to provide the option of competency-based training and satellite training locations.

But in the joint comments, industry groups are asking the agency to go further, including reconsidering prescriptive terms in the SNPRM. They further encouraged simplification of dual enrollment programs and deference to the Department of Education requirements on issues involving quality of education.

Mexico Approves Butler ADS-B STC for Older Learjets

Butler Avionics has received Mexican Direccion General de Aeronautica Civil (DGAC) approval of its ADS-B STC for a range of out-of-production Learjet models, the Olathe, Kansas-based company announced. The FAA-approved STC also covers the ADS-B Out equipment mandate in Mexico that takes effect January 1, 2020.

Under DGAC's approval, Butler's ADS-B Out solution is available for Learjet models 31, 31A, 35, 35A, 36, 36A, and 60 that have TCAS II installed. "With the significant number of Learjets in Mexico, it is important to provide these reasonably priced ADS-B solutions," Butler director of avionics Guy Morris said.

Constant Aviation Receives Brazilian Mx Nod

Cleveland, Ohio-based MRO provider Constant Aviation has added to its list of international approvals after receiving certification from ANAC, Brazil's civil aviation authority, to conduct maintenance support for Brazil-registered aircraft. In addition to airframe, avionics, and engine maintenance, the company is approved to conduct non-destructive testing.

According to the company, the certification process entailed onsite audit and inspections from Brazilian authorities, Portuguese language versions of specified manuals as well as staff members fluent in the language who could serve as interpreters for customers. Along with Cleveland, Constant also has facilities in Mesa, Arizona; Las Vegas, and Orlando, Florida.

Dallas Airmotive Joins Online Marketplace

Engine support specialist Dallas Airmotive is the latest aviation maintenance provider to join online repair quote marketplace MRO Insider. The online tool, which is free for aircraft owners and operators, allows users to post their aircraft maintenance needs on the site, which automatically notifies qualified subscriber service facilities. Those shops can then upload a price quote for the work.

Dallas Airmotive represents the second international MRO to subscribe to the service, bringing its 11 locations throughout North America, South America, Europe, Africa, and Asia.

FAA Issues STC With More Options for Part 25 ADS-B

FreeFlight Systems has received FAA approval for a new ADS-B Out-compliant upgrade for Part 25 jets that include Hawkers, Challengers, Falcons, Gulfstreams, Learjets, and Citations equipped with the Honeywell MST 67A transponder. The STC, which was developed in partnership with Becker Avionics and Peregrine, can also include ADS-B In capability.

For ADS-B Out, the STC replaces dual MST 67As with Becker's BXT6533 Mode-S transponder paired to FreeFlight's 1203C SBAS/GNSS sensor. To add ADS-B In capability, the FreeFlight Rangr RX ADS-B receiver is also installed.

The STC'd ADS-B upgrade can be installed in aircraft with TCAS I and II and is diversity-capable (a requirement for Canada's upcoming ADS-B mandate). The system is available in single or dual configurations. ■

IFEC propels Oman Air as Gulf's dark horse

by Peter Shaw-Smith

As the first female Gulf national to become an avionics maintenance engineer, Alya Al Qalam Al Yafie, manager for in-flight entertainment and connectivity (IFEC) at Oman Air, is no stranger to mold breaking.

"We [consider] cabin innovation and in-flight entertainment systems one of the key pillars to differentiate us as an airline," she told **AIN**.

Al Qalam Al Yafie joined Oman Air as a trainee in June 1994, specializing in avionics-electrical systems, after graduating from Egypt's College of Aeronautical Science and Technology. She also acquired an aircraft maintenance engineer (avionics) license and, in 2011, gained a master's of science in maintenance management from Glasgow Caledonian University. Al Qalam Al Yafie started with Oman Air as a licensed aircraft maintenance technician, and acquired the approvals to perform maintenance and troubleshooting activities on the in-service fleet at that time. She then moved to development engineering in 2001, responsible for electrical and avionics/IFEC/E-enablement and obtained all type ratings on all existing in-service aircraft types

> **"We [consider] cabin innovation and in-flight entertainment systems one of the key pillars to differentiate us as an airline"**
>
> –Alya Al Qalam Al Yafie, manager for in-flight entertainment and connectivity (IFEC) at Oman Air

"[In 2009], we were the first airline worldwide to get the Thales i5000 suite on the A330 fleet, with Wi-Fi, connectivity, text messaging, and onboard telephony. This was an achievement for the airline. At the time, we worked hard with all stakeholders, and now we can see how this enhanced our role as an airline within the region, and how it differentiated [us] as being one of the first to adopt the technology."

Oman Air's regional competitors in the Gulf took notice. "Full-service luxury makes a statement," said the Dubai-based representative of an in-flight communications service provider. "Oman Air made a bold, forward-looking decision in 2009."

Addressing the future of aircraft connectivity and the systems and capabilities she expects to emerge in the coming years, she said: "The existence of new emerging technology, satellites with high-speed, global coverage, and high-capacity bandwidth [means] superfast connectivity service in the cabin will be key to keeping passengers content in flight. We could see more airlines considering connectivity solutions either on single-aisle or long-haul fleets, provided the cost and quality of the service is acceptable to the airline operators and their passengers onboard."

Airlines trying to monetize internet-service delivery face the question of whether they should offer free services to attract more passengers. "I believe every airline will opt for a suitable model to differentiate themselves, as connectivity [can] be a tool to generate revenue and make profits," she said.

"As staying connected is becoming a key to winning customer loyalty, we see some airlines [offering] the service at no cost to first and business class guests. Also, some airlines offer Wi-Fi service at very attractive [rates] to holiday travelers to enhance their travel experience. We shouldn't forget airlines' main objective in diversifying their services is to be more profitable." ■

Serving the capital of the European Union, Strasbourg Airport will undergo an $11 million upgrade to its general aviation host facility. Benelux-based Flying Group will lead the project.

New Consortium To Take Over FBO at EU Capital Airport

France's Strasbourg Airport has partnered with Benelux-based charter provider and FBO operator FlyingGroup to establish a new FBO complex known as Strasbourg Executive SAS. FlyingGroup will take over management of the existing, airport-operated FBO in May 2020. Located less than eight miles from the city of Strasbourg, the seat of the European Parliament, the planned $11 million-plus complex—which will be operational in spring 2021—will replace the current 1,600-sq-ft facility. It will consist of an approximately 10,800-sq-ft terminal to cater to heads-of-state and high-level European delegations, with a "Salle d'Honeur" for dignitaries that replaces a small room currently used in the commercial terminal.

The new terminal will also include a private aviation area, separated by a common security area, themed by Alsace-based ultra-luxury car manufacturer Bugatti, to handle the increasing executive traffic. This will include complementary airside crew lounges with a relaxation area offering snacks and beverages, cable television, computer stations, and free Wi-Fi. Other benefits will include customized parking options and discounted hotel rates through the FBO's complementary booking service. While a new 21,500-sq-ft hangar will shelter VIP aircraft, an additional 32,300-sq-ft hangar, capable of accommodating aircraft up to a BBJ or multiple large-cabin business jets, will begin construction in 2021. The airport has contracted with World Fuel Services to provide exclusive fueling services and construct a new fuel farm to provide short fueling times, as well as help to establish the airport as a desired location for international fuel stops. The project also includes a new highway connection to the airport so that future clients will be on the highway within 60 seconds of leaving the FBO.

