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« Joby Aviation's S4 eVTOL aircraft took a leap forward in the race to launch commercial service with a January 15 announcement of $590 million in new investment from a group led by Japanese car maker Toyota. Joby says it will have the piloted S4 flying as part of the Uber Air air taxi network in early adopter cities before the end of 2023, but it will surely take far longer to get clearance for autonomous eVTOL operations. (Full story on page 8)

Remote ID NPRM maps out UAS airspace integration plans

by Charles Alcock

Stakeholders have until March 2 to comment on proposed rules intended to provide a framework for integrating unmanned aircraft systems (UAS) into the U.S. National Airspace System. On New Year's Eve, the Federal Aviation Administration (FAA) published its long-awaited notice of proposed rulemaking (NPRM) for remote identification of UAS. The proposals have important implications not only for how rapidly proliferating drone flights can be safely accommodated but also how autonomously-operated, passenger-carrying electric vertical takeoff and landing (eVTOL) aircraft might function in planned urban air mobility applications.

The final rule resulting from NPRM FAA-2019-100 is expected to require remote identification for the majority of UAS, with exceptions to be made for some amateur-built UAS, aircraft operated by the U.S. government, and UAS weighing less than 0.55 pounds. The core requirement is that UAS can provide "certain identification and location information that people on the ground and other airspace users can receive."

Essentially, the FAA is proposing three compliance methods: standard

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Read Our **SPECIAL REPORT**

EFB Hardware

When it comes to electronic flight bags, (EFBs), most attention focuses on software. But the tablets pilots hold in their hands are also of special note. We look at some of the top tablets and how well they play with the leading apps.

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INSIDE this issue

PILOT REPORT

AIN flies the venerable Citation CJ4, and it performs as expected: offering a significant advancement over its small siblings.

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As We Go To Press

BOMBARDIER BIZJET DELIVERIES UP, BUT SHORT OF TARGET

With four deliveries of its Global 7500 slipping into the first quarter, Bombardier handed over 11 of the new flagship models last year, shy of the anticipated 15 to 20, according to preliminary results released on January 16. In all, the company delivered 142 business jets and 33 commercial aircraft last year. While the 175 deliveries were in line with the 175 to 180 estimated in revised guidance at the end of the second quarter, the 142 business jet deliveries were short of the 150 to 155 estimated at that time. However, the deliveries overall made a jump over the 137 Bombardier business jets handed over in 2018. As for financial results, Bombardier had estimated its aviation division would generate about $8 billion in 2019 but is now expected to report $7.5 billion. The company will report full results on February 13.

FARNBOROUGH LOGS RECORD TRAFFIC GROWTH

Business aircraft traffic grew 5.3 percent last year at London-area Farnborough Airport, with 32,366 movements recorded in the 12-month period. The privately-owned airport has achieved three consecutive years of record traffic growth and indicated that the trend is set to continue in 2020 with a further 3.5 percent growth in movements achieved as of mid-January. In September, Macquarie Investments and Real Assets purchased Farnborough Airport from the TAG Group .Through 2030, local government has approved further growth of up to 50,000 movements per year. Subject to further approval, this limit could, in theory, be raised in the longer term.

CONSTANT NAMES NEW CEO, 'REFOCUSES' BUSINESS

Cleveland, Ohio-based MRO provider Constant Aviation said a "refocus" on the business prompted the closing of its facility at Phoenix-Mesa Gateway Airport last month. It also said former Flexjet COO David Davies has been named its new CEO, replacing Stephen Maiden, who left the company on January 1. Constant said its research shows a trend of greater demand for heavy maintenance inspections and noted that the company is "well positioned" to handle this at its Cleveland facility. Aircraft paint and refurbishment, a specialty for Constant's facility at Orlando Sanford International Airport, is another segment that the company has identified as a high-growth opportunity.

EASA, EHA PARTNER ON NEW EUROPEAN ROTORS SHOW

The European Helicopter Association (EHA) and EASA have launched a new annual conference and trade show called European Rotors. The first event will be held from November 10 to 12, 2020 in Cologne, Germany. This new show is intended to include all vertical takeoff and landing (VTOL) aircraft, including both conventional helicopters and new-generation electric VTOL (eVTOL) aircraft being developed for so-called urban air mobility applications. The conference program will include EASA's annual Rotorcraft Symposium, which has been held at its headquarters in Cologne. EHA said it has the support of all leading helicopter manufacturers, including Airbus, Bell, Leonardo, and Kopter.

FAA CERTIFIES LEARJET 70/75 G5000 FLIGHT DECK UPGRADE

Bombardier has received FAA certification for an upgrade to the Garmin G5000 flight deck in the Learjet 70 and 75. According to the Montreal-based airframer, the new features will be incorporated on new Learjet deliveries, including the recently announced Liberty version of the Model 75 that is expected to enter service by midyear. A retrofit option for existing Learjet 70/75s will also soon be available. The G5000 avionics suite reduces pilot workload, improves situational awareness, "and gives pilots a superior in-flight experience," Garmin said.

LIVING LEGENDS HONOR DICHTER FOR ENTREPRENEURSHIP

Wheels Up founder and CEO Kenny Dichter was honored with the Eren Ozmen Entrepreneur of the Year Award last month during the 17th Annual Living Legends of Aviation Awards in Los Angeles. He was lauded for bringing innovation, technology, and a disruptive force to private aviation. Dichter founded membership-based Wheels Up in 2013 with a fleet of King Airs, and since then, the operator has sold more than 8,000 memberships, expanded its fleet to nearly 200 aircraft, and grown its employment base to more than 1,000 people.

FLIGHTSAFETY TEXTRON OFFERS G5000 EXCEL/XLS TRAINING

Pilot initial, recurrent, and differences training on Garmin G5000-equipped Cessna Citation Excel/XLSs is now being offered by FlightSafety Textron Aviation Training under an exclusive arrangement. Those courses are now available at the FlightSafety Textron Aviation Training Learning Center in Wichita, where differences training is available using a Garmin G5000 training kiosk. A level-D-qualified Excel/XLS simulator equipped with Garmin G5000 will be added later this year, according to FlightSafety. The G5000 retrofit replaces the Honeywell Primus 1000 avionics and offers fully integrated ADS-B Out, as well as PBN/RNP 0.3 with LPV/APV approach capability.

MIT researchers explore nanotubes for composites

by Jerry Siebenmark

Engineers at the Massachusetts Institute of Technology (MIT) have developed a method to use carbon nanotubes to produce aerospace-grade composites without an autoclave, researchers announced in a paper published last month in the journal Advanced Materials Interfaces. "If you're making a primary structure like a fuselage or wing, you need to build a pressure vessel, or autoclave, the size of a two- or three-story building, which itself requires time and money to pressurize," said MIT professor of aeronautics and astronautics Brian Wardle. "These things are massive pieces of infrastructure. Now we can make primary structure materials without autoclave pressure, so we can get rid of all that infrastructure."

A team led by MIT post-doctoral student Jeonyoo Lee created a method to make aerospace-grade composites without requiring an oven to fuse the materials together. The team wrapped layers of material in an ultrathin film of carbon nanotubes that, when electrified, generated enough heat to cure and fuse them together. As a result, the team produced composites as strong as those made in a conventional aircraft autoclave but only using one percent of the energy.

Next, the team will look for ways to scale the process for curing large sections of composites that would be used for primary aerostructures to generate enough pressure to fill any void between the layers of materials. They've successfully done that in the lab with very small samples. "There are ways to make really large blankets of this stuff, and there's continuous production of sheets, yarns, and rolls of material that can be incorporated in the process," Wardle added.

There are many advantages to making fuselages from composites rather than aluminum, including weight savings of up to 50 percent. Composites are also more flexible and handle turbulence better than aluminum. Single-piece structural assemblies are stronger, have better impact resistance, and are easier to assemble. The greater strength also enables more robust pressurization systems, significantly reducing the cabin altitude and greatly improving passenger comfort. The higher oxygen content of a lower cabin altitude also reduces passenger fatigue. Aluminum airliners typically have a cabin altitude of as high as 8,000 feet at their cruising altitude. The composite-fuselage Boeing 787 Dreamliner, however, maintains a cabin altitude of 6,000 feet at its cruising altitude.

Composite structures are also noncorrosive, which enables higher humidity levels on board. The low moisture content needed to sustain aluminum structures—as low as 5 to 10 percent relative humidity—can be very uncomfortable over time. Low humidity dries out nasal passages, reducing the protective moisture of the mucous membranes and making passengers more vulnerable to germs. Also, in a very dry environment, viruses are able to survive much longer, floating around in the air and increasing the chance of infection.

If the MIT project ultimately leads to greater availability of composites in major aircraft structural assemblies, the weight savings, alone, could significantly improve efficiency and reduce emissions. ■

WEF draws attention to SAF

The SAF Coalition took advantage of last month's World Economic Forum to increase the awareness of sustainable aviation fuel. At a press event on January 20, line crew fueled a business jet with an SAF blend for the first time at Zurich Airport.

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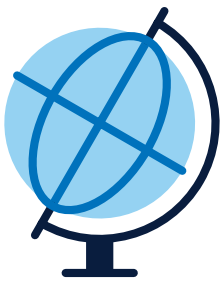
1. 

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Toyota invests big in eVTOL maker Joby

by Jerry Siebenmark

Billing itself as a "global mobility company," Japanese automaker Toyota Motor Corp. last month announced a partnership with and a $394 million investment in eVTOL developer Joby Aviation. The investment makes Toyota the lead investor in Joby's $590 million Series C financing.

"Air transportation has been a long-term goal for Toyota, and while we continue our work in the automobile business, this agreement sets our sights to the sky," Toyota president and CEO Akio Toyoda said. "As we take up the challenge of air transportation together with Joby, an innovator in the emerging eVTOL space, we tap the potential to revolutionize future transportation and life. Through this new and exciting endeavor, we hope to deliver freedom of movement and enjoyment to customers everywhere, on land, and now, in the sky."

Under the partnership, Toyota executive vice president Shigeki Tomoyama will join Joby's board of directors while the carmaker will leverage its expertise in manufacturing, quality, and cost controls for the development and production of Joby's aircraft, a piloted, four-passenger eVTOL.

Toyota's investment and expertise are expected to accelerate the development and certification of Joby's eVTOL. "This collaboration with Toyota represents an unprecedented commitment of money and resources for us and this new industry from one of the world's leading automakers," Joby founder and CEO JoeBen Bevirt said. "Toyota is known globally for the quality and reliability of their products driven by meticulous attention to detail and manufacturing processes."

It's not the first time Toyota has been involved in aircraft manufacturing. Between 1943 and 1945 and under contract from the Japanese army, Toyota produced 151 units of the Ha-13A-2 radial aircraft engine. In 1996, the FAA certified the FV2400-2TC twin-turbocharged V-8 piston aircraft engine that was jointly developed by Toyota and Hamilton Standard as a competing engine to Teledyne Continental and Textron Lycoming. But the engine was never brought to market. And Scaled Composites and Toyota jointly built the TAA-1 all-composite single-engine piston airplane, which was later shelved after first flight of the prototype in 2002.

Previous investors that participated in Joby's Series C fundraising include Sparx Group, Intel Capital, Capricorn Investment Group, JetBlue Technology Ventures, Toyota AI Ventures, and AME Cloud Ventures. They were joined by two new investors: Baillie Gifford and Global Oryx. Joby's investment funding, including previous rounds, now totals $720 million.

Its all-electric-powered aircraft features six sets of propellers—four mounted on the wings and two aft—with a cabin optimized for ride-sharing operations and easy passenger ingress and egress. Capable of reaching a speed of 200 mph, it is planned to have a range of 150 miles on a single charge. It also will be 100 times quieter than conventional aircraft during takeoff and landing, and nearly silent in forward flight, Joby claims.

Joby is targeting a 2023 deployment of its aircraft. Last spring, the company hired Gregory Bowles as its head of government affairs. Bowles brought to the job a strong background in aircraft certification, having served as co-chairman of the FAA Part 23 Reorganization Aviation Rulemaking Committee as well as chairman of ASTM International's F44 committee for Part 23 aircraft. ■

Bombardier's Global 5500, 6500 gain U.S. approval

by Kerry Lynch

BOMBARDIER

Bombardier handed over the first Global 6500 on order with HK Bellawings as it celebrated the receipt of U.S. approval for both the 6500 and its sibling, the 5500.

Bombardier received FAA validation for its newest Globals, the 5500 and 6500, paving the way for the aircraft to enter the U.S. market. With the latest nod, Bombardier has a triumvirate of approvals for the models, with Transport Canada certification coming in late September, followed by the European Union Aviation Safety Agency's nod in October. The first 6500 entered service in late September following Canadian approval. As Bombardier celebrated the FAA approval, the Montreal-based manufacturer also announced the delivery of the initial 6500 on order with Hong Kong-based HK Bellawings.

The trio of approvals come a little more than a year and a half after Bombardier made the surprise unveiling of the aircraft during EBACE 2018 in Geneva. Building on their Global 5000 and 6000 predecessors, the new variants are fitted with the new Rolls-Royce Pearl 15 engines, reprofiled wings, upgraded interiors, and flight deck features. The result is a 5,900-nm range for the 5500 and a 6,600-nm range for the 6500.