Mapiex To Open VIP Lounge in Panama City

Panamanian aviation services company Mapiex has opened a VIP lounge for the business and general aviation clients for which it provides ground handling services at Tocumen International Airport, Panama's main international gateway. Julio Miselem, the company's flight services chief, told **AIN** that the VIP lounge—which represents a new business model for the company—will operate 24/7/365. Other than the Signature Flight Support FBO, it will be the only private-aviation facility at Tocumen where clients will not have to go to the crowded commercial-aviation terminals for customs and immigration clearance. Rather than being located in the two commercial terminals, which are a long distance from the GA ramp, the Mapiex VIP Lounge will be located in the airport's cargo facility. These days, the cargo terminal's customs and immigration facilities process only the pilots of the approximately 20 cargo flights which land at Tocumen daily, so Mapiex is promising its VIP-lounge clients expedited and discrete processing. While the 750-sq-ft lounge will not be a full FBO, it will include a dispatch center and a small crew room. Mapiex will provide its entire suite of VIP concierge services at the facility. Mapiex handles about 65 percent of all general and private aviation activity in Panama. It operates FBOs at Panama's Pacifico and Marcos A. Gelabert airports, both of which see much more business aviation activity than does Tocumen. Mapiex also operates FBOs in Guatemala and—with local partners—at all of Cuba's nine civilian airports.

Indian Operator Achieves IS-BAH 3 Registration

Delhi-based SRC Aviation, which became the first in the world to be awarded the International Standard for Business Aircraft Handlers (IS-BAH) 1 and among the first for IS-BAH 2, has now been awarded IS-BAH 3, becoming the only organization outside North America to earn the stringent registration. IS-BAH, developed by the International Business Aviation Council in concert with the National Air Transportation Association, is a set of global industry best practices for business aviation ground handlers that features at its core a safety management system. SRC founder Bobby Chadha explained to **AIN** that the company underwent a rigorous audit of its best practices in safety management systems, emergency procedures, security and operating procedures, and training processes to achieve IS-BAH 3. "This also works like a self-check and keeps us from being complacent about delivering quality," Chadha added. American Aero Fort Worth, an FBO at Meacham International Airport in Fort Worth, Texas, became the first FBO worldwide last year to earn the new Stage 3 safety and ground handling certificate of registration.

Las Vegas Gateway To Receive New Hangar Complex

Las Vegas-area Henderson Executive Airport will receive a new hangar complex next year. According to aviation services provider All In Aviation, which is building it in cooperation with Part 145 maintenance provider Lone Mountain Aviation, the 25-hangar facility, which will open in spring 2020, is already 90 percent pre-leased. The first purpose-built, multi-use aviation facility of its kind at the airport, it will include 9,000 sq ft of office space, five training rooms, a classroom, library, conference room, avionics workshop, pilot shop, parts department, and a 22,000-sq-ft maintenance hangar. According to the developers, all 16 of the small T-hangars are reserved, while three of the nine box hangars, capable of sheltering aircraft up to a midsize business jet, are still available. All In Aviation, a Cirrus Aircraft training partner, offers flight training, pilot certification and aircraft sales, rentals, management, and storage, while Lone Mountain Aviation claims to be the largest general aviation repair station in the state, servicing Cessna, Piper, Beechcraft, Daher, and Pilatus aircraft, among others.

All In Aviation at Henderson Executive Airport is in the midst of a project that will bring a 25-hangar complex to the Las Vegas gateway.

CAA Adds Nine New Locations to Network

The Corporate Aircraft Association (CAA) continues to experience strong growth with the addition of nine new service providers to its preferred FBO network over the past few months. They include: Cutter Aviation at Colorado Springs, Colo.; Tri State Aero in Evansville, Ind.; Harrison Aviation at Fort Worth Spinks Airport in Texas; FlightLevel Aviation in Norwood, Mass.; Tac Air's facility in Provo, Utah; Bighorn Airways in Sheridan, Wyo.; Washington State's Tacoma Narrows Aviation; and the Air Service Hawaii locations in Kona and Kahului, Hawaii. In addition, 18 current CAA preferred FBOs have renewed their contract with the 250-location-strong association for an additional three years. CAA was founded in 1995 to negotiate discounted fuel prices for its Part 91 membership, by combining purchasing power and working with respected members. "CAA's growth is a direct reflection of our win-win strategy," said president Bob Bordes. "Our FBOs deliver unbeatable fuel prices and service to our members. We are fortunate to have loyal members who recognize this and continue to recommend our organization to FBOs and other Part 91 operators."

Jet Aviation Riyadh To Move to Larger Facility

Jet Aviation is relocating to a new, larger facility at Riyadh Airport's private aviation terminal, which is expected to be operational in the fourth quarter. This move comes as the company marks its 40th anniversary in Saudi Arabia, with plans to expand operations further in the key Gulf Cooperation Council destination. The two-story FBO will include a ground-floor reception and three VIP lounges, while the upper floor will accommodate a crew lounge. Jet Aviation's Riyadh FBO services include passenger and baggage handling, immigration and customs clearance, transportation, hotel, and catering coordination, and aircraft refueling. "With the expected traffic growth to Riyadh in coming years, the additional space is necessary and offers great benefit in terms of passenger and crew comfort," said

Khaled Al-Ghamdi, general manager of Jet Aviation Saudi Arabia. "As the country's capital and main business center, Riyadh is a key strategic location for us." Jet Aviation Saudi Arabia is a joint venture company with local partners. It was the first company to set up an FBO in Saudi Arabia. and operates four FBOs—at Jeddah, set up in 1979, Riyadh (1983), Medina (2012), and Yanbu (2018).

NATA To Sponsor Hangar Foam-suppression Study

The National Air Transportation Association (NATA) has agreed to sponsor a University of Maryland research project that will delve into the causes, hazards, and associated costs of accidental discharges of foam fire-suppression systems. It will address both high- and low-expansion foam systems in addition to determining the rationale for the requirement of foam systems in the National Fire Protection (NFPA) 409 standard for aircraft hangars. According to the organization, industry feedback indicates a high risk associated with accidental discharges, with significant clean-up and aircraft damage costs as well as possible environmental damage. "There is significant uncertainty surrounding the benefits versus potential hazards related to hangar foam fire-suppression systems," stated Gary Dempsey, NATA president and CEO. "NATA members have repeatedly voiced concern that the cost of installing these foam systems dramatically increases the expense of new hangars, while providing limited risk mitigation due to the low incidence of hangar fires." The revision cycle for NFPA 409 is currently underway, with industry comments due by November 14. The NFPA's technical committee will review those comments for consideration in the next standard, which is expected to be published in early 2021. "We believe that this analysis will confirm what our members have expressed: that the cost of installation, maintenance, and clean-up from false discharges far exceeds the risk reduction of these systems," Dempsey concluded.

Louisiana FBO Expands with Rival Purchase

Baton Rouge Jet Center (BTR Jet), one of three service providers at Louisiana's Baton Rouge Metropolitan Airport, will expand its operation with the purchase of competitor Executive Aviation. Following the expected smooth merger this summer, BTR Jet, which opened in 2015, will begin construction on a new 5,000-sq-ft FBO operations facility and three hangars totaling 45,000 sq ft of aircraft storage. That project is expected to be completed in the first half of next year. "In a little over three years, BTR Jet has grown to be the number-one FBO on the field," said company president Brett Furr, adding they accomplished that through offering concierge service at fair prices. "We have rapidly outgrown our facilities and have much need for expansion. When completed, our new facilities will be among the finest in the country and will distinguish Baton Rouge in a very positive manner."