Michel Ouellette, Bombardier Aviation senior v-p for program management and engineering, said the latest approval "starts a new chapter in our Global family story...the Global 5500 and Global 6500 have a strong future and will earn the appreciation of executives, pilots, and operators around the world."

HK Bellawings initially announced a letter of intent (LOI) for a fleet of up to 18 6500s and 7500s valued at well over $1 billion at EBACE 2018. The aircraft management company later firmed up that LOI with orders for at least four 6500s and six more options. Also, HK Bellawings has firmed up at least six orders for the 7500. The agreements position HK Bellawings to manage the largest fleets of 6500s and 7500s in China. ■

News Briefs

Falcon Deliveries Flat at Dassault; 6X On Track

Dassault Aviation delivered 40 Falcon business jets last year, one fewer than it did in 2018. "While we had guided for 45 Falcon deliveries in 2019, we had to face a difficult market," it said. Falcon net order intake was on par with deliveries, resulting in a 1:1 book-to-bill ratio. This was two fewer than the orders for 42 Falcons that the company logged in 2018, it said. Overall Falcon backlog at the end of last year stood at 53 units, unchanged from a year earlier. Meanwhile, the company continues to make progress on the Falcon 6X program. Final assembly of the first 6X is set for "early 2020," with first flight expected next year and planned entry into service in 2022.

NTSB Returns To Full Board with Graham, Chapman

The National Transportation Safety Board is set to return to its full complement of board members with the recent confirmation of two new members, both of whom have had strong ties to business and general aviation. Michael Graham, who had been director, flight operations safety, security, and standardization for Textron Aviation, was confirmed for terms extending through 2025. Graham formerly chaired the Air Charter Safety Foundation and led the NBAA Safety Committee's Pilot Safety Working Group. Joining him on the board is Tom Chapman, who was confirmed for a term extending through the end of 2023. Chapman most recently was minority counsel for the Senate aviation subcommittee.

Tamarack Progresses On Bankruptcy Emergence

Tamarack Aerospace Group's plan to pay back all debtors as it emerges from reorganization bankruptcy has been approved by the U.S. Bankruptcy Court of the Eastern District of Washington, the Sandpoint, Idaho developer of Atlas active winglets said early last month. With the Chapter 11 disclosure statement approved, Tamarack said it expects to come out of bankruptcy early in the second quarter. EASA and FAA airworthiness directives last June grounded the fleet of 91 Atlas-equipped Citation CJ1s, CJ2s, and CJ3s, leading to Tamarack's bankruptcy protection filing. The grounding orders were later lifted. Tamarack president Jacob Klinginsmith said the company has installed active winglets for 10 customers since the grounding.

Aussie Wallabies Feed On Copter Carrot Bombing

The New South Wales National Parks and Wildlife Service is airdropping carrots and sweet potatoes from helicopters to starving wildlife affected by Australia's record brush fires, now estimated to have killed more than 800 million wild animals. The mission was designed to feed at-risk colonies of endangered brush-tail rock wallabies that have seen large amounts of their habitat destroyed by the fires.

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Editorial

Defending our industry: a little context

by Mark Phelps

"There's a reason why they call it a *business* jet."

That's how Bob Taylor, co-founder of Taylor Guitars, described how he explained to a friend that, no, he could not "go for a ride" in the company's Gulfstream G450. After I interviewed Taylor and co-founder Kurt Listug for a profile in **AIN** sister publication *Business Jet Traveler* a few years ago, NBAA literally made them poster examples of responsible use of a business jet.

Taylor and Listug use the company airplane to maximize Taylor Guitars' bottom line, and that's all. Unfortunately, though, they are the antithesis of what most of the public sees as the typical business jet traveler. They didn't order fancy linens for the cabin; they don't use the airplane to try to impress friends or even clients; and if they ever fly for personal travel (which is practically never), they adhere staunchly to the financial rules outlined by the 2002 Sarbanes-Oxley Act, written to crack down on corporate fraud, including illegal personal use of company aircraft.

To Taylor and Listug, asking to "go for a ride" in the Gulfstream is as illogical as asking if you could stop by the guitar factory and play around with the milling lathes.

I really wish they could be around to explain how business aviation really works when 99 percent of the public reads stories about how private flying is nothing more than a perk for the ultra-elite class. Even *The Economist*, which I usually rely on for unbiased reporting, has published articles decrying business flying as a perk enabling elite billionaires to "save a little time."

The current trend toward near-universal "flight-shaming" has been in place for decades when it comes to flying on privately-operated jets. But I believe that if the average person understood the way business aviation really works, they wouldn't be so quick to condemn. It's all about the optics, and we, as an industry, have not done a good job of keeping that lens in focus.

Whenever a bizav-related dust-up makes the news, as with the infamous case of Detroit's big three automakers flying their corporate jets to Washington to discuss a government bailout, most other end-users go completely dark on the topic until well after the story fades into the next news cycle. That strategy may be effective in the short term, but over time, each such episode adds another, thicker layer to the distorted image of elitism.

Rarely does anyone peek over the rim of the foxhole to defend their use of business aircraft, even when it is clearly demonstrable that the flexibility and efficiency of business flying enables the company to prosper, much as a personal automobile is more efficient than public transportation.

PHOTOS: JEFF BERLIN

Taylor Guitars' Kurt Listug, above, along with co-founder Bob Taylor, make up NBAA's dynamic duo of business aviation end users.

There have been exceptions where steely-nerved business aviation users have spoken out; notably in the 1980s when then-Chrysler president Lee Iacocca, faced with cutting costs to the bone, publicly singled out the company jet as an untouchable resource, vital to completing the recovery. (To appreciate how dire Chrysler's straits were, one running joke at the time was: "The good news: Frank Sinatra has agreed to appear in Chrysler ads for a full year for the token fee of one dollar. The bad news: Chrysler is unable to raise the dollar.")

In another case, billionaire "Oracle of Omaha" Warren Buffett, known for his no-frills lifestyle, famously spoke out in support of the effective business case for corporate jets, changing the name of his Bombardier Challenger from "The Indefensible" to "The Indispensable."

More recently, when Elton John provided a jet to fly England's Prince Harry and his family to visit the singer at his home in Nice, France, the uproar was louder than the crowd at one of his concerts. But the Rocket Man didn't shrink from his actions, tweeting: "Prince Harry's mother, Diana Princess of Wales was one of my dearest friends. I feel a profound sense of obligation to protect Harry and his family from the unnecessary press intrusion that contributed to Diana's untimely death. To maintain a high level of much-needed protection, we provided them with a private jet flight."

Sir Elton added: "To support Prince Harry's commitment to the environment, we ensured their flight was carbon neutral, by making the appropriate contribution to Carbon Footprint."

There *is* a real climate crisis, and objections to gratuitous flying are not without merit. But it's important to grasp the context, and to be able to explain it when the optics of irresponsible jetsetters blow the picture out of proportion. Here are some facts that can help you to speak up when business aviation comes under attack:

According to the Air Transport Action Group (ATAG), air travel of all kinds contributes a mere 2 percent of all fossil fuel-related carbon emissions, compared with 74 percent for surface travel. Business and personal aviation generate only 10 percent of aviation emissions, or 0.2 percent of the 36 gigatons of CO_2 generated annually by the burning of all fossil fuels.

Further, every new generation of jet engines has reduced fuel burn by double-digit percentages. ATAG notes that today's emissions are 80 percent less than the first passenger jets from the 1960s. The motivation for this is not all altruism. Business aviation wants to burn less fuel because it makes flying more affordable.

Putting this in analogous "budget" terms; if our annual carbon "spending" were translated to $1,000, we would be allocating $740 for surface travel and $20 for aviation; and $2 of that $20 would be going to private flying, including business and personal flying. Remember that. ■

News Briefs

Rolls-Royce Plans 'Smooth' Pearl 15 Ramp-up

Rolls-Royce is ready to proceed with production of its new Pearl 15 turbofan that powers Bombardier's new Global 6500 and 5500 twinjets following FAA certification of the engine on December 20. This family also includes the Pearl 700 that will power Gulfstream's new G700. "The Pearl 15 production line has been set up and engines will be assembled in parallel to the BR710s and BR725s in Dahlewitz, Germany," said Rolls-Royce spokesman Stefan Wriege. FAA certification of the Pearl 15, designated as BR700-710D5-21, builds upon certification the engine has already received from EASA and Transport Canada.

Latécoère Buying BBD's Mexico Wiring Systems Biz

Latécoère last month inked a definitive agreement to acquire Bombardier's electrical wiring interconnection system business in Querétaro, Mexico, for $50 million. The deal is expected to close in the first half, following customary approvals. Under a separate long-term agreement, Latécoère will supply electrical wiring systems for all Bombardier Aviation platforms—including Globals, Challengers, and Learjets—from the existing Querétaro facility. The sale will not affect the remainder of Bombardier's operations at its Querétaro site, which will continue to produce major structures for Bombardier aircraft.

FAA Opens Fire Research Facility in Atlantic City

The FAA completed construction and opened a new environmentally friendly indoor fire research center at its Atlantic City, New Jersey facilities to conduct performance tests of a potential replacement for current fire extinguishing foam used at airports. Construction of the new facility started in November 2018 and testing began this month. The $5 million, 2,500-sq-ft building will "contain and collect the byproducts of fire testing chemicals and prevent any contamination of the surrounding area and groundwater, allowing for more frequent and efficient testing."

Collins Providing HUD VR Trainer for FAA

The U.S. FAA selected Collins Aerospace's head-up display (HUD) virtual-reality (VR) training device for use in research on pilot-HUD interface, pilot performance, and crew workload. Its HUD VR device incorporates the Collins Head-up Guidance System (HGS) and enhanced vision system (EVS) to provide an "out-of-the-window" view. "The HUD VR system provides increased access to training, helping pilots get as much time as they need using a HUD on approaches and landing in difficult conditions," said Nick Gibbs, v-p and general manager of simulation and training solutions for Collins Aerospace.

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Part 91 fatalities lead to record high for bizav in 2019

by Gordon Gilbert

An unusually large number of fatalities from accidents involving Part 91 business turboprops and jets thrust the number of people who lost their lives in U.S.-registered turbine business airplanes in 2019 to their highest level in recent history. According to preliminary data gathered by **AIN**, the 77 people who died in 16 accidents in 2019 exceeded the previous high of 76 in 2006.

In the second half of last year, there were no fatal accidents of U.S.-registered business jets, however, the 24 fatalities from accidents in the first half of 2019 was the highest number since the previous record level of 30 deaths in 2014 (all occurring under Part 91 in both years). There were no fatal charter jet accidents by U.S. or non-U.S. registered business jets in 2019.

The number of business jet fatalities last year included the reported 14 passengers and two crew who perished on May 5, 2019, when their N-numbered Challenger 601-3A crashed in Mexico on a flight from Las Vegas. Questions remain as to whether this flight was possibly an illegal charter and exactly how many persons were on board. At press time, Mexico's accident investigation authority has not released an update. Until more official information is known, the accident is being reclassified under Part 91.

Another four accidents involving business jets flying under Part 91 accounted for the 10 remaining business jet fatalities last year. Two died in the May 22 crash of a Cessna Citation SII and a sole-occupant pilot was killed just two days later when their Citation 560 overshot its planned destination and crashed into the sea. On April 12, three were killed in the crash of a Rockwell Sabreliner, and two perished in a March 18 landing accident of an Israel Aircraft Industries Westwind 1124.

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

(2019 vs. 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	**16**	**14**	**14**	**11**	**2**	**0**	**0**	**2**	**0**	**1**	**0**	**0**
Nonfatal accidents	11	10	9	7	2	0	0	2	0	1	0	0
Fatal accidents	5	4	5	4	0	0	0	0	0	0	0	0
Fatalities	24	10	24	10	0	0	0	0	0	0	0	0
Incidents	66	76	49	54	2	1	15	20	0	0	0	1

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	**23**	**16**	**22**	**13**	**0**	**0**	**1**	**2**	**0**	**1**	**0**	**0**
Nonfatal accidents	12	10	12	7	0	0	0	2	0	1	0	0
Fatal accidents	11	6	10	6	0	0	1	0	0	0	0	0
Fatalities	53	16	52	16	0	0	1	0	0	0	0	0
Incidents	50	48	44	38	0	0	5	10	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	**14**	**9**	**8**	**6**	**3**	**1**	**2**	**1**	**1**	**1**
Nonfatal accidents	12	6	6	3	3	1	2	1	1	1
Fatal accidents	2	3	2	3	0	0	0	0	0	0
Fatalities	4	16	4	16	0	0	0	0	0	0
Incidents	16	10	7	6	5	2	0	0	4	2

Business turboprops	Total		Private		Charter		Other*		Unknown	
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Total accidents	**22**	**28**	**5**	**9**	**8**	**9**	**6**	**6**	**3**	**4**
Nonfatal accidents	15	23	3	7	4	8	5	4	3	4
Fatal accidents	7	5	2	2	4	1	1	2	0	0
Fatalities	30	19	10	2	11	5	9	12	0	0
Incidents	10	13	5	3	2	5	2	4	1	1

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

53 Killed in 11 Turboprop Crashes

Historically, fatalities from Part 91 turboprop accidents exceed those from business jets, and last year was no exception. In 2019, 52 people died in 10 Part 91 U.S.-registered turboprop accidents and one death resulted from a sole Part 135 mishap. The Part 135 accident last year was the May 13 midair collision between two tour aircraft that claimed 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. In 2018, six turboprop accidents (all under Part 91) were fatal to 16.

Here were the 10 Part 91 turboprop fatal accidents last year with the number of fatalities shown in parentheses: January 21, Turbine DC-3 (2); January 29, Beechcraft King Air 200 (3); February 28, Piper JetProp DLX (2); June 7, Piper JetProp DLX (4); June 10, Cessna Conquest (1); June 21, Beechcraft King Air 90 (11); June 30, Beechcraft King Air 350 (10); October 3, Daher TBM 700 (5); November 30, Pilatus PC-12 (9); and December 28, Piper Cheyenne (5).

The NTSB classified four of the accidents as personal flights, two as business flights, and one flight each as positioning, ambulance, skydiving, and corporate/executive.

In 2019, two private non-U.S. registered business jets suffered fatal accidents in which four persons died. In 2018, three private jet accidents resulted in 16 deaths. Chartered jets recorded no fatal crashes. Nonfatal accidents doubled year over year from six to 12. Meanwhile, seven accidents in 2019 involving non-N-numbered turboprops were fatal to 30, compared to 19 killed in five accidents in 2018. ■

NEWS note

SmartSky Networks has received an additional $25 million from funds managed by the Global Credit Opportunities team at BlackRock after completing a network deployment milestone. Global Credit Opportunities previously committed to a $75 million credit facility, with $50 million drawn initially and the final $25 million contingent on "substantial progress on the nationwide network rollout," which SmartSky said it achieved in November.

SmartSky is now predicting commercial launch of its network over the continental U.S. in the second quarter, a six-month slip from the company's most recent previous estimate. When announced in October 2014, the network was expected to be available for both business aviation and airline use in 2016. ■

News Briefs

Embraer Kicks Off Flexjet Order with Praetor 500

Flexjet took delivery of an Embraer Praetor 500 business jet in late December, marking the first delivery from the fractional operator's $1.4 billion order for a mix of Praetor 500/600s and Phenom 300Es announced at NBAA-BACE 2019. Compared with the Legacy 450, the Praetor 500 has larger cabin seats, better fuel efficiency, and longer range. In addition to purchasing new Praetor 500s, Flexjet also will convert its Legacy 450 fleet into Praetor 500s under an FAA-approved modification.

Gulfstream Reaches New G550 Milestone

Gulfstream Aerospace recently handed over its 600th G550 since the large-cabin, ultra-long-range twinjet entered service in 2003. "The G550 has solidified its place as one of the most dependable business jets available," said Gulfstream president Mark Burns. More than 20 percent of Gulfstream aircraft in service are 550s, "proving its reputation as an established and versatile aircraft for business aviation." Powered by a pair of Rolls-Royce BR710 engines, the G550 can fly 6,750 nm at Mach 0.80. It has also seen extensive use outside of luxury passenger transport, including aeromedical evacuation, head-of-state transport, atmospheric research, maritime patrol, and airborne early warning.

FAA's Privacy Program for Aircraft Goes Live

The FAA's Privacy ICAO Address (PIA) program went live in late December, providing operators the means to shield their movements from publicly available flight tracking. Separate from the Limiting Aircraft Data Displayed (LADD) program that was formerly known as the Block Aircraft Registration Request, PIA is designed to address privacy concerns with the traceability that comes with mode-S, key equipment used for ADS-B. Mode-S transponders right now emit the aircraft's ICAO code enabling people to track aircraft. For now, the FAA is administering the PIA program, assigning an alternate ICAO address that is decoupled from the aircraft registration number at operator request.

Piaggio Wins Order for Nine Avanti Evos, Retrofits

Piaggio Aerospace has won a nearly $221 million (€200 million) contract from the Italian Ministry of Defense for nine Avanti Evos and the retrofit of more than 19 aircraft. Under the aircraft order, Piaggio will deliver five of the twin turboprops in a passenger and ambulance configuration and four for control of the country's navigation and radio systems including radar, ILS, and VOR. It also will retrofit the first Avanti used by the Italian Armed Forces. The same agreement also calls for the defense ministry to finalize a commitment to retrofit 18 Avantis used by the Carabinieri, army, navy, and air force.

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Hyundai Motor Company is developing its S-A1 eVTOL aircraft for the Uber Air rideshare air-taxi program.

Hyundai and Uber announce eVTOL air-taxi partnership

by Charles Alcock

Hyundai Motor Company and Uber are working together to develop a new electric vertical takeoff and landing (eVTOL) aircraft to be used for rideshare air-taxi service. The announcement was made on the eve of this year's Consumer Electronics Show (CES) in Las Vegas last month, making the South Korean automotive group the eighth prospective eVTOL aircraft manufacturer selected by Uber to support its planned Uber Air rideshare service.

At CES, Hyundai displayed a scale model of a "personal air vehicle" designated the S-A1. The all-electric aircraft is projected to offer a range of 60 miles, speeds of up to 180 mph, and a cruising altitude of between 1,000 and 2,000 feet.

Hyundai has yet to announce a timeline for certifying the new aircraft and it is unclear when it expects to fly a full-scale prototype. Uber has said it wants to start flight demonstrations this year with aircraft produced by its partners and be ready to start commercial air-taxi service in 2023.

The eVTOL, which features four sets of rotors for vertical lift and four propellers for cruise flight, will seat four passengers. It will initially have a pilot on board, but the plan is for the S-A1 eventually to be flown autonomously. According to Hyundai, the aircraft's batteries will need between five and seven minutes to recharge.

Uber said Hyundai will be able to produce aircraft on a far greater and more cost-effective scale than its other partners. These include experienced aerospace companies such as Boeing (through its Aurora Flight Sciences subsidiary), Embraer, Bell, and Pipistrel Aircraft, as well as three startups: Karem Aircraft, Joby Aviation, and Jaunt Air Mobility.

"Hyundai is our first vehicle partner with experience of manufacturing passenger cars on a global scale," said Uber Elevate head Eric Allison. "We believe Hyundai has the potential to build Uber Air vehicles at rates unseen in the current aerospace industry, producing high-quality, reliable aircraft at high volumes to drive down passenger costs per trip. Combining Hyundai's manufacturing muscle with Uber's technology platform represents a giant leap forward for launching a vibrant air-taxi network in the coming years."

Jaiwon Shin, executive v-p and head of Hyundai's urban air mobility division, said its aircraft will "transform the concept of urban transportation." However, Hyundai has not outlined how many engineers it has working on the new program and what experience they have in developing aircraft.

At CES, Hyundai also unveiled its Purpose Built Vehicle (PBV), an "eco-friendly" ground-based mobility solution, and the Hub, which it said will be used for transfers between the PBV and the new Hyundai eVTOL. ■

HAI names senior FAA safety exec Viola as CEO

The Helicopter Association International (HAI) has selected James Viola to succeed Matthew Zuccaro as president and CEO, bringing on board a long-time government and military professional with deep aviation safety and helicopter experience.

Viola joined HAI on January 16 after spending more than a decade with the FAA, most recently as director of General Aviation Safety Assurance. In that role, he oversaw 78 Flight Standards District Offices and 2,500 employees across the U.S., responsible for safety oversight activities involving the general aviation community. He helped launch the U.S. Helicopter Safety Team (USHST) as the initial government co-chair.

A former U.S. Army special operations MH-6 and MH-47 helicopter pilot, Viola also gained experience managing large operations during his military service. His final assignment was division chief, Army Aviation for Current Operations, steering the aviation unit station, including the prioritization and optimization of 4,200 army aircraft, 100 manned units, and the combat rotation plan to Iraq and Afghanistan.

HAI named Viola to the position following a search process that began last summer, when Zuccaro announced his plans to retire from the association he has led since November 2005. "When Matt announced his retirement, the board knew that replacing him would be no easy task. We had to find a dynamic, innovative CEO who has both vision and passion," said HAI board chair Jan Becker. "We sought someone able to take up the challenge of leading HAI forward to meet the needs of a globally changing industry. With Jim, we found that leader, as well as one who understands and supports HAI's safety values."

Viola shares HAI's vision for member service initiatives, including a further international outreach, and reflects the changes occurring through vertical-lift aviation such as increasing use of unmanned aircraft systems, the association said.

"I am grateful to the board of directors for selecting me to take up Matt's role in promoting the international vertical lift industry," Viola said. "Matt's unwavering advocacy for safe flight of all kinds made him a pleasure to work with while I was with the FAA. I look forward to continuing his legacy of HAI advocacy for safety."

James Viola will succeed Matthew Zuccaro as president and CEO of HAI.

Zuccaro called Viola the ideal person to lead the association. "You've got a Chinook driver who understands the safety and regulatory issues facing our industry, as well as the capacity to effect change where and when it is needed. I am proud to leave this organization in Jim's hands."

An airline transport pilot with ratings for helicopters and fixed-wing aircraft, Viola has accumulated more than 6,000 flight hours, 1,100 with night-vision goggles. He holds three master's degrees and is a member of the Army Aviation Association of America, the Military Officers Association of America, the Veterans of Foreign Wars, the American Legion, and the Aircraft Owners and Pilots Association. **K.L.**

News Briefs

Part 135 Survey To Help Orgs in Flight, Duty Rewrite

Business aviation organizations, including NBAA and NATA, have just completed surveying Part 135 organizations to get a more complete picture of the evolving community as work gets underway for a potential rewrite of pilot rest and duty requirements. At the behest of Congress, the FAA last summer formally established a Part 135 Pilot Rest and Duty Rules Aviation Rulemaking Committee (ARC) to review current regulations and make recommendations on any necessary changes. Congress stipulated that the ARC comprises representatives of industry, labor (both from Part 135 and 91K), and safety experts, along with FAA officials. The ARC kicked off in September and has already held its first couple of meetings. Recommendations from the ARC are due within 16 months of the first meeting, but the charter of the group is to last 24 months.

Frequentis Powers South America's First Remote Tower

The first remote ATC tower in South America, provided by Frequentis, was recently inaugurated at the Santa Cruz military air base in Rio de Janeiro. The setup includes 16 high-resolution cameras located around the air base that are linked to a wall of high-definition monitors, providing controllers with a panoramic view and the ability to zoom the cameras up to 24 times. Frequentis's technology includes automated object detection and camera tracking based on image recognition. The experience gained will be used to develop standards for broader implementation.

FAA Issues New Policy Guidelines on Charters

"Illegal air charter operations pose a serious safety hazard to the traveling public, and the FAA works aggressively to identify and shut down rogue operators," proclaimed the agency in one of several new guidance documents intended for charter operators, brokers, and passengers. Essentially, the agency's main point states "that pilots who are paid to fly passengers generally can't just hold the required commercial or airline transport pilot certificate, they also must be employed by the company operating the flight, which must hold a certificate issued under FAR Part 119 [certification of commercial operators]. Or the pilots must themselves hold a Part 119 certificate."

Charter Operator GrandView Opening New Base

GrandView Aviation has opened a new base at Chicago Executive Airport. The new base is the Maryland-based operator's third and is being served by an Embraer Phenom 300. The Part 135 charter operator has a fleet of five Phenom 300s (soon to be six) and a Sikorsky S-76D.