PANYNJ Ponders ACY Buy

The Port Authority of New York & New Jersey (PANYNJ) will initiate a study to possibly acquire Atlantic City International Airport (ACY) at the behest of several state lawmakers. The airport, which features a 10,000-foot main runway, serves the southern coastal region of the state in addition to the city's gambling enclave. It is home to a single FBO and sees approximately 160 operations a day, according to the FAA; more than one-third of those are general aviation or air-taxi flights. While the agency briefly ran the airport earlier in the decade, it is owned and currently managed by the South Jersey Transportation Authority. In addition to the three major metropolitan New York-area airports (John F. Kennedy International, Newark Liberty International, and La Guardia), the PANYNJ operates business aviation hub Teterboro Airport and Stewart International Airport, a joint civil/military-use airport in New York's Orange County, which it acquired in 2007. The legislators are hoping a PANYNJ takeover could boost commercial traffic at ACY, which is currently served by just one airline. ■

NATA is sponsoring a study on whether or not foam systems are more trouble than they're worth.

FBO PROFILE: Lehigh Valley Aviation Services

Lehigh Valley Aviation services, the airport-owned and -operated FBO at Allentown, Pennsylvania's Lehigh Valley International Airport is home to more than 50 business jets and scores of smaller aircraft. With nearly 200,000 sq ft of hangar space (and another 46,000 sq ft opening later this year), the FBO with its 200 acres of space has room to accommodate nearly anything.

'Living here in Allentown'

In his working-class anthem Allentown, singer Billy Joel described the decline of Pennsylvania's rust belt, long the heart of America's steel industry. Bethlehem Steel, one of the titans in the field, as well as one of the region's major employers went bankrupt, but today, amid the ghosts of the company's former flight department at Lehigh Valley International Airport (ABE), an FBO is thriving. Operated since 2004 by the Lehigh Northampton Airport Authority (along with the lone service facilities at Allentown Queen City Municipal Airport and Braden Airpark (formerly Easton Airport), Lehigh Valley Aviation Services occupies Hangar Seven, which still bears evidence of its former occupant.

The full-service FBO, a member of the Air Elite Network, has a 6,400-sq-ft terminal adjoining the hangar, offering a pilots lounge, flight planning room, showers, two 10-seat conference rooms, concierge service, a crew car, and a courtesy shuttle. It is currently open from 5 am until 10 pm but is planning to move to 24/7 operations by the end of the summer as it augments its 28-member staff. Fitting its international airport status, U.S. Customs is available weekdays from 9 a.m. until 5 p.m., but the airport authority is working on an agreement with CPB on an after-hours approved-reimbursable plan.

The airport averages approximately 500 general aviation arrivals a month, with traffic steady all year 'round. "I wouldn't say there is one season that is busiest," said general manager Kimberly Rawhouser. "I've just been noticing that each year we are busier and busier."

The FBO is home to 62 private turbine aircraft ranging from a Gulfstream G650 to a Pilatus PC-12. While it has nearly 200,000 sq ft of hangar space, which can accommodate aircraft up to a BBJ, the facility is currently at over 97 percent occupancy. To remedy that, another $16 million, 54,000-sq-ft heated hangar is under construction and is expected to be completed this fall.

"Take a look at the economy for the Lehigh Valley and its incredible what kind of business growth there has been in the area," said Thomas Stoudt, the authority's executive director. "As businesses are locating there and logistics and supply chain businesses are finding the Lehigh Valley as home, you're really starting to see a lot more activity on the corporate side for travel."

With responsibility for all aircraft fueling on the airport, the FBO pumps upwards of 17 million gallons a year, two million in Jet A for general aviation alone. The airport's World Fuel Services-supplied fuel farm holds 150,000 gallons in jet fuel, and 12,000 gallons of avgas. It is served by five Jet A refuelers (two 10,000-gallon, three 5,000-gallon and one 3,000-gallon tanker) and a pair of avgas trucks. During a project to enlarge the fuel farm, the foundations and basements of long-forgotten dwellings, which once housed Bethlehem Steel's pilots, maintenance technicians and their families, were uncovered.

The airport, which once hosted the likes of Amelia Earhart, celebrates its 90th anniversary this year, but prior to its 1929 opening, it served for two years as an emergency landing strip, as designated by the U.S Department of Commerce.

The airport is also celebrating its 15th anniversary as an FBO operator. "We're a very customer-centric organization and I think that's really one of the reasons we wanted to get into the FBO business," said Stoudt. "We really believe that we can provide a higher level of customer service internally given the culture of our team. I think that's the thing we are known for, whether you are flying commercially at this airport or you're flying through our general aviation terminal at the FBO."

Recently, when Nicole Kidman's flight into Teterboro Airport was diverted to ABE due to weather, her limousine was unable to reach her in time due to traffic. Instead, after asking if the Oscar-winning actress would mind riding in a Jeep, an FBO staffer drove her and her assitant more than an hour away to her movie set.

ABE is currently in the midst of a four-year, $80 million renovation project on its 7,599-foot main runway, including pavement reconstruction, new lighting and drainage. **C.E.**

G650ER crew sets polar circumnavigation record

by Curt Epstein

A Qatar Executive Gulfstream G650ER has broken the speed record for polar circumnavigation of the Earth, accomplishing the flight in 46 hours, 39 minutes, and 38 seconds. Scheduled to commemorate the 50th anniversary of the Apollo 11 moon landing mission, the flight departed NASA's Cape Canaveral facility at the Kennedy Space Center in Florida July 9 at 9:32 a.m.—the same time as the moon mission launch a half-century earlier—and landed July 11 morning at 8:12 a.m., shaving 5 hours, 51 minutes, and 26 seconds off the previous speed record set in 2008.

The ultra-long-range twinjet (of which Qatar Executive is the world's largest operator with six) accomplished the 40,172-km (21,691-nm) mission in four legs: Florida to Astana, Kazakhstan; Astana to Mauritius; Mauritius to Punta Arenas, Chile; and Chile to Florida, refueling at each stop. The project was named "One More Orbit" in recognition of NASA's Apollo 11 mission.

"Qatar Executive, together with the One More Orbit team has made history," said Qatar Airways Group chief executive Akbar Al Baker, who was on hand to greet the arriving business jet, noting many people behind the scenes worked tirelessly to make the record attempt a success. "A mission like this takes a huge amount of planning as we need to factor in the flight paths, fuel stops, potential weather conditions and make plans for all possibilities." The record flight, a first for Qatar Executive will be detailed in an upcoming documentary.

"We did this during the 50th-anniversary celebrations of the Apollo moon landing and the 500th anniversary of man first circling the planet, which Magellan did by sailing ship," said Hamish Harding, chairman of Action Aviation and the mission's director, as well as one of its pilots. "It is our way of paying tribute to the past, present, and future of space exploration."

Terry Virts, former space shuttle pilot and commander of the International Space Station, was among the crew of the One More Orbit mission. Virts is now an accomplished filmmaker known for the Imax production A Beautiful Planet. He chronicled the global preparations for the record flight. "We're making a documentary about the mission," he said, "which we will share with audiences worldwide in the near future."

Environmental consulting firm The Carbon Underground supported the mission. Co-founder and president Larry Kopald said the company "is proud to be a partner in this historic mission by making the mission carbon negative. Alleviating the existential threat of climate change by restoring the carbon balance and cycle will take a similar effort, with a similar commitment to speed." ■

Qatar Executive, which previously placed orders for up to 30 Gulfstreams, is adding on to its fleet with a new order for a mix of 18 G650ERs and G500s.