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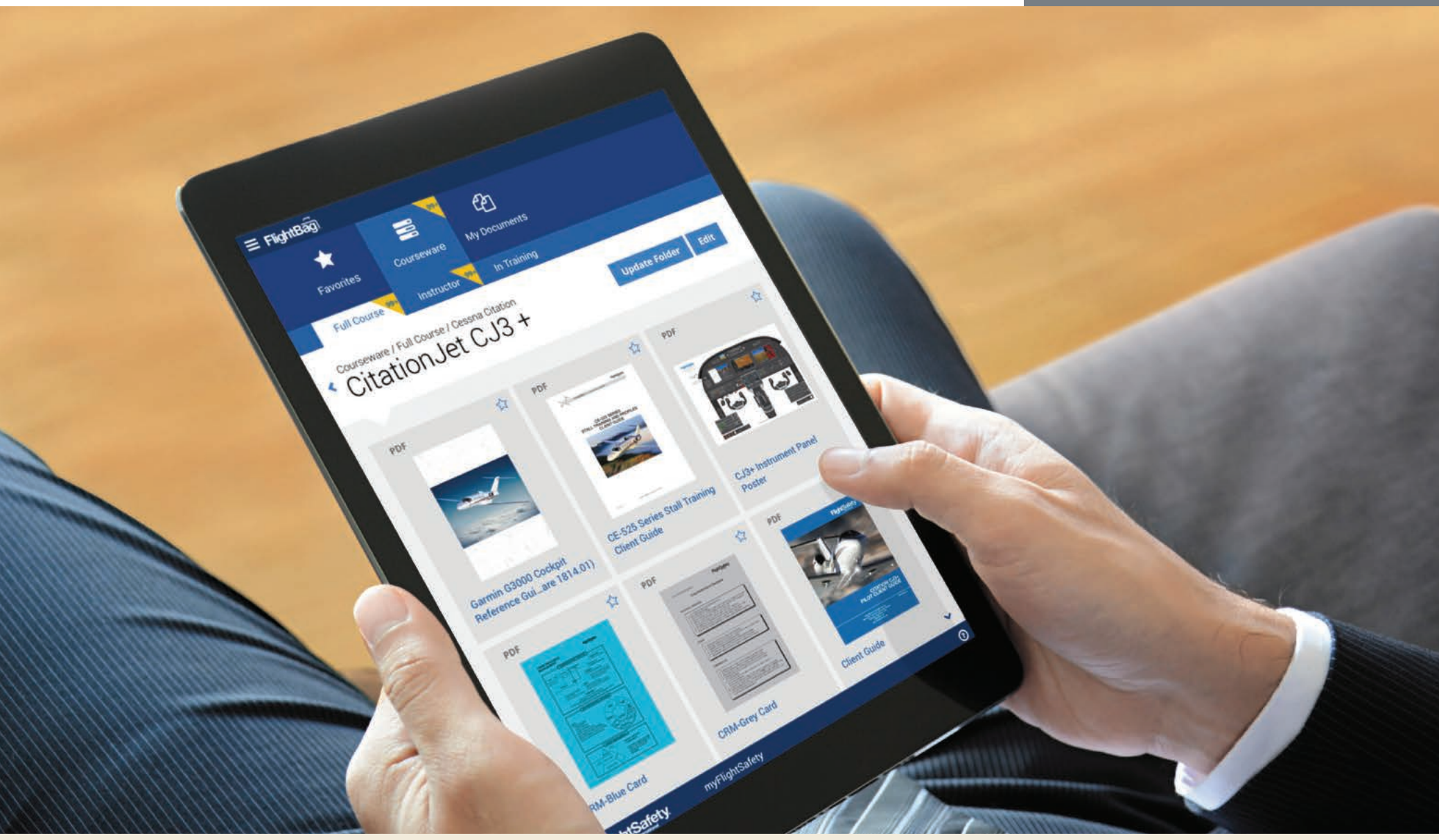

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Ukraine International Airlines demands full investigation into Iran 737 shootdown

by Reuben F. Johnson and Kerry Lynch

In the wake of last month's downing of Ukraine International Airlines Flight PS752 in Iranian airspace, the Flight Safety Foundation (FSF) issued a call for all countries to adhere to guidance surrounding civil aircraft flight through conflict zones. Meanwhile, Ukraine International Airlines (UIA) has demanded that the Iranian government fully explain how its Revolutionary Guard Aerospace Force shot down the UIA Boeing 737-800 on January 8, killing all 176 passengers and crew on board.

"The shooting down of a civilian aircraft operating in civilian airspace, whether mistaken or not, represents a flagrant violation of international law and an irresponsible attack on the safety of international civil aviation. Under established International Civil Aviation Organization (ICAO) guidance, it is the responsibility of the state civilian aviation agency to close its airspace and provide timely risk information to airlines during military conflict," said FSF president and CEO Hassan Shahidi. "Iran's civilian authority appears not to have followed the guidance, which would have prevented this tragic outcome."

FSF noted the Iranian government's claim the attack was unintentional, saying the aircraft was mistaken for a cruise missile during the heightened tensions.

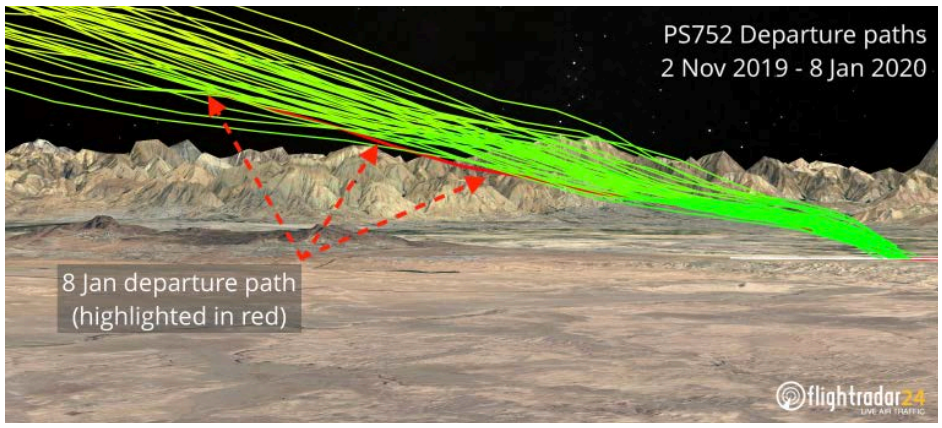
FSF pointed to other military conflicts resulting in similar tragic outcomes, including the U.S. Navy's mistaken downing of Iran Air Flight 655 over the Persian Gulf that killed 290 people in 1988. Following the shoot-down of Malaysia Airlines Flight MH17 in 2014 while flying over Ukraine, an international task force on civilian aircraft operating in conflict zones convened and led to ICAO in 2015 clarifying guidance on roles and responsibilities for states, airlines, air navigation service providers, and other stakeholders during times of conflict to enable information sharing that could maintain safe operations. "The Flight 752 tragedy underscores the importance of adherence to this guidance by every stakeholder," FSF said.

The foundation added the international community must reaffirm its commitment to protecting civilian aircraft.

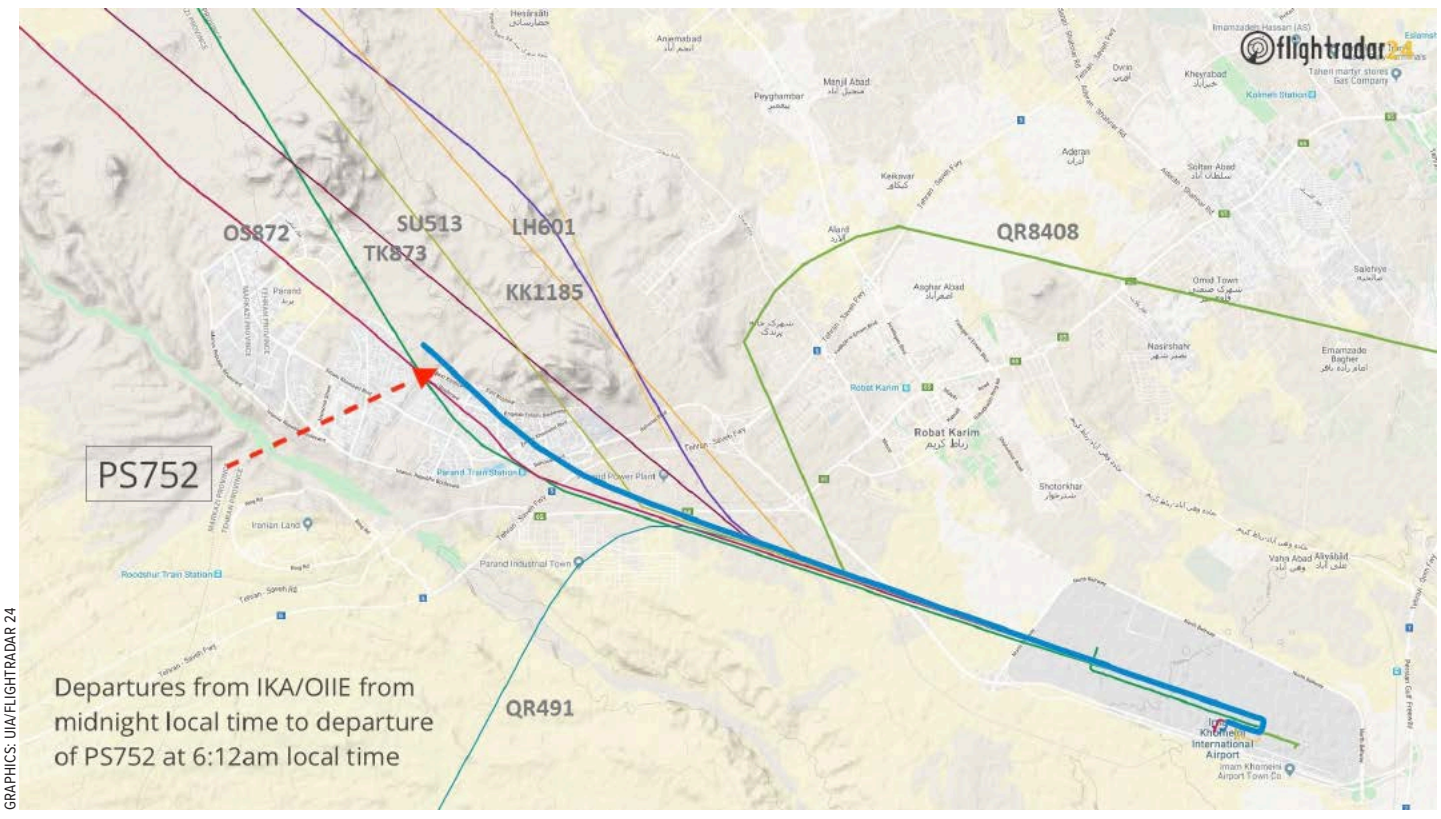
At a press conference in Kyiv a few hours after Iran admitted responsibility for the attack, the airline stated that flight PS752 had not deviated from its assigned flight path and that its pilots had been in contact with air traffic controllers until just before the aircraft was destroyed by a surface-to-air missile.

Iran's admission of responsibility came just a day after officials had insisted it was "scientifically impossible" for the aircraft to have been shot down and that technical failures on the 737 were to blame for the accident. However, on January 11, Brigadier-General Amir-Ali Hajizadehh, head of the Revolutionary Guard's Aerospace Force, indicated that before the shoot-down his personnel had asked for commercial flights in Iran to be suspended and that this had been refused by both Iran's military leaders and the country's civil aviation authorities.

At the press conference, UIA president Yevhenii Dykhne and flight operations vice president Igor Sosnovsky, showed reporters flight tracking data to support their insistence that their aircraft had not deviated from its assigned flight path and that the same course had been flown by other aircraft departing Tehran's Imam Khomeini Airport. Some reports out of Iran had suggested that PS752's pilots flew off track towards a Revolutionary Guard missile base.



Ukraine International Airlines presented FlightRadar 24 data to show that flight PS752 had followed the same flight path of other departures from Tehran's Imam Khomeini Airport on the day it was shot down by Iranian missiles.



GRAPHICS: UIA/FLIGHTRADAR 24

Dykhne stressed that prior to Iran's confession of having shot down the aircraft, the airline had conducted an exhaustive set of computer modeling exercises and concluded that the cause of the crash could not be explained by any failure in the aircraft or error by its crew. The UIA executives said that Iran's government must fully explain how the shoot-down happened. They demanded full cooperation with Ukrainian and other international aviation experts on site in Iran to complete a full and transparent inquiry.

"I am with [Ukrainian] President Volodymyr Zelenskiy when I demand to know what happened in this incident and a full accounting that the entire responsibility for this incident is Iran's," said Dykhne. The Ukrainian president, who spoke with Iranian President Hassan Rouhani, said, "We expect Iran…to bring the guilty to the courts," calling also for the payment of compensation and the return of the remains of the flight crew and other Ukrainians who were on board.

Rouhani stated that Tehran "deeply regrets this disastrous mistake" and, in another reversal of its initial position, has invited the U.S., Ukraine, Canada, and others to join the crash investigation. The Boeing airliner, which had been delivered new to the Ukrainian carrier in 2016, was brought down by a Russian-made Tor (SA-15) air defense battery. However, the surface-to-air missile unit belonged not to the regular Iranian military's air defense command but to the Iranian Revolutionary Guard Corps. The unit in question had been on high alert following earlier ballistic missile attacks by Iran on U.S. military bases in Iraq.

Brigadier-General Hajizadeh's admission that his forces had asked for civil airspace to be closed brought denunciations from Sosnovsky, who stated that Tehran should have closed the airport to all traffic until the situation in the region returned to normal. "It's absolutely irresponsible," he said, and accused the Iranians of failing to protect ordinary citizens while "playing at war."

"They were obligated to close the airport. Obligated! Then shoot as much as you like," he continued.

The two airline chiefs declined to specify either the form or value of the compensation that they believe both the families and the air carrier are entitled to. "We are in the middle of a legal process at this point and cannot comment on these particulars," said Dykhne. On January 10, **AIN** asked the Civil Aviation Organization of the Islamic Republic of Iran to answer several questions about the PS752 accident. It had yet to respond at press time. ■

OJETS

ENSURING SUCCESSFUL CHARTERS

IN THE ASIA-PACIFIC REGION

Businesspeople throughout Asia-Pacific are awakening to the benefits of air charter—not simply for meeting travel needs but to maximize productivity, create opportunities, and enjoy time savings and convenience that no airline experience can offer.