Qatar Exec ups Gulfstream orders with 18-aircraft deal

Qatar Airways confirmed an order valued at $1 billion for 18 Gulfstream aircraft during a White House ceremony in July witnessed by Sheikh Tamim Bin Hamad Al-Thani, Emir of Qatar, and President Donald Trump. The orders were announced as the leaders jointly vowed to further cooperation between the two nations.

The latest deal, previously announced by Gulfstream parent General Dynamics as from an "undisclosed" customer, follows orders made in 2015 from Qatar Executive for up to 30 Gulfstream jets, deliveries of which Qatar Executive executive v-p Ettore Rodaro told **AIN** in May would be completed in 2022. Qatar Executive is the business jet subsidiary of Qatar Airways. Gulfstream said the latest deal represents a new order.

No timeline on the delivery sequence for the new orders was given. "The order, worth over $1 billion, is for 14 Gulfstream G650ERs and four Gulfstream G500s, and will add to Qatar Executive's growing fleet that currently includes six G650ER and four G500 aircraft," Qatar Airways said yesterday.

"Qatar Airways is very pleased to confirm this landmark deal with Gulfstream," Qatar Airways Group chief executive Akbar Al Baker, said. "Our corporate jet division, Qatar Executive, goes from strength to strength and this commitment to new orders will allow us to offer our bespoke luxury service to even more passengers." **P.S.S.**

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Hemisphere 'on hold'

Further, Safran said its initial contract with Textron Aviation for the Silvercrest has been terminated with no financial impact to either company. The troubled engine program, which caused French airframer Dassault to cancel the Falcon 5X in late 2017, has made progress on fixing the engine's high-pressure compressor but so far is falling short of what Textron needs.

"The engine hasn't yet demonstrated the performance required for the aircraft," Donnelly explained. "We would certainly revisit it [the Hemisphere], but too much time has gone by here."

Textron Aviation suspended the Hemisphere program in April 2017 because of the high-pressure compressor issue and later said it would make a decision to proceed after Safran came up with a solution. Donnelly insisted on the call that the Hemisphere decision was made based solely on the engine issue and not because of market forces or competition. "There was only one engine suitable to meet the performance point," he said.

"While the aircraft/engine combination does not currently meet all the objectives, the Silvercrest engine development has made the intended progress over the past 12 months," Safran said. "The new high-pressure compressor shows performance for which ground test results have exceeded expectations." Upcoming tests to further confirm the improvements, as well as to complete overall engine performance and durability validation, are planned, Safran added. ■

› continued from page 1

G600 now certified

that are second to none, into the hands of our worldwide customers," said Burns.

The G600 program shared much of the same data as the G500, since they share the same base type certificate for both models. The G600 was particularly able to benefit from the shared data in a number of aircraft systems. But the G500 and G600 have different wings, which necessitated separate aerodynamics testing.

Two simulators are already in place with FlightSafety for the G500, and since the G500 and G600 have identical flight decks, the simulators can be shared. Both models are equipped with the Honeywell Primus Epic-based Gulfstream Symmetry flight deck with touchscreen displays and fly-by-wire with active-control sidesticks. Colin Miller, senior v-p of innovation, engineering, and flight, said the G500/G600 program benefited from the Gulfstream G650 fly-by-wire technology. Calling the system on the G650 a big step forward, Miller added, "The flight controls and the way we did that set the stage for partnering...with the sidestick." The fly-by-wire technology also enables other safety enhancements such as high-speed protection, he added.

Both are equipped with enhanced vision system (EVS) and the G500 was the first in the Gulfstream lineup to receive approval to use the EVS to land. They both will be certified for steep approaches. The aircraft not only meet Stage 5 noise standards but also benefit from quiet technology that has been developed with the help of submarine acoustic engineering expertise from its parent company General Dynamics to help design that quiet environment, Miller said.

A primary difference between the G500 and G600 is cabin length. Both can be fitted for 19 passengers and feature 6-ft, 2-in high and 7-ft, 7-in wide cabins. But the 600 has a 45-ft, 2-in cabin length, while the 500 has a cabin that is 41-ft, 6-in long. ■

Webinar

YOUR SAF QUESTIONS ANSWERED

Sustainable Aviation Fuel is Here to Stay

September 10, 2019 | 1:30pm Eastern

Sustainable aviation jet fuel (SAF) is relatively simple because it is perfectly acceptable to use in any turbine engine, but there is a lot more to this new fuel than meets the eye. Manufacturing and distributing SAF is just a technological hurdle but getting the new fuel into widespread use is going to require a robust pull on the demand side.

Aircraft operators need to know what SAF is, how it runs in turbine engines, how it benefits the environment, where it can be purchased, and how much it will cost.

AIN Editor-in-Chief Matt Thurber will moderate this discussion. Panelists to be determined.

What attendees will learn:

- What is SAF?
- Why is it beneficial for the environment?
- Demand vs. supply?
- How was SAF qualified for turbine engines?
- How does SAF benefit flight operations?
- Where can I buy SAF?

AIN

Register today at ainonline.com/safwebinar

ACI Jet is hiring for what it expects to be a 30 percent growth in labor in each of the next few years and a doubling of in-service aircraft at its San Luis Obispo, California, maintenance facility.

Bombardier expands mx to California with new ASF

by Curt Epstein

Bombardier has expanded its aircraft maintenance support footprint to California for the first time, selecting San Luis Obispo-based ACI Jet as its latest authorized service facility (ASF). The location will be authorized to perform line maintenance on the Global and Challenger families.

For the airframer, the designation marks its first new ASF in the U.S. in more than five years. "What we see with ACI Jet is the quality and the reputation that they bring to the table is completely in line with the brand and the reputation that we have in the marketplace," said William Molloy, Bombardier Business Aircraft's vice president of aftermarket sales. The company was one of the major proponents of the recent trend of OEMs bringing their maintenance support back in house, with a recent major expansion at its Tucson location, and new customer service center under construction in Miami, which will bring it to five Bombardier-owned service centers in the U.S., along with 10 ASFs in North America.

"Another part of our strategy has been to look at our authorized service facilities and streamline not only where we think it makes sense, but also where we believe there are opportunities," explained Molloy, noting the new ASF will benefit the OEM's clients on the West Coast. "We have relationships with a lot of providers throughout the U.S., but we don't have them as an approved line maintenance provider where they can conduct warranty work on our behalf, for example," Molloy told **AIN**. "This arrangement with ACI is about a partner that we've identified that we trust and that we feel can add value to not only our in-service aircraft but also new customers."

Centrally located in the state, the San Luis Obispo facility could also be a time saver for the more than 2,900 North America-based Bombardier Business Aircraft requiring maintenance. "Tucson, I think for a Bombardier customer who owns a plane in L.A. or San Francisco, is anywhere from a 90-minute to two-hour flight," stated ACI Jet president and CEO William Borgsmiller, "as opposed to San Luis Obispo, which is about a 30-minute flight from either of those major metropolitan areas." Currently, the facility can handle heavy checks on three Global-size aircraft simultaneously. ACI itself operates a quartet of Globals, along with four Challenger 600-series twinjets in its own charter fleet.

The news comes as ACI has begun a more-than-$18.5 million expansion of its 18-acre complex at San Luis County Regional Airport (KSBP), where it also operates the lone FBO. In addition to a new terminal, the company will be adding another approximately 12,000 sq ft of maintenance hangar space (which will bring it to 80,000 sq ft of aircraft repair, storage, and tenant hangars), a 4,000-sq-ft parts warehouse increase, and expanded interior, avionics, sheet metal, and wheel-overhaul shops. That will more than double ACI Jet's size, and it is adding more office space, which is expected to be completed in the second quarter of 2020.

"California is a place where it's expensive to build hangars, so you really have to make sure you use every square foot wisely," said Borgsmiller. "I think San Luis Obispo is a unique spot because we've been here for 20 years. We got in when the time was right, and it's given us access to property and real estate at competitive rates where it still makes sense to do maintenance in California and build a new hangar."

To support the influx of Bombardier-focused support work—an expected increase of 30 percent for each of the next two years—Borgsmiller's company is recruiting to fill 15 additional full-time technical positions including A&P and avionics technicians, management positions, inspectors, and a project manager. ■

Copperstate Turbine Engine Co. rebrands as TAE Aerospace

During the recent Regional Air Cargo Carriers Association conference, Australian MRO provider TAE Aerospace announced the name change of its latest acquisition, Arizona-based Copperstate Turbine Engine Co. (CTEC), to TAE Aerospace. The acquisition, which includes CTEC's Scottsdale, Arizona, and Anchorage, Alaska, locations, occurred in February 2019 shortly after TAE purchased Kansas City-based Propulsion Controls Company (PCC). In addition to other capabilities, all three companies provide MRO support for the Honeywell TPE331 turboprop engine or its associated Woodward fuel control.

"CTEC was a good match for us in culture, market knowledge, and the way they do business," said TAE Aerospace CEO Andrew Sanderson. "We could see where the synergies from our business in Australia would fit well with these businesses in the U.S. [The acquisitions were] a good stepping stone for our entry into the U.S. market."

Founded in 2000 to perform aircraft maintenance for the Royal Australian Air Force, TAE Aerospace offers a range of MRO services including overhauls, repairs, or maintenance on various aircraft wheels and brakes; select GE, Honeywell, Pratt & Whitney Canada, and Rolls-Royce engines; Honeywell and Woodward fuel controls and governors; electro-mechanical components; and Kidde fire protection equipment. With the acquisition of PCC and CTEC, TAE claims to be the largest provider of TPE331 services in the world.

"With these acquisitions, we can share components with global coverage," said Sanderson. "TAE can now serve TPE331 customers around the world from Alaska to Antarctica and everything can stay within our combined capabilities. We will also have better buying power with Honeywell and others in our supply chain by combining the CTEC business with our Australian business."

While Sanderson said TAE plans to infuse some capital into improvements at the CTEC facilities, personnel will essentially remain the same.

"The employees are excited about being part of a global enterprise with more corporate structure," said John Phoenix, former CTEC v-p, now TAE Aerospace U.S. sales and marketing manager. "They see that TAE is serious about improvement and that [TAE] didn't buy us to simply sell us off. We're all in this together." **K.R.**

by David Jack Kenny

PRELIMINARY REPORTS

In-flight Breakup Ends Illegal High-altitude Flight

PIPER PA-46-350P JETPROP CONVERSION, JUNE 7, 2019, CASTALIA, NORTH CAROLINA

The airplane broke up in flight during a suspected thunderstorm encounter, killing all four on board. En route from Naples, Florida, to Easton, Maryland, at FL270 on an instrument flight plan, the pilot received an alert from air traffic control of weather ahead and ATC rerouted him via the Franklin, Virginia VOR. Two minutes later the pilot reported encountering rain; the airplane climbed to FL273 before entering a rapidly descending right turn during which radio and radar contact were lost. Weather radar images reviewed afterward "indicated that the airplane was in the vicinity of heavy rain and thunderstorms at the time." The elevator and outboard sections of both wings were found 1.4 miles from the fuselage and inboard wing sections.

The 2007-model Piper had been converted from piston to turbine power in 2017 under a supplemental type certificate held by JetProp LLC. The NTSB's preliminary report, filed June 14, notes that its owner and pilot did not hold an instrument rating. The passenger in the right front seat was instrument-rated but not legally current for flight under instrument flight rules, having logged no instrument approaches or flight in actual instrument conditions during the previous 12 months. Federal Aviation Regulations require all flights between FL180 and FL600 to operate under instrument flight rules; to do so, the pilot is required to hold an instrument rating and meet currency requirements that include having logged at least six instrument approaches plus holding procedures and course tracking using electronic navigation systems within the preceding six months.

Eleven Dead in Hawaiian Skydiving Accident

BEECHCRAFT KING AIR A90-65, JUNE 21, 2019, MOKULEIA, OAHU, HAWAII

Ten parachutists and the pilot were killed when their jump plane crashed moments after takeoff from Runway 08 of Oahu's Dillingham Field. According to the NTSB preliminary report filed on July 8, another of the operator's parachute instructors said that the airplane's takeoff roll sounded "normal, consistent with the engines operating at high power." By the time it came into his sight at an altitude of 150 to 200 feet, however, it was already banking to the left. Footage from an airport surveillance camera shows that it struck the ground in an inverted, 45-degree nose-down attitude and was immediately consumed by a fireball. The debris field was confined to a 75-foot-wide area just inside the airport's perimeter fence.

On July 12, the Hawaii Tribune-Herald reported that the operator, Oahu Parachute Center, was "not in good standing" with the state's Department of Commerce and Consumer Affairs, had never obtained a permit to conduct skydive operations, and was not a registered tenant of the Dillingham Airport. A predecessor company, the Hawaii Parachute Center, had obtained a permit limited to parachute rigging and repairs.

King Air Crashes into Hangar Outside Dallas

BEECHCRAFT B300 KING AIR 350I, JUNE 30, 2019, ADDISON, TEXAS

A two-year-old King Air 350i with two pilots and eight passengers on board veered left and crashed into a hangar seconds after takeoff from Runway 15 of the Addison, Texas Airport. There were no survivors. A Dassault Falcon 900B inside the hangar was damaged by the impact and resultant fire, but there were no injuries on the ground.

A preliminary NTSB report released on July 8 notes that the accident sequence was witnessed by several people on airport grounds and also captured by multiple security cameras. One witness characterized the engine noise as quieter than usual and thought it "did not have enough power to take off." After lifting off, the airplane began a left drift that developed into a roll. It went completely inverted before striking the hangar "in a right-wing-down, nose low, and inverted attitude. The main wreckage came to rest on its right side and was destroyed by the impact forces and post-impact fire."

The cockpit voice recorder was recovered and contained two hours of high-quality audio that included the accident flight. About eight seconds before the end of the recording, a crew member is heard to mention a problem with the left engine. The last three seconds contain three automated aural "bank angle" warnings.

Coal Baron, Daughter Among Seven Victims in the Bahamas

LEONARDO AW139, JULY 4, 2019, TWO MILES OFF GRAND CAY ISLAND, ABACO, BAHAMAS

West Virginia coal magnate Chris Cline and his daughter Kameron were among the seven killed when their helicopter crashed into the Atlantic two miles west of Grand Cay Island in the Bahamas at approximately 2 a.m. The other victims included two pilots and three friends of Kameron Cline's. The group had been spending the Fourth of July holiday at Mr. Cline's private cay when Kameron reportedly suffered a medical emergency. The flight was intended to transport her to a Florida hospital.

The helicopter was reported missing at 2:53 p.m. the following day. Searchers located it about two miles offshore in 16 feet of water. After investigators mapped and photographed the underwater debris field, the wreckage was raised and transported to the United States. Unconfirmed press reports suggest that the victims were found strapped into their seats, with the pilot's hands still on the controls.

Bahama's Air Accidents Investigation Department has elected to delegate the investigation to the U.S. NTSB. As of July 15, the NTSB had not yet released its preliminary report.