"Customers first come to charter when commercial flights can't meet their schedules," said Keith Tsang of Singapore-based OJets, which provides air charter service worldwide. "Then they see they can carry eight or nine passengers comfortably, have meetings onboard with top executives, and make business deals in one day that would take three to do flying commercially—and they come back for more."

Travelers eager to make the most of precious leisure time are also turning to charter. "Fiji, the Maldives, ski resorts—destinations change depending on the season," said Tsang, OJets' vice president of sales for Asia-Pacific.

The air charter concept is simple: instead of flying according to airlines' routes and schedules, customers hire a private aircraft to take them exactly where and when they want to go. The destinations are often hours from the nearest airport served by an airline, and private aviation's flexibility allows travelers to conduct multiple meetings in far-flung cities in a single day if needed.

REGIONAL CHARTER CHALLENGES

But charter in Asia-Pacific is "not mature," said Tsang, and the more customers know about regional challenges, and about the differences among charter companies, the more they can take advantage of its benefits.

Only about 300 business jets for charter are based in Asia-Pacific, according to Asian Sky Group, and the majority are available only when their owners aren't using them, which can limit aircraft choice. Consequently, jets often fly long distances to pick up charter customers, and these so-called repositioning flights can add significantly to the cost of a charter trip. Additionally, on-the-ground support for private aircraft—dedicated terminals with customs facilities, fueling and catering services, even landing and parking slots—are scarce, while myriad national jurisdictions, overflight rules, and other regulations make Asia-Pacific airspace among the world's most complex. These all create challenges to delivering consistent, high-quality charter service.

> **"Customers should look for providers who understand the unique dynamics of the Asia-Pacific market."**
>
> **Keith Tsang**
> OJets' vice president of sales for Asia-Pacific

"You need a lot of experience to operate in this region," summed up Tsang. "Customers should look for providers who understand the unique dynamics of the Asia-Pacific market."

CHOICES IN PROVIDERS AND AIRCRAFT

One important distinction to recognize among charter providers: most are brokerages that simply arrange trips on behalf of clients with charter operators—the companies that manage and control the aircraft. When booking a flight, brokers must wait for operators to OK aircraft availability and trip details before they can complete the booking, which can create uncertainties and delays.

Meanwhile, most charter operators manage but don't own the aircraft they employ and must get approval for any charter flight from the airplane's owner before confirming a trip, which can also slow the booking process.

In contrast, OJets owns all the airplanes in its fleet, which is operated by Elit'Avia Malta Limited. This allows immediate bookings and confirmation—and a consistent, high-quality travel experience.

Aircraft used for charter can vary widely in quality. "The jet's age, interior appointments, and entertainment and connectivity systems are all important parts of a charter flight," Tsang noted. Does the aircraft provided have enough room to fit your group comfortably? Does it have enough range to reach the destination nonstop? What about a private stateroom with bed for transpacific flights? Is the cabin in like-new condition, or does it need refurbishment?

OJets' fleet consists of late-model, long-range Bombardier Global 5000 and 6000 and Challenger 650 jets. These aircraft, offering a selection of cabin configurations and accommodating up to 14 passengers, can take travelers anywhere in the region and connect major cities in Asia-Pacific with Europe, the U.S., or Africa nonstop. Moreover, OJets operates a "floating" fleet—meaning the jets have no home base they must travel from or return to—which reduces repositioning fees.

The onboard charter experience—the service by cabin attendants and flight crews, quality of catering, amenities, and attentiveness to customers' requests and needs—can vary as much as the aircraft. That's why charter customers should consider one additional regional distinction: Asia-Pacific's hospitality and service culture, which forms the core of OJets' operating philosophy. These principles are symbolized by the ensō, or "O"—Asian expression of elegance, strength, and infinite possibility—on the tail fin of its jets. The "enso" is also an expression of OJets' dedication to providing the pinnacle of service excellence and an unparalleled luxury experience.

A dedication to service underpins the rigorous standards set for OJets' pilots and the hospitality training its multilingual cabin attendants receive.

Recognizing the importance of regional nuances within Asia-Pacific, OJets has built a team that speaks more than a score of languages among them, ensuring charter customers have a cabin attendant who really understands them and their preferences.

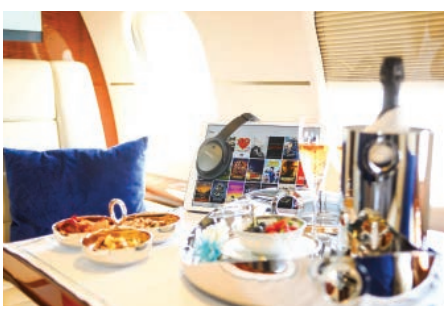
CONSIDERING CHARTER COSTS

If you travel only occasionally, on-demand charter allows you to book your flights one at a time, with no further commitment. Alternatively, frequent travelers can take advantage of block-hour or jet card-type programs, which guarantee access to an aircraft as needed for a set number of prepaid flight hours. OJets provides both on-demand and block-hour programs, tailored to fit customers' needs, schedules, and preferred routes for travel worldwide.

Cost is a key consideration for any flight. A charter company, after fielding a request for an ad hoc charter trip, will provide an estimated price quote before confirming the booking. The cost is based primarily on the aircraft's hourly rental rate multiplied by the flight time. But charter isn't a product to shop primarily by price. The safety systems, training, maintenance, capital investments, and other expenses of providing high-quality charter service add up and are typically well worth the money for the security and reliability top companies deliver.

In addition to the fee for the aircraft, many other charter expenses may be incurred, depending on the provider, such as for premium catering or fuel surcharges. "Those items can significantly inflate costs above the initial quote," said Tsang, so customers should discuss potential additional fees, cancellation policies, and other payment issues before confirming the flight.

OJets uses a simple method to ensure that customers aren't surprised by the final bill: its charter quotes provide an all-inclusive price (though individual costs are fully listed); and should the customer book the trip, that's the final price charged. Onboard Wi-Fi (a rarity in Asia-Pacific) and premium catering are standard.



ASIA-PACIFIC'S STANDARD OF EXCELLENCE

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MNG Jet: employee acted alone in arranging escape flights for fugitive Ghosn

by Charles Alcock

As part of the probe into indicted auto executive Carlos Ghosn's daring escape from Japan last month, Turkish police apparently continue to hold four pilots, named as Turkish nationals and including two identified in an article by Forbes as Noyan Pasin and Bahri Kutlu Somek. Also still being held is an employee of Turkish charter provider MNG Jet as part of their investigation into how two of the Istanbul-based operator's aircraft were used by the automotive executive to escape from Japan to Lebanon. According to MNG, police also impounded the two aircraft used for flights from Osaka to Istanbul (a Bombardier Global 6000, tail number TC-TSR) and from Istanbul to Beirut (a Bombardier Challenger 300, tail number TC-RZA).

Meanwhile, Japanese justice minister Masako Mori announced an investigation into how Ghosn had been able to leave the country while subject to bail restrictions and having surrendered his three passports to police. At a press conference, she further said immigration procedures are likely to be tightened at Japanese airports.

Interpol issued a "red notice" to Lebanese police, asking them to arrest Ghosn, who was released on $8.9 million in bail in April 2019 and required by a Japanese court to remain in his Tokyo home. He holds French, Brazilian, and Lebanese citizenships, and had supposedly surrendered all his passports to Japanese police.

According to MNG Jet, its crew used InterAviation Japan to provide handling for the Global 6000 at Osaka Kansai International Airport. Japan's NHK news outlet quoted unnamed aviation industry sources in reporting that two U.S. citizens were on board the flight, in addition to two Turkish pilots and a flight attendant. This report also said two large boxes designed to carry large audio equipment used by musicians were among the baggage loaded onto the aircraft, but none of these details have been officially confirmed.

On January 3, MNG said it had filed a criminal complaint against an employee who it alleged had acted alone in falsifying records for the two charter flights. In response to questions from **AIN**, MNG issued this statement: "Following the filing of a criminal complaint by MNG Jet, against a former employee and against whoever cooperated on this illegal activity, the Turkish authorities have opened an official inquiry and have arrested the employee, as well as the four pilots. The two planes are being held in Istanbul by the police. The criminal investigation is ongoing. We are not authorized to comment on its developments, unfortunately. But we will keep on fighting for justice as we are a victim of this fraudulent scheme."

BERTEL SCHMITT

MNG Jet said company management was unaware that the Bombardier Global 6000, left, and Challenger 300 on its certificate were chartered to enable former automotive executive Carlos Ghosn, top, to escape from Japan, where he is facing charges of financial misconduct.

Turkish newspaper Hürriyet reported on January 4 that Okan Kösemen, who it described as an operations manager with MNG Jet, was among the five people arrested by police on charges of migrant smuggling. According to this report, Kösemen has told investigators that an unnamed acquaintance from Beirut had pressured him into assisting in Ghosn's escape. LinkedIn shows a profile for Okan Kösemen, in which he is described as MNG's "operation and charter sales manager."

On January 4, a Turkish interior ministry spokesman confirmed that police had detained seven people, including four pilots, two employees with an unnamed handling company, and an employee of a cargo company. The most recent information from MNG suggests that the latter three may have been released and that the arrest of a fifth MNG employee is a further development.

InterAviation Japan provides private aviation handling at five airports, including Tokyo Narita and Haneda; Kansai; Chitose; and Chubu. In a statement to **AIN**, the company said it had not had "any involvement with the unlawful activities." It said it provides "ground services" for aircraft operators, but does not own or manage the airport facilities used for private flights.

A spokesperson for InterAviation told **AIN** that the request to provide handling had not come directly from MNG, but from an unnamed "third-party trip coordinator" that it said had made the same request to several handling agents in Japan. The company said that it was able to obtain the required permit for the flight from Japanese authorities before the other handling agents.

"Aviation security checks are done by a contracted, licensed, and properly trained security company under the guidance from the airport authority, as well as the civil aviation bureau," said the statement from InterAviation. "We don't provide any security checks. Customs and immigration examine inbound and outbound passengers and their baggage, which is not the business of the handling agent."

According to MNG Jet general manager Can Sasmaz, the company "leased" the two aircraft to two different clients—one for a trip from Dubai to Osaka in Japan and then from Osaka to Istanbul, and the second for a flight from Istanbul to Beirut. A company spokesman confirmed to **AIN** that, as previously reported, the aircraft used for the flights were Global 6000 TC-TSR and Challenger 300 TC-RZA.

MNG said that it does not own these aircraft but was operating them under a management contract. It stated that the two "leases" did not appear to be connected to each other and that Ghosn's name did not appear in any official documentation associated with them. It subsequently clarified that the flights were conducted as charter bookings.

"After having learned through the media that the leasing was benefitting Mr. Ghosn and not the officially declared passengers, MNG Jet launched an internal inquiry and filed a criminal complaint in Turkey on Wednesday, 1 January 2020, to prosecute those who were involved," Sasmaz said in the written statement. "One employee of the company, who is under investigation by the authorities, has admitted having falsified the records. He confirmed that he acted in his individual capacity, without the knowledge or the authorization of the management of MNG Jet. MNG Jet is proactively cooperating with the authorities and hopes that the people who illegally used and/or facilitated the use of the services of the company will be duly prosecuted."

In addition to aircraft management and charter, MNG also provides a wide range of maintenance services for business aircraft. The company is a member of the European Business Aviation Association.

The current ownership of the two aircraft used for Ghosn's escape is unclear. The Global 6000 appears to have been formerly owned by the Qatar government's Amiri Flight before it joined the Turkish aircraft register in 2018. The Challenger 300 entered the Turkish register in 2012 and was then shown to be owned by Turkish leasing group Halk Finansal Kiralama AS. According to MNG, both flights were handled at Ataturk Airport by Havas Celebi. MNG declined to comment to **AIN** on the current ownership of the aircraft. It also would not confirm how many passengers had been on the flights concerned, but did say that it had not previously provided any services to Ghosn.

Analysis of flights leaving Japan on the evening of December 29 highlighted the Bombardier Global TC-TSR departed Osaka Kansai Airport at 11:10 p.m. local time and arrived at Istanbul Ataturk Airport at 5:26 a.m. local time. At 6:30 a.m., Bombardier Challenger TC-RZA departed Istanbul, arriving in Beirut at 6:14 a.m. local time. Japanese officials have indicated that Ghosn had not used any of his passports to leave the country. ■

OpenAirplane and FlyOtto close doors in December

by Matt Thurber

Two companies—OpenAirplane and FlyOtto—that were designed to simplify general aviation (GA) aircraft rental and charter booking ceased operating in late December. The companies were founded by Rod Rakic and Adam Fast, with OpenAirplane launching in 2013, followed by FlyOtto in late 2016.

OpenAirplane solved the perennial GA problem, where pilots who fly rental aircraft avoid doing so because of the onerous checkout requirements at rental outlets. With OpenAirplane, pilots could qualify to rent from any member company after completing a universal checkout. The system allowed pilots to rent the same aircraft model at participating rental firms, anywhere in the U.S., simply by scheduling via the OpenAirplane website, showing up at the agreed time, and showing identification documentation. No further in-aircraft flight check was required. OpenAirplane cost nothing for pilots; rental outfits paid a small percentage of the rental to OpenAirplane.