FINAL REPORTS

No Reason Found for Cheyenne Engine Failure

PIPER PA-31T, JULY 13, 2017, TYLER, TEXAS

Underscoring the risk posed by an engine failure after takeoff, the NTSB has ascribed the fatal crash of a PT6A-powered Piper PA-31T Cheyenne during takeoff from Tyler, Texas's Pounds Regional Airport to the pilot's failure to control the airplane after a sudden loss of power in the right engine. The actual cause of the engine failure was not determined, as examination of the wreckage uncovered no pre-impact anomalies. The tower controller said the airplane rolled left, according to the NTSB, and descended into the ground about half a mile from the departure end of Runway 17 after an initial climb the tower controller described as shallower than usual. There was no post-impact fire.

The 62-year-old airline transport pilot held type ratings in the Boeing 737 and Falcon 10. His most recent first-class medical application filed six months earlier cited 17,590 hours of career flight experience. The Board's finding of probable cause, adopted July 8, noted that the accident flight was his first as pilot-in-command of a PA-31T since completing a checkout three days earlier. The family of the only passenger, a prominent East Texas pastor, subsequently filed a wrongful-death lawsuit against the airplane's operator and the pilot's heirs.

Pilot Flew into Ground While on Cell Phone

BELL 206L-3, SEPTEMBER 16, 2017, ANCHO, NEW MEXICO

The fatal crash of the news reporting helicopter of an Albuquerque television station occurred while the pilot was on the phone with an automobile rental agency. The NTSB attributed the collision to "the pilot's distraction by a cell phone during a low-altitude flight," citing the pilot's phone records as showing that he was in the midst of the call with a rental agency at the Albuquerque Sunport at the moment of the accident. The employee with whom he was speaking, who knew the pilot, recalled that the call disconnected "in mid-sentence" while they discussed a future rental. She added that while she wasn't aware the pilot was in a helicopter at the time, she did notice that he seemed "busy or distracted."

The accident occurred at 4:35 p.m. in good visibility with light winds. The report describes the accident site as "flat terrain in open ranch land" at an elevation of 6,330 feet. Ground scars in the 300-foot debris field "were consistent with a slight, nose-low impact with terrain." The television equipment on the bottom of the helicopter, operated by KRQE TV-13, was found near the point of initial impact.

The flight was returning to its base in Albuquerque from Roswell, where the 64-year-old, 8,800-hour commercial pilot (who was also a reporter) had spent the night after covering a story near Carlsbad. The last position fix recorded on a portable Garmin Aera 796 GPS recovered from the scene was about 1.5 nm from the accident site at an altitude of 6,456 feet, or 126 feet above the ground. (*See fuller story on page 44.*)

CFIT Confirmed in New Mexico Helicopter Wreck

BELL UH-1H, JANUARY 17, 2018, RATON, NEW MEXICO

As he was being transported to a hospital following the accident, the pilot of a Vietnam-era Bell UH-1 Huey helicopter acknowledged having flown the aircraft into terrain. It struck a mesa during a night flight from the Raton airport to a ranch near Folsom, New Mexico. He succumbed to his injuries in transit, one of five fatalities in the accident. One passenger survived with a broken shoulder and broken arm. The group had flown from Houston to Raton on a Hawker 800 jet earlier in the day and was en route to a fiftieth birthday party for a close friend of the surviving passenger. The accident occurred around 6 p.m., which was about 25 minutes after the end of civil evening twilight, on a moonless night.

The NTSB's probable-cause report describes the accident site as a flat mesa only about 100 feet higher than surrounding terrain with no sources of ground light and few features that would be visible at night in the vicinity. Skies were clear with 10 miles' visibility reported; the pilot's decision to fly at such low altitude over unfamiliar terrain was not explained. The report also notes that the helicopter was registered in the restricted category for aerial application and was therefore not authorized to carry passengers under FAR 91.313. (*See fuller story on page 44.*) ■

ECCAA seeks FAA guidance on charter 747 registration

by Chris Kjelgaard

The Antigua-headquartered Eastern Caribbean Civil Aviation Authority (ECCAA) is consulting closely with the FAA over a request by charter operator One Caribbean to put a 21-year-old Boeing 747-400 on the register of Saint Vincent and the Grenadines (SVG).

The 747-400 was originally operated by Taiwan's China Air Lines but went into storage at Victorville, California, in October 2017 with the U.S. registration N508BB. Soon after One Caribbean flew it to Saint Vincent's Argyle International Airport on May 24, the aircraft's owners asked ECCAA to re-register the aircraft. One Caribbean already holds an air operator's certificate (AOC) awarded by ECCAA, but until it took delivery of the 747 it operated just one aircraft, an SVG-registered Beech 1900D, on private-charter work.

Capt. Paul Delisle, ECCAA's flight operations inspector, confirmed to **AIN** at the Caribbean Aviation Meetup conference in St. Maarten in mid-June that "the foreign owners" of the 747 were "desirous of putting it on a Saint Vincent AOC." The aircraft, "physically in Saint Vincent, [was] presently being de-registered, and they have applied to put it on the SVG register," he said.

Multi-step Process

However, the request to certify the 747-400 was a big step for ECCAA, Delisle said. He noted that, as the airworthiness regulator for six member nations of the English-language Organisation of Eastern Caribbean States (Antigua and Barbuda, Dominica, Grenada, Saint Kitts and Nevis, Saint Lucia, and SVG), ECCAA today has oversight of six AOCs, 14 airports and just 41 aircraft. Six are helicopters—but none of the aircraft is a large commercial jet.

Delisle said ECCAA is taking a two-step approach to re-register the One Caribbean 747-400. First, "We are discussing the whole plan with the FAA," which originally awarded the Boeing 747-400 its type certification, he said. "We want concurrence" with the FAA on all matters relating to N508BB's potential SVG certification.

One reason is that, 21 years ago, ECCAA's predecessor certified a McDonnell Douglas DC-10-10 for the Antigua and Barbuda registry, for a company called Skyjet. However, according to Delisle, the aircraft actually was based in Belgium, from where it was leased to various carriers throughout the world. The FAA took such a dim view of the situation that in 2002 it removed the Eastern Caribbean regulator from its list of approved Category 1 airworthiness authorities. "We had to stop that [Belgium-based] operation to get Category 1 categorization" back, said Delisle. "It's a sensitive subject."

Of necessity, ECCAA's second step is to ensure that suitably trained inspectors are in place to certify the 747-400 properly. According to Delisle, ECCAA has three choices: to give existing staff additional training; to employ additional, fully trained inspectors; or to lease inspectors from another regulator. However, Delisle added that ECCAA is planning to train at least one inspector for 747-400 certification and that it already numbers among its staff a former 747-400 pilot.

Meanwhile, speculation surrounds the 747-400's unusual move to Saint Vincent. Several Caribbean media outlets report that One Caribbean is planning to operate the passenger-configured 747-400 nonstop between Saint Vincent and Dubai. ■

After 70 years, BACA rebrands, with same mission

BACA-The Air Charter Association is celebrating its 70th anniversary with a rebranding to The Air Charter Association, a move the organization says will give it a clearer identity. The organization was founded in 1949 as the Baltic Air Charter Association at London's Baltic Exchange and has focused on representing the air charter industry before regulatory authorities and governments worldwide.

The brand change is the second for the organization that is fully eliminating the "Baltic" reference. "With only two brand refreshes in those 70 years, the council has taken the opportunity to mark the 70th anniversary with a clear statement to the world of our purpose with the brand and identity change to 'The Air Charter Association,'" the organization said

"This rebrand really cements in everyone's minds what The Air Charter Association is here for and who we represent. We're a global trade body with over 250 members around the globe," CEO Dave Edwards said. "It's been a great 70 years as BACA, but the time is right to drive the organization to its full potential now." **K.L.**

by Gordon Gilbert

Within 6 Months

Oct. 1, 2019 **NEW**

U.S.: Interior Fire Protection

The FAA is proposing to amend certain airworthiness regulations for fire protection of Part 25 aircraft interior compartments. This proposal would convert those flammability regulations from detailed, prescriptive requirements into simpler, performance-based standards. Comments are due on October 1.

Jan. 1, 2020 **5 Months 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. 30, 2020

Datalink Com in North Atlantic

Phase 2 of the North Atlantic datalink mandate began in February 2015, at which time flights within the North Atlantic Tracks between FL350 and FL390 were required to be equipped with FANS-1/A controller-pilot datalink communications and ADS-C. The program expanded to these altitudes in the entire ICAO NAT region on Dec. 7, 2017, and will apply to all flights in this region above FL290 on Jan. 30, 2020.

June 7, 2020 **10 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 on or after June 8, 2016.

Aug. 13, 2020 **NEW**

EASA: Training Requirements

Flight crew training rules for certain helicopter and airplane operations would be updated under a notice of proposed amendment (NPA) from the European Union Aviation Safety Agency. In addition to implementing evidence-based training (EBT), this NPA proposes to improve existing requirements covering commercial operations by airplanes and helicopters, specialized operations, and non-commercial operations with complex aircraft. Comments are due August 13.

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.

Aug. 22, 2020

Australia: Airport Certification

Revised Australian airport certification regulations (CASR Part 139) and an accompanying revised manual of standards (MOS) start on Aug. 22, 2020. There will be a transition period up to two years for registered airports, due to the requirements to develop an airport operations manual. Certified airports are expected to largely be compliant with the new MOS at commencement.

Beyond 12 Months

Jan. 1, 2021 and Jan. 1, 2022 **NEW**

Canada: ADS-B Out Mandate

The implementation date of Jan. 1, 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. 1, 2022. Beyond this date, expansion of ADS-B requirements mandate to other Canadian domestic airspace will be based on an assessment of the safety and efficiency requirements for specific airports.

Jan. 1, 2021

EASA: Cockpit Voice Recorders

Cockpit voice recorders with a recording duration of at least 25 hours will be required on commercial airplanes with an mtow of 60,000 pounds or more manufactured from Jan. 1, 2021. ■

Compiled by Kerry Lynch

ROMAIN TRAPP

CHRIS EDWARDS

ALESSANDRO SCARPELLINI

JOHN PETERSEN

Romain Trapp was appointed president of Airbus Helicopters' U.S. subsidiary, *Airbus Helicopters Inc*., and head of the North America region for helicopters. He succeeds Chris Emerson, who is assuming the role of president of Airbus Defence and Space. Trapp served as CFO of Airbus Helicopters Inc. in Grand Prairie, Texas, beginning in 2008 and became Airbus Helicopters COO in 2016 and president of Airbus Helicopters Canada in 2013.

Christian Sasfai was named president of South Carolina-based MRO provider *Stevens Aerospace and Defense*. Most recently v-p and COO for TAC Air, Sasfai returns to Stevens after serving as its director of business development and financial planning from 1995-2002.

Emlyn David was named president and CEO of *Skyservice Business Aviation*, effective June 30. He succeeds Marshall Myles, who retired as CEO after serving with the company since 2008. Myles will continue to serve the executive team in a consulting capacity. David has been a director of Skyservice and has held the role of president since 2012.

StandardAero appointed **Roger Ross** president of its Airlines & Fleets division, based at the company's Scottsdale, Arizona headquarters. Ross, who has 25 years of aerospace leadership experience, has managed various operations for Goodrich and previously was president of Esterline Technologies, Sensors, and Systems.

Gulfstream Aerospace has expanded its European sales team with the addition of two regional vice presidents. **Chris Edwards** was appointed regional v-p of sales for Northern Europe, covering the United Kingdom, Ireland, the Netherlands, and Scandinavia after serving in that same role with Embraer Executive Jets. **Alessandro Scarpellini**, most recently Embraer's director of sales in Africa, was named regional v-p of sales for Southern Europe, including Switzerland.

Joe Gibney has been promoted from director of business development to v-p and COO for aviation services provider *TAC Air* and will also oversee business management of sister company *Keystone Aviation*. **Aaron Fish** was promoted from controller at Keystone to v-p and COO, reporting to Gibney.

Andreas Roelofs joined *United Technologies Corp.* as v-p of research on July 1. Roelofs, who will lead the United Technologies Research Center, holds more than 20 patents and has a background as physicist, start-up founder, industry executive, and former leader of a government research facility, including as director of the Center for Integrated Nanotechnologies at Los Alamos National Laboratory and Sandia National Laboratory and as founding director of Argonne National Laboratory's Chain Reaction Innovations.

Argus International named **Doug Schwartz** v-p, leading the Operational Excellence Program. Schwartz, who spent 20 years with FlightSafety International, recently retired from Conoco Phillips as general manager of global aviation services.

Noble Aerospace (formerly All Metals Processing Holdings) added **Brad Morton** to its board of directors. Morton was most recently president of Eaton Aerospace.

Leon Silva rejoined *Sikorsky Commercial Systems & Services* as director of aftermarket programs. Silva, who has more than 28 years of program management and engineering experience, previously served as chief engineer for Global Military Systems & Services and director of Sikorsky's S-76 line of commercial helicopters in his former roles with Sikorsky.

Bob Sanchez was named director of government business development for *Universal Avionics*, overseeing efforts to promote the company's commercial products to government customers worldwide.

FlightSafety International promoted **Suren Meras** to executive director of operations. Meras, who will oversee the range of training operations and development for the company's global network, joined FlightSafety's Toronto facility in 2007 as assistant center manager and director of training and later was promoted to director of training operations and then senior director of operations.

Kevin Sullivan joined Freestream Aircraft as director of business development. Sullivan has an extensive background in Part 135 operations and served with the Time Warner/Warner Brothers flight department.

Duncan Aviation announced several personnel changes. The company named **Michael Kussatz** regional avionics sales manager, supporting the company's East Coast Satellite Avionics Shop network. **Luke Swager** was appointed manager of customer service for its Battle Creek, Michigan location. **Joe Cugnetti** moved over to Duncan Aviation's aircraft service sales team as a Bombardier service sales representative. Cugnetti previously was a lead technician in the company's Battle Creek, Michigan airframe department. Finally, the company named **John Petersen** regional manager for the Northwest U.S.

Daniel Bull joined *Harvest Aviation*, a subsidiary of the Prax Group, as aviation manager. .

Summit Aviation Manufacturing added **Tara Connell** to its sales team as a business development representative. Connell previously was a senior buyer for Honda Aircraft, Major Structures.

Linda Pfeifer joined *Immaculate Flight* as regional sales manager for the Southeast Florida market.

West Star Aviation appointed **Kenneth Rivers** satellite manager of the MRO's Scottsdale, Arizona (SDL) location. Rivers previously was satellite manager and lead tech at West Star's Chicago (PWK) location.