FlyOtto was a unique transparent charter marketplace that sought to change the way brokers vie to sell a trip to a client at the lowest possible cost. FlyOtto was free to charter clients and for operators to join, and once a trip was confirmed, the operator would pay a fee to FlyOtto. The FlyOtto website was simple and easy to understand, with no membership, and all a client had to do was fill out the departure and destination locations to get a list of available trips.

OpenAirplane was designed to help pilots fly more, by having access to a fleet of 457 aircraft at 109 operators in 30 states without needing a checkout flight for each new rental location. For a pilot who couldn't access the airplane they normally fly, OpenAirplane offered a simple alternative. Of the 19,000 pilots who signed up with OpenAirplane, 67 percent lived within a reasonable distance of the nearest OpenAirplane operator, according to Rakic. For pilots who travel and want to rent an airplane near the destination, OpenAirplane provided an attractive option.

Unfortunately, Rakic lamented, "There weren't enough people like me who wanted to use the service. People definitely liked the idea. The disconnect was not in the service," he said. "It ended up being the volume of utilization was not sustainable. It's hard to get pilots off the couch into the cockpit. If we were able to monetize good vibes, it would have been sustainable."

FlyOtto likewise didn't reach the volume of business needed to continue and prosper. Rakic and Fast didn't just rely on revenue from OpenAirplane and FlyOtto but intended for both to grow much larger. "We bootstrapped it for three years," Rakic said, but they realized they would need more funding to launch FlyOtto. In 2015 they raised a seed round of $500,000, then those investors came back for a bridge round of $800,000 in 2017. "We couldn't have done it without them," Rakic said gratefully.

All of the money, including funds from some surveys conducted for large aviation companies, kept the lights on, he said, "but eventually we got to the point—am I tilting at windmills?" His company spent two years trying to raise additional money in a Series A fundraising, pitching it to investors in New York, Dubai, and San Francisco, with a solid plan for customer acquisition costs and driving growth. "But there is just a point where you run out of airspeed, altitude, and ideas," he said.

Rakic remains puzzled about the lack of interest on both the financial and demand side of the business, especially with FlyOtto, given the investment of $10 million by Airbus in its Blade charter brokerage and charter broker BlackBird's raising of $10 million from venture capitalists. (BlackBird also offered a low-cost, Part 91 non-charter option to its customers, which likely competed with certified charter operators. *See article on page 22.*)

Decision To Close

When it came time to make the difficult decision to shut down OpenAirplane and FlyOtto, Rakic was prepared. In the email to customers explaining why the company was shutting down, Rakic wrote: "From the beginning, we designed OpenAirplane to be failsafe. This timing will give us time to process payments, and provide for the orderly shutdown of the platform. We've always done our best to ensure vendors got paid before we did. We built that into our system from day one. We're taking care to protect everyone's data, just as we have since we started back in 2012."

"We're not going bankrupt," he told **AIN**, "and not leaving anyone holding the bag." He didn't want to be the proprietor of yet another aviation company that left a bad taste in customers' mouths. "There are so many tales of woe how people were screwed by aviation companies when they closed suddenly."

Although, Rakic, said, "I'm deeply sad that the ride is ending," he remains proud of having "built something that people

› continues on page 25

Full-throttle opinion from former NTSB member John Goglia

Why does Indonesia rate Category 1?

I know the FAA is facing a lot of harsh criticism since the two Boeing 737 Max accidents less than six months apart: the Lion Air Flight 610 crash in Indonesia in October 2018 and the Ethiopian Airlines Flight 302 crash in March 2019. But those criticisms have focused on the FAA's certification of the Boeing 737 Max and its oversight of Boeing. Some of that criticism is justified, in particular, allowing the aircraft to be certified with just one angle-of-attack (AOA) sensor for its MCAS supplemental flight control software system. One sensor for a critical component is a design failure that Boeing and the FAA should never have allowed. But there are more questions that the FAA needs to answer as a result of these accidents and their aftermath.

While Boeing and the FAA made their share of mistakes in certifying the 737 Max, my review of the available public information shines an even harsher light on Lion Air and its operation of revenue service flying passengers. And it begs the question, why has the Indonesian government failed to take strong action in light of the glaring maintenance and other errors revealed by its own accident report? And, if the accident report wasn't enough, a *New York Times* investigation of the airline should be. If reporters could find these problems, one would hope the government agency entrusted with ensuring aviation safety in Indonesia could, as well.

Pre-existing Issues

First, the accident report prepared by the Komite Nasional Keselamatan Transportasi (KNKT)—the Indonesian equivalent of the U.S. NTSB—contains information that should call into question Lion Air's qualifications to fly and Indonesia's oversight of the airline. Most troubling for me is the history of maintenance problems before the 737 crashed on October 29. Those problems, and the failures to properly document or correct them, indicate to me that the crew on the fateful flight was assigned an unairworthy aircraft. And no crew should have ever been given that aircraft to fly, let alone a scheduled airline flight with paying passengers.

According to the accident report prepared by the Indonesian government, the maintenance issues with the AOA sensor began almost a month before the accident. Thereafter, on multiple flights, there were indications of problems with this sensor, as well as with the flight control system. Maintenance actions based on these reported problems were incomplete, inadequate, or non-existent. For example, in one case where maintenance was unable to rectify the problems, the crew was told to just fly the aircraft—with paying passengers—to the next station. It is shocking that maintenance asked the crew to do this and even more shocking that the crew did this.

In addition to the problems noted in the accident report, a subsequent investigative report by the *NY Times* found "based on interviews with dozens of officials and airline employees, including pilots and members of maintenance teams...that Lion Air has a track record of working its pilots to the point of exhaustion, faking pilot training certification and forcing pilots to fly planes they worried were unsafe, including the plane that crashed." The *NY Times* investigation further found that "just as the company does not seem pressed to adopt changes from the report...Indonesian officials were quick to defend a carrier that has had 11 accidents and incidents since its founding in 1999." The report concluded, "after a crash, a company and a government deny problems, deflect blame, and drag their feet on improvements." To date, there is no indication that Lion Air management or the Indonesian government are tackling the systemic problems that appear to exist at the airline.

Out of ICAO Compliance

It seems to me that from these reports Lion Air is not planning to take significant action to correct its safety issues any time soon nor does it appear that the Indonesian government will force the airline to make necessary changes or shut the airline down until it does. If that's the case, then Indonesia is not in compliance with its responsibilities as a member of ICAO, the International Civil Aviation Organization. Under ICAO, member countries are responsible for complying with international aviation safety standards and overseeing compliance with those safety standards by their air carriers.

Indonesia's apparent reluctance to take on safety problems at Lion Air should cause the FAA to revisit its Category 1 designation for Indonesia under its International Aviation Safety Assessment (IASA) program. Until the Indonesian government shows a willingness to take on Lion Air's safety problems, it's hard to imagine that it deserves to be rated a Category 1 country. The FAA owes it to American travelers to reassess Indonesia's compliance with international safety standards. ■

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

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JOHN A. MANFREDO

Top portable hardware for electronic flight bags

by Matt Thurber

The ecosystem of aviation apps that run on portable devices changed this year, with the news that Boeing purchased the developer of ForeFlight, probably the most popular electronic flight bag (EFB) app for pilots. This not only underscored ForeFlight's growing use by professional pilots but also Boeing unit Jeppesen's acknowledgment that its own EFB apps were not as popular as ForeFlight.

Of the three platforms for portable devices used by pilots, Apple's iPad remains the most popular, in part because ForeFlight is designed only to run on Apple's iOS (operating system). Android-based devices are in second place, followed by Microsoft's Surface tablet/laptop, which runs on Microsoft's Windows OS.

The popularity of the hardware platform has an enormous influence on the availability of software, especially in the small-scale aviation market. Windows did have an advantage early on as many EFB manufacturers built their devices on Windows PCs, including going through the enormous hassle and expense to get them certified by aviation regulators. However, the certification process itself ended up making these devices too expensive and hobbled the ability of the manufacturers to update the software quickly. The market was ripe for disruption, and this came about with the development of portable devices that were easy to use, reliable, quick to update, relatively inexpensive, and as it turns out, not subject to the same certification requirements.

Essentially, pilots just began using iPods, iPhones, iPads, Android phones and tablets, and Windows laptops to carry their maps and charts. Of course, there were products that tried to fill the role of dedicated chart reader before the advent of the tablet, but none survived in the small aviation market. In what turned out to be spectacularly bad timing, in 2009 SolidFX began selling its iRex electronic paper-based device loaded with Jeppesen charts. In 2010, Apple unveiled the iPad, and Android tablets quickly followed. SolidFX ended up suing Boeing and Jeppesen. The dispute centered on a claim for lost profits that SolidFX could have earned with its own tablet app if Jeppesen hadn't created the FliteDeck app and refused to provide the necessary software toolkit for SolidFX to deliver Jeppesen charts in its app. Of course, SolidFX could have avoided this issue by simply using U.S.-government-issued charts, which are free, but this wouldn't have included the charts outside the U.S. that Jeppesen also provides.

ForeFlight's early efforts showed pilots how easy it was to access charts on their Apple devices, and the advent of the iPad accelerated this shift. For users who didn't like the Apple ecosystem, Android offered an alternative, and there are apps that work on both iOS and Android, such as Garmin Pilot, WingX, and iFly GPS. Some airlines insist on using Windows devices, and this left a small market open for Windows-based devices. That market remains tiny, however, and represents a relatively small portion of the EFB software arena.

Here are more details about the three hardware platforms and some of the software pilots are flying with.

Apple iPad

A problem for iPad users is that Apple keeps improving the devices on a regular basis, and eventually the most current applications won't run on older devices. The latest version of ForeFlight, for example, requires iPads that can be upgraded to a more recent version of iOS. ForeFlight now lists the iPad Air, iPad mini 2, and iPhone 5S as the minimum, although older devices can run older versions of ForeFlight. The new, low-cost entry-level iPad is also fully capable of running the latest version of ForeFlight.

The iPad arena has grown with new models that offer new capabilities that pilots might enjoy, and this is often enough to stimulate a buying decision. Perhaps in recognition of the iPad's popularity, most aircraft OEMs are delivering their performance calculation and weight-and-balance software in iPad versions. Flight planning utilities like Aircraft Performance Group's iPreFlight Genesis, Universal Weather's UvGO, Collins Aerospace's ArincDirect, Honeywell GoDirect Flight Bag Pro, and others all run on the iPad, further cementing the device's popularity among pilots.

The latest and greatest iPad is the Pro series, available in 12.9- and 11-inch sizes. While all of the newer iPads work with the first-generation Apple Pencil, the Pros can use the second-generation Pencil, which has a much more convenient charging mechanism where the Pencil simply attaches magnetically to the side of the iPad Pro. The first-generation Pencil plugs into a Lightning port, which can be inconvenient and awkward.

In either case, the Pencil makes using apps that allow drawing and annotation much easier, because it automatically detects and eliminates any wrist contact while writing on the screen. This is a much more natural way to write and makes using ForeFlight's ScratchPad writing tools much more worthwhile. ForeFlight includes templates for ATIS, pilot reports, and IFR clearances, as well as blank pages for typing text or drawing, plus annotation on maps and charts. Most other EFB apps offer annotation tools, such as FlyQ, WingX, Garmin Pilot, FltPlan Go, iFly GPS, etc., including drawing on charts, but not all allow drawing on maps.

The Pro's screen is somewhat sharper thanks to its "Liquid Retina" display, and a big advantage of the larger size is less need to zoom in when trying to read fine print on charts. The iPad mini is an excellent size for aircraft with limited space, but a little harder to read chart information without zooming in. The iPad Air at 10.5 inches and iPad at 10.2 inches are sufficiently large too. The main difference between these two is the iPad runs on the A10 processor, not the faster A12 in the Air and latest fifth-generation mini. The Pro has the A12X, and it is the only iPad with face recognition: the others still use the Touch ID button. For a capable portable device at a bargain price, it's hard to beat the regular iPad, which retails for $329 but occasionally drops to $250 or lower. The Pro versions start at $799, but if planning to store more than a few apps and all their data, more memory may be needed, pushing the price higher, not to mention the added cost of the

MATT THURBER

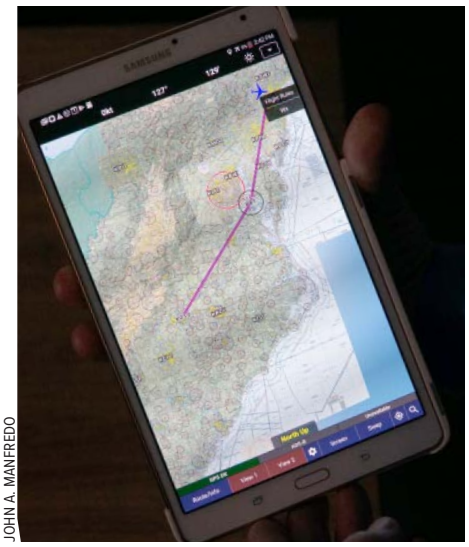
Jeppesen's Mobile FliteDeck is still popular among professional pilots, shown here with an annotated approach plate on an iPad mounted in a Bombardier Global 7500.