Peter Schmitz has helped found *Risk Management & Insurance Solutions* with **Mark Church** to provide aviation insurance advising, expert witness availability, due diligence reports, risk management outsourcing, and project-based consulting. Schmitz is president of the new firm, while Church is a partner. ■

AWARDS and HONORS

Steve Padgett, co-founder and chairman of Alliance Aviation Services (formerly Alliance Airlines) and founder and managing director of Flight Options (Australia), Universal Training Systems, and SJP Aviation, was honored with the Medal of Order of Australia for outstanding achievement and service. Padgett was recognized for playing an instrumental role in developing new aviation business and contributing to the fabric of aviation, Flight Options said. He additionally is a life member of the Regional Aviation Association of Australia, a council member of the Australian Air Force Cadets National Council, and chairman of the Australian Aviation Hall of Fame.

GAMA is presenting its 2019 Edward W. Stimpson Aviation Excellence Award to **Ericka Hardin**, who is planning to attend Moody Aviation Technology in Spokane, Washington, in the fall. Named after the long-time head of GAMA, the $2,000 scholarship is awarded to a graduating U.S. high school senior who is enrolling in an aviation degree program at a college or university. Hardin plans to earn a bachelor of science degree in missionary aviation technology-flight. An active member of the Civil Air Patrol, she has received numerous recognitions, including the Mary Feik Achievement, the Wright Brothers Award, and the Lindbergh Achievement. ■

FINAL FLIGHTS

Karl Bergey, a long-time aeronautical engineer who led the development of the Piper Cherokee, died on May 27 in Norman, Oklahoma. He was 96. A retired University of Oklahoma professor and chairman of a small wind turbine manufacturing company, Bergey grew up in Lewistown, Pennsylvania, and began his studies at Penn State before joining the Navy and attending flight navigation school. After WWII, he returned to college to receive a degree in aeronautical engineering and later a master's degree in aeronautical engineering from MIT.

Bergey worked with companies including Grumman Aviation and North American Aircraft in California before he joined Piper Aircraft in 1957. There he oversaw both development and certification of the Cherokee, which became one of the best-selling general aviation aircraft. He subsequently served as v-p of engineering for Aero Commander, where he spearheaded development of the Aero Commander 114.

He joined the staff of the University of Oklahoma School of Aeronautical, Mechanical, and Nuclear Engineering in 1970, teaching and mentoring students for the next 40 years. He also became involved in the wind power market, founding Bergey Windpower with his son Michael.

Bergey has received a Lifetime Achievement Award from the American Institute of Aeronautics and Astronautics (AIAA) and an Outstanding Engineering Alumnus award from Penn State.

Roger Béteille, a founding father of Airbus, died June 14 at the age of 97. Béteille is credited with shaping not only the first Airbus commercial aircraft, the A300B, but also Airbus Industrie. Born in Aveyron, France, in 1921, Béteille studied at Supaéro in Toulouse. He then joined SNCASE, which later became Sud Aviation, in 1943. A pilot and flight test engineer, he was part of the flight test team on the Caravelle's first flight. By 1967 Béteille had become chief engineer for the A300 program at Sud Aviation. When it became known that Air France and Lufthansa wanted a smaller product, he began working on the 250-seat A300B in secret. His fuselage cross-section design for that aircraft is still in use today on the A330.

Béteille has been credited with innovations that culminated with the launch of the A320, a single-aisle aircraft that featured fly-by-wire flight controls, in 1984. He retired from Airbus Industrie as president in 1984. ■

CORPORATE ANGEL NETWORK

CAN

Fund an Angel Cocktail Reception

Wednesday, October 23 | 6–8 P.M. | Wynn Las Vegas

The 10th Annual Fund an Angel Cocktail Reception, held on the second day of the NBAA Business Aviation Convention & Exhibition (NBAA-BACE), is an invaluable networking event for business aviation leaders and influencers. The reception will feature an auction to benefit Corporate Angel Network (CAN) who organizes critical flights for cancer patients to treatment centers throughout the country.

"Corporate Angel Network has helped to open up trials and treatment for Ava that we otherwise could not afford. They help to ensure she gets the medical care that she needs."

– Ava's Parents

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ROLLS ROYCE

DUBAI AIRSHOW 2017

NBAA 2018

PHOTOS: DAVID MCINTOSH

AUGUST

RTCA SC-147 TRAFFIC ALERT & COLLISION AVOIDANCE SYSTEM PLENARY SESSION... August 8, RTCA Headquarters, Washington, D.C. Info: (202) 330-0647; email: asecen@rtca.org; rtca.org/content/upcoming-committee-meetings.

LATIN AMERICAN BUSINESS AVIATION CONVENTION & EXHIBITION... August 13-15, São Paulo, Brazil. Info: labace.com.br.

CIVIL HELICOPTER SOUTHEAST ASIA SUMMIT... August 28-29, Bangkok, Thailand. Info: civilaviationsea.com/.

SEPTEMBER

CITATION JET PILOTS CONVENTION... September 4-8, Colorado Springs, CO. Info: citationjetpilots.com.

INTERNATIONAL BRAZIL AIR SHOW... September 11-13, GRU Airport-São Paulo International Airport, Guarulhos, São Paulo, Brazil. Info: +55 11 97664-7750; ibas@sators.com.br; internationalbrazilairshow.com.br/en/.

MASSACHUSETTS BUSINESS AVIATION ASSOCIATION ANNUAL SCHOLARSHIP GOLF TOURNAMENT... September 12, The International, Bolton, MA. Info: massbizav.org.

RTCA SC-216 AERONAUTICAL SYSTEMS SECURITY PLENARY... September 9,-12, 9-23, rue Paul LaFargue, Saint Denis, France. Info: email: khofmann@rtca.org; rtca.org/content/upcoming-committee-meetings.

IS-BAO WORKSHOP: MARRAKECH, MOROCCO... September 23, Marrakech Menara Airport, Morocco. Info: mebaa.com.

MEBAA SHOW MOROCCO... September 25-26, Marrakech Menara Airport, Morocco. Info: mebaamorocco.aero.

OCTOBER

CHC SAFETY AND QUALITY SUMMIT... October 1-3, Omni Dallas Hotel, Dallas, Texas. Info: chcsafetyqualitysummit.com.

REDBIRD MIGRATION FLIGHT TRAINING CONFERENCE... October 15-17, Wings Over the Rockies Blue Sky Aviation Gallery, Englewood, CO. Info: migration.redbirdflight.com.

NBAA TAX REGULATORY & RISK MANAGEMENT... October 20-21, Las Vegas, NV. Info: nbaa.org.

NBAA-BACE BUSINESS AVIATION CONVENTION & EXHIBITION... October 22-24, Las Vegas Convention Center, Las Vegas NV. Info: (202) 783-9000; nbaa.org/events/bace/2019/.

MALTA AVIATION CONFERENCE AND EXPO... October 30-November 1. Info: https://mace.aero/.

NOVEMBER

FLIGHT SAFETY FOUNDATION INTERNATIONAL AIR SAFETY SUMMIT... November 4-6, Taipei. Info: flightsafety.org/events.

BOMBARDIER SAFETY STANDDOWN... November 12-14, Omni Fort Worth Hotel, Fort Worth, Texas. Info: safetystanddown.com.

IBERIAN PENINSULA BUSINESS AVIATION CONFERENCE... November 14, Madrid, Spain. Info: ipbace.com.

DUBAI AIRSHOW... November 17-21, Airport Expo, Dubai, UAE. Info: +97 1 4286 7755; dubaiairshow.aero.

AFRICAN AIR EXPO... November 27-29, King Shaka International Airport, Durban, South Africa. Info: africanairexpo.com.

DECEMBER

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

JANUARY 2020

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

FEBRUARY 2020

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

MARCH 2020

AIR CHARTER SAFETY SYMPOSIUM... March 3-4, Ashburn, VA. Info: acsf.aero.

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

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

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