Pencil ($99 for first-generation, $129 for second-generation).

Android

As popular as the Android OS is, development of EFB applications for these devices has lagged compared to the iPad. Android tablets are available in a seemingly infinite variety of sizes and configurations, but despite major developers like ForeFlight declining to port their products onto Android, there are some robust products available for the platform.

Garmin has been one of the strongest Android supporters, continually updating the Android version of Garmin Pilot, although it still lags behind the functionality of the iPad version. Garmin's purchase of FltPlan last year added a second EFB app—FltPlan Go—to its stable, and now FltPlan Go is one of the rare EFB apps—and the only free app—that offers the same functionality on iOS, Android, and Windows platforms. The EFB from iFly GPS also runs on all three platforms, and this is the only paid-for app that offers this kind of multi-platform capability.



JOHN A. MANFREDO

An inexpensive Samsung Android tablet does just fine running WingX's EFB app.

WingX continues supporting Android, and its Android version is fairly closely matched to the functionality of WingX on the iPad. However, the Android version of WingX doesn't offer the Traca feature, which allows iOS users to trace a route by drawing on the screen, nor the iOS version's Black Box data recorder.

There are a surprising amount of Android EFB apps, including the free Avare, AvPlan EFB (iOS and Android), DroidEFB, AvNav, Naviator, SkyDemon (iOS and Android), and others.

The easy availability of inexpensive Android tablets and free apps like Avare and FltPlan Go (WingX is free for flight instructors and active and retired military aviators) makes Android a useful way to carry along an independent backup EFB device.

The best attribute of Android is that the latest versions of EFB apps run perfectly well on older Android tablets.

Windows Surface Go

Sadly, one of the best modern tablet computers, Microsoft's Surface series, is the least-supported by aviation EFB app developers. While early versions of the Microsoft tablet suffered from performance issues, the latest Surface products are a well-designed alternative to iOS and Android devices. The Surface runs the full version of the Windows 10 OS, which makes it more of a two-in-one tablet/laptop than a regular tablet. This means the Surface can run any Windows program, making it a useful all-in-one computer for work and to run the few EFB apps that are available in Windows.

I've been testing a Surface Go for the past year, and it's the only tablet-type computer I can carry that can run the InDesign software that we use for magazine layouts along with the EFB apps that are available. To get the same functionality in the Apple world, I have to carry two devices, an iPad and a MacBook Air.

This Surface Go is the LTE Advanced model and includes Wi-Fi and LTE cellular connectivity.

There are three EFB apps that run on Windows computers, but only two available to the general public. This version, with 8 GB of RAM and 128 GB of storage plus 4G+ cellular connectivity, GPS receiver, and Wi-Fi, sells for $679. If cellular service is not needed, the entry-level Surface Go with 64-GB storage and 4-GB RAM sells for $399, but it would need an external GPS. Battery life for the Go with cellular is up to 8.5 hours. With a 10-inch screen, this Go weighs 1.17 pounds, not including the Type Cover. An available dock ($132.99) makes connecting the Surface tablet to external accessories easier, with two high-definition video ports, a gigabit Ethernet port, four USB 3.0 ports, and an audio output.

The Go is a solid computer and tablet, and at 10 inches, just about the perfect size for a variety of flight decks. Useful accessories include the Surface Slim Pen ($149.99) or Surface Pen ($99.99) and Type Cover ($129.99), which includes a trackpad. The Pen is a helpful way of interacting with the Go, and the Type Cover makes typing much easier, although I found the trackpad somewhat over-sensitive. When flying with the Go, I found it worked better to use the touchscreen, either with a finger or the Pen, instead of the Type Cover.

MATT THURBER

Microsoft's Surface Go Windows tablet is a solid performer but lacks attention from EFB app developers, although it runs Garmin's FltPlan Go (shown here) and the iFly GPS apps perfectly.

Windows EFB Apps

Jeppesen's FliteDeck has long been available in a Windows version, but not for just anyone to buy, only for large fleet operators like airlines, some of which refuse to get on the Apple bandwagon. Jeppesen doesn't see a market opportunity for a Windows version of FliteDeck for individual purchase, which probably has a lot to do with Boeing's investment in buying ForeFlight and that ForeFlight is the company's focus for EFB apps. Jeppesen stopped supporting Mobile FliteDeck VFR on December 31, 2019, moving existing subscribers to ForeFlight, but the other FliteDeck versions are still available for the iPad for general users.

As for Windows versions of FliteDeck, Jeppesen provided this statement to **AIN**: "We continue to monitor market adoption and customer requests of the Windows platform as an EFB technology in business and general aviation, but at this time it has not reached a level that would allow us to justify the investment needed. Apple iPads continue to be the market leader for EFBs in business and general aviation. In addition, we will be working to merge capabilities between Mobile FliteDeck and ForeFlight Mobile over time."

For diehard Windows users, the sole choices for EFBs now are Garmin's FltPlan Go and Adventure Pilot's iFly GPS. Both are capable, full-featured EFBs, although iFly GPS also offers synthetic vision and a vertical profile display. FltPlan Go is free, while iFly GPS is $149.98 per year, plus $24.99 for the multi-platform option, which allows simultaneous installation on Windows, iOS, and Android devices. A drawback for international travelers is that these apps primarily serve pilots flying in the U.S., although FltPlan Go includes charts for Canada and the Caribbean and weather briefing and flight planning in Canada, the Caribbean, Bahamas, Mexico, and Central America.

FltPlan Go's strength is its integration with the FltPlan website, which offers additional tools for flight planning such as airport information, checklists, weight-and-balance, takeoff and landing data card, and integration with paid-for services such as eAPIS U.S. Customs clearance, safety management system, flight tracking, and international handling in Mexico, Central America, and the Caribbean.

Like most modern EFB apps, FltPlan Go has a moving-map with own-ship position (when GPS information is available) and overlay of terminal charts, ADS-B In weather and traffic, and SiriusXM Weather on the map. FltPlan Go works with a variety of ADS-B In receivers. It also integrates with the X-Plane and FSX and Prepar3D simulation platforms, which means that users can practice flying with FltPlan Go on either of the three device types before taking to the skies.

Just recently, iFly GPS added simulator integration with X-Plane, and this will help users learn how to use the app.

The iFly GPS features are on par with other sophisticated EFB apps, specifically the ability to select arrival and departure procedures from the map and add them to the flight plan, as well as selecting an instrument approach at the destination, which is added to the flight plan and shown on the map. Weather briefings are available via Leidos's briefing service, and iFly GPS allows the filing of flight plans. One area where it comes up short in comparison to other EFB apps is in the lack of weight-and-balance and performance calculations. Current weather information is available on the map, and it is possible to optimize a flight plan based on altitude and forecast winds.

The ability to draw on the map and charts is another helpful iFly GPS feature, aided by the Surface Pen. Sketches can also be done on airport diagrams and approach charts and pre-loaded blank pages. In the case of sketches on charts, the drawings remain with the original document and don't transfer onto that document when it is overlaid on the map.

Mounting Schemes

A final note on the three tablet EFB hardware platforms: one might assume that the more popular the hardware, the more accessories that are available for that particular tablet. But that isn't necessarily true. The robust Pivot cases, popular with airline pilots, are available for most iPad models and also some of the Microsoft Surface products, although not yet for the Surface Go.

While MyGoFlight's kneeboards and mountable cases are designed to fit most iPad models, the company does make cradles that can fit almost any type of tablet from 7 to 13 inches, and this would work for Android and Surface tablets. Ram also offers a huge variety of yoke attachments and suctions cup mounts with tablet cradles that can fit tablets of any size. ■

FAA warns BlackBird, pilots of possible rule violations

by Matt Thurber

The FAA sent a letter on December 17 warning charter broker BlackBird Air that pilots using the company's online platform and app to fly passengers under Part 91 "are holding out and thus are engaged in common carriage." The agency said it is planning to investigate BlackBird's activities and possibly also pilots flying for BlackBird. In response, BlackBird "paused" this feature of its offerings.

San Francisco-based BlackBird Air is primarily a charter broker, but has also offered the option to hire a commercial pilot and lease an airplane to travel to a destination, all under Part 91. According to Crunchbase, BlackBird has raised $15 million in venture capital funding. BlackBird's website homepage advertises: "Rent a plane and go anywhere. How it works: BlackBird helps you fly over traffic by connecting you with planes and pilots, bringing you true freedom of flight."

The FAA doesn't agree with BlackBird that this kind of operation is not a charter, and it said that the company and/or pilots must obtain a Part 119 certificate to transport people or property for hire or compensation.

According to an FAA spokesman, "We haven't taken actions in relation to BlackBird per se, but we alerted pilots that they could be violating the regulations if they're not operating under a certificate issued under Part 119."

In the letter sent to BlackBird attorney Roy Goldberg, the agency's Office of the Chief Counsel, Enforcement Division made a case that BlackBird's pilot-hire and airplane-lease operation under Part 91 fits all the criteria that make an operation subject to requiring a Part 119 certificate and operating under Part 135 charter regulations.

For its part, BlackBird had sent a letter on June 10 to the FAA outlining its business plan, explaining that it facilitates its customers with "leasing an aircraft and... separately hiring a commercial pilot to fly the aircraft the user has leased." Because, BlackBird wrote, it doesn't "own, manage, or maintain the aircraft and does not employ pilots..." and the customer selects the aircraft and pilot separately, "operational control of the aircraft remains with the user at all times." In the FAA letter, the agency wrote that "BlackBird represents that it only facilitates the agreements, processes payments, and provides customer support to all three parties (user, i.e., person leasing the aircraft and hiring the pilot; pilot; and aircraft lessee)."

According to the FAA, BlackBird, itself, outlined the agency's criteria for determining whether an operator must hold Part 119 certification. From the December 17 FAA letter: "As BlackBird noted in its [June 10] letter, to determine whether common carriage is present, the FAA assesses whether there is: (1) a holding out of a willingness to (2) transport persons or property (3) from place to place (4) for compensation."

The FAA explained that BlackBird easily met the last three criteria, but "holding out" was subject to more discussion. The FAA letter went on: "We have little trouble concluding that the pilots listed on BlackBird's pilot database selected by the user are transporting persons or property, from place to place, for compensation. Despite BlackBird's assertion that the pilots are not transporting persons or property, it is clear that they are being hired for that very purpose. In addition, as BlackBird concedes, the pilots are being compensated for the flight service (whether the money comes directly from the lessee or through the BlackBird platform). That leaves only the issue of holding out."

FAA Precedent

That BlackBird and its pilots are holding out is supported, the FAA claimed, by two legal interpretations involving aviation ride-sharing providers AirPooler and FlyteNow.

Essentially, because BlackBird's online and app platform is available to anyone and pilots on the platform [from the FAA letter] "are available and willing to transport passengers who solicit pilot services through the platform...A pilot's participation in the BlackBird platform amounts to holding out a willingness to transport persons from place to place for compensation and requires certification under part 119 prior to conducting the operation."

BlackBird doesn't agree with the FAA's interpretation. In its June 10 letter, the company had explained its operation thusly: "[u]nlike air carriers, BlackBird is not building an operation based on crews, aircraft, or routes. BlackBird is building an infrastructure that supports all of general aviation, which includes air carriers and operators." In the December 17 letter, the FAA elaborated, "BlackBird manages two databases: one for aircraft available for lease and a second one for commercial pilots (described as 'independent person[s] with a specific skill set [pilot]).' BlackBird uses the databases as part of a marketplace service that serves as an aggregator of information and connects third-party service providers (the pilots) with users seeking to charter an aircraft or purchase a ticket on a direct air carrier. BlackBird asserts, 'the ultimate business goal is to create an online platform that surfaces the many options available to users; [and] NOT to provide air transportation.'"

Asked about the FAA's warning in the December 17 letter, BlackBird founder and CEO Rudd Davis told **AIN** that the company is pausing its Part 91 pilot-hire, airplane-lease operations. Davis sent this statement to **AIN**: "We disagree with the FAA's interpretation and look forward to continued discussions on this topic, given that their guidance isn't law. BlackBird is the largest digital aviation marketplace in the world and the one place travelers can find and instantly book all private flight options. [Part] 91 operations are the minority of our business and for the moment we will pause that aspect of the marketplace and continue to provide charter flights and individual seats on private [Part 135] aircraft."

The National Air Transportation Association has focused increasingly on the illegal charter issue, and NATA COO Timothy Obitts sent this statement to **AIN**: "We thank the Federal Aviation Administration's Office of General Counsel, Enforcement Division for the well thought out and articulate letter to BlackBird Air regarding non-Part 135 operators' use of their platform. This letter is clear guidance from the FAA and confirms NATA's understanding of the regulations. We hope that pilots pay heed to the FAA's guidance. NATA, along with its Illegal Charter Task Force, will continue to work with the FAA on this very important safety issue."

The FAA letter concluded that BlackBird pilots are holding out and "engaged in common carriage. Because these operations are subject to Part 119 certification, a pilot who holds an airline transport pilot or commercial pilot certificate must obtain and hold a certificate issued under part 135 or the pilot must be employed by a company operating the flight that is certificated under part 119. Accordingly, please expect further investigative activity into BlackBird's operations, particularly regarding its pilot database. In addition, we would be interested in learning of any action you intend to take in view of the jeopardy facing pilots who participate in BlackBird's service."

The BlackBird website no longer promote the original pilot-hire, airplane-lease concept and now offers potential customers the opportunity to book flights with certified Part 135 providers, to "... fly over traffic by connecting you with charter operators." ■

The copilot's inadvertent application of the Learjet 45's brakes was blamed for a nosegear collapse last year.

UK agency blames crew braking under tow in Learjet 45 nose gear collapse

Inadvertent crew braking during taxi pushback likely led to the nose landing gear (NLG) collapsing on a 2000 Bombardier Learjet 45 (registration C-GMCP) on May 4, 2019, at Scotland's Edinburgh Airport, according to a UK AAIB final report released on January 9. There were no reported injuries to the two passengers or two crewmembers.

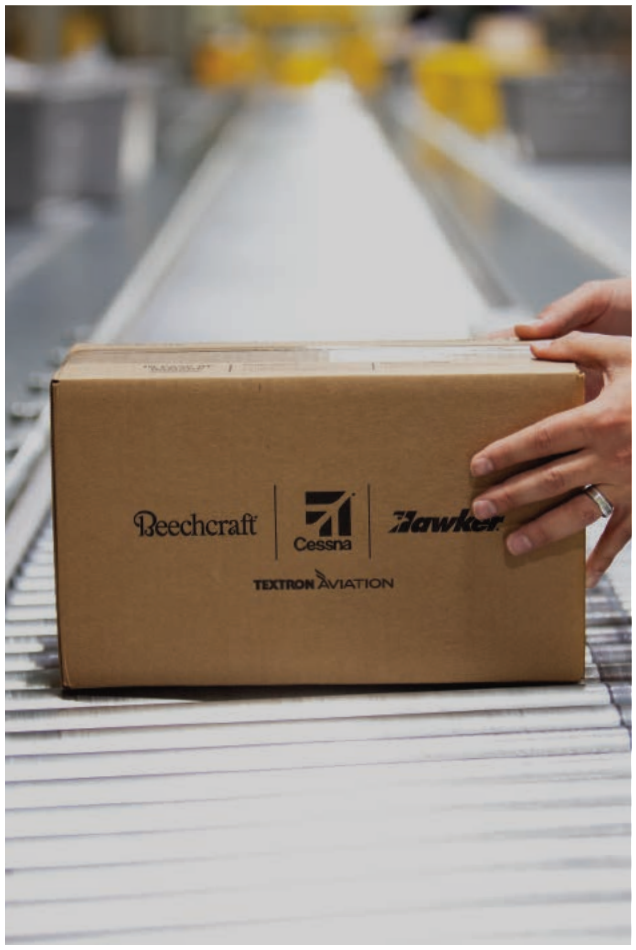
At the time of the mishap, the captain had 2,669 hours in type and 12,920 hours total time. The aircraft appears to have been operated by Skyservice Business Aviation.

The pilots started both engines at the gate before the aircraft was pushed back using a TLD 150 Max tug. As the aircraft was being turned to line up on the taxiway, the NLG suddenly collapsed aft and the aircraft came to rest.

During pushback, the copilot had been carrying out checks and had started adjusting the position of his rudder pedals. He was bringing the pedals aft and he said there was a possibility he might have tapped the brakes, but was not aware of having done so.

Examination of the aircraft showed that the nose leg bracket connected to the gear actuator had failed, allowing the NLG to collapse aft. (The Learjet 45's nose gear retracts in the forward direction.)

The bracket was examined at a metallurgical lab, revealing that it had failed due to overload. There was no evidence of material defects or fatigue, the AAIB said. It added that the aircraft manufacturer had examined photographs of the structural damage to the NLG bay and stated that this damage and the damage to the bracket was similar to the damage that occurred to a Learjet 45 at its production facility, which occurred during pushback with brake application. The company said it was also aware of two other in-service events in which brake application during pushback resulted in the same rearward NLG collapse. **I.S.**



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TEXTRON AVIATION

Board focusing on weather in Hawaii air-tour crash

by Mark Huber

Rapidly changing localized weather and pilot fatigue are two possible contributors to the fatal crash of an air tour helicopter in Hawaii on December 26th that killed the pilot and his six passengers.

In its preliminary accident report issued last month, the National Transportation Safety Board (NTSB) noted discordant weather reports in the area of the crash site, 24 miles northwest of Lihue, that suggest a challenging and rapidly changing weather situation. A witness 1.5 to 1.75 miles away from the scene in the Koke'e State Park reported hearing the accident helicopter shortly before the crash at 4:57 p.m. local time and weather conditions of 20 feet forward visibility in rain and fog. The closest official weather reporting station in the area, nine miles southwest at Kauai's Barking Sands Pacific Missile Range Facility (PABK), at 4:56 p.m. local time reported wind from 310 degrees at 12 knots, gusting to 15 knots; 10 statute miles visibility; few clouds at 1,200 feet, broken clouds at 3,400 feet and 4,700 feet, overcast clouds at 6,000 feet; temperature 70 deg F; and dewpoint 57 deg F. However, by 5:18 p.m. conditions had deteriorated to wind from 350 degrees at 10 knots; 2.5 statute miles visibility in rain and mist, overcast clouds at 3,000 feet; temperature 73 deg F; and dew point 72 deg F.

The NTSB also reported that the pilot, identified in news reports as Paul Matero, 69, was flying his eighth 50-minute aerial tour flight of the day. The total length of his time on duty on the day of the accident flight is not specified. Matero held a commercial rotorcraft certificate issued in 2011 and a second-class FAA physical with limitations for corrective lenses. He was scheduled to retire in early 2020. Another helicopter in the area reported hearing Matero give a position report at 4:45 p.m. at reporting point "Upper Mic," which would have suggested that the accident helicopter was leaving Waimea Canyon then transitioning via the Koke'e State Park to the Na Pali coastline.

The NTSB reports the accident helicopter, a 1998 Airbus AS350 B2 , N985SA, was destroyed by impact forces and a post-crash fire when it collided with terrain on a north-facing slope at an elevation of 3,003 feet msl and came to rest at an elevation of about 2,900 feet msl. The flight originated at the Lihue Airport at 4:31 p.m. The helicopter was registered to SAF LTD and operated by Safari Aviation Inc., doing business as Safari Helicopters, as a Part 135 on-demand commercial air tour VFR flight. Company flight following procedures were in effect. Safari reported the helicopter missing at 5:31 p.m. local time, 10 minutes after its scheduled arrival time back at Lihue. An extensive aerial search located the wreckage at 9:32 a.m. the following morning. ■

TEXTRON AVIATION

The Cessna Citation Longitude received FAA type certification on September 21.

NetJets receives first Citation Longitude

Textron Aviation delivered its first Cessna Citation Longitude to NetJets, a key customer for the super-midsize business jet, the two companies announced on January 6. The delivery was completed on December 31 and the twinjet is expected to enter service for the fractional provider early this year. The $28.345 million Longitude received FAA type certification on September 21, followed by entry into service on October 2.

"No matter the reason for being on board, from takeoff to landing, the innovations of the Citation Longitude make it the most enjoyable flight imaginable," said NetJets chairman and CEO Adam Johnson. NetJets is the largest, publicly-announced customer for the Longitude, having agreed to acquire up to 175 of the twinjets.

So far, NetJets has also taken delivery of more than 100 midsize Citation Latitudes. "We are pleased to have the new Citation Longitude enter the NetJets fleet and continue to strengthen a relationship that goes back decades," said Textron Aviation president and CEO Ron Draper. Since 1984, NetJets has cumulatively operated a fleet of nearly 500 Cessna Citations. **J.S.**

› continued from page 18

OpenAirplane, FlyOtto close up shop

cared about. I truly wish we could have kept doing it." Since the shutdown announcement, "there has just been an outpouring of love and support and appreciation. A lot of folks had their bucket list experience in aviation enabled by this."

Happy Flier

One frequent customer who greatly appreciated OpenAirplane is Christian Calcedo, a Boeing 777 captain based in the Middle East. "For me, aviation is not my job, it is my passion. It is my entire life," he told **AIN**.

Calcedo used to live in Florida and fly Cessna 172s in his spare time, but after moving to Dubai, "I realized that general aviation is non-existent here. In some places, you still have a little bit of general aviation, but it is either way too expensive or it is very restrictive—or with really inadequate or insufficient facilities... Pilots in the U.S. do not realize how blessed they are."

For three years after moving to the Middle East, he wasn't able to fly light airplanes but kept his interest alive by reading magazines and listening to aviation podcasts. One day, he heard on a podcast about OpenAirplane and how he could rent Cessna 172s almost anywhere in the U.S. with just one annual check flight. "I was super excited," he told **AIN**. "That was exactly what I had been waiting for; it was perfect for my situation."

Calcedo flies to the U.S. seven or eight times per year, staying from 24 to 48 hours. "The chance to have a nearby place to rent a C-172 pretty much anywhere in U.S., without the hassle of rental checkouts and all that, is just perfect for someone in my situation."

He joined OpenAirplane in 2014 and has flown in the network about 100 hours. "I reserve several days in advance online. I receive my confirmation online. I read and study the local rules from the OpenAirplane website and I prepare myself as best as I can, gathering all the information available. On the day of the flight I show up at the FBO, they give me the keys to the airplane, I go out, do my preflight and go flying... as simple as that...it is brilliant."

Thanks to OpenAirplane, Calcedo has expanded his general aviation horizons and completed many flights he otherwise would not have been able to enjoy if he had to do a checkout flight every time.

"I have many, many memories that will live with me from those flights, like when, with my wife, we flew from Long Beach to Burbank [California] to pick up a friend and flew to Big Bear for a great $100 hamburger at the airport restaurant. Or when I flew with another pilot who joined me from Chicago; along the shoreline and to Oshkosh, again for an awesome $100 hamburger. Yet another one was flying with two cabin crew friends [through] the famous [New York City] Hudson River corridor and then to Martha's Vineyard for lunch. Another time was flying with my family to Cape Canaveral; we even had the chance to fly over the landing Shuttle runway. Maybe the best one was with my son flying to SPG [St. Petersburg, Florida] for the $100 lunch at the airport. We met astronaut Nicole Stott there. So many amazing memories and adventures...

"It is with great sadness that I read the news about OpenAirplane closing, and now what is left for me? I guess, more years without flying general aviation...very sad indeed." ■

Airbus Corporate Jets offers missile-defense system

by James Wynbrandt

Airbus Corporate Jets (ACJ), capped 2019 by partnering with French MRO Sabena Technics to offer directional infrared countermeasure (DIRCM) self-protection systems for its VIP airliners. DIRCM systems use infrared lasers to protect aircraft against missiles fired from man-portable air defense systems (manpads), today's most widespread missile threat, according to the French airframer. The new security offering "expands and consolidates the widespread range of modern aircraft and services that ACJ offers," ACJ president Benoit Defforge said.

Initially available for ACJ320 models, such anti-missile systems are available from several different companies, and Sabena will act as the system integrator. Some in-service ACJs are already equipped with DIRCMs offered through third-party manufacturers.

2019 Was a Very Good Year

ACJ experienced a strong 2019, with nine aircraft sales inked, including its first ACJ350XWBs (Xtra Wide Bodies) sales, complemented by first deliveries of its ACJ320neo family models.

The year's sales included four ACJ350XWBs—the latest addition to ACJ's VIP widebody family—with the German government buying three and one going to a private customer. The jumbo jet can fly 25 passengers 11,000 nm, or more than 22 hours non-stop, and incorporates a next-generation carbon composite airframe and in-flight wing morphing technology that increases efficiency and performance. While carbon fiber airframes can create challenges for custom interior outfittings, ACJ developed the Easyfit solution for the new widebody, providing hundreds of pre-equipped attachment points and standard system interfaces to simplify completions.

ACJ320neo Sales Are Promising

The corporate version of Airbus's new engine option (neo) line, the ACJ320neo family, began deliveries to Airbus-approved completion facilities last year, the first—an ACJ320neo—was bound for launch customer Acropolis Aviation, a UK-based VIP charter operator. A second ACJ320neo and an ACJ319neo were also handed over, and all remain in completion, ACJ marketing director David Velupillai said. ACJ has notched 16 ACJneo sales in total.

The ACJ320neo can carry 25 passengers 6,000 nm, while the ACJ319neo can tote 19 passengers 6,750 nm, both at double-digit operational cost savings over previous generation ACJ320s.

Meanwhile, ACJ has made it easier for high-end charter customers to book trips aboard its jets, having launched in October the iflyACJ.com website, created to "connect business jet travelers to ACJ operators," said Defforge. The site provides access to the world's 12 charter companies operating ACJs. "Just click to book a unique flying experience," he added.

Airbus Corporate Helicopters

Airbus Corporate Helicopters (ACH) markets corporate versions of the brand's rotorcraft. ACJ and ACH have been appearing in tandem at recent trade events under the Business Aviation by Airbus banner to underscore the parent company's message that "ACJ and ACH are part of the only manufacturer to offer both corporate jets and helicopters."

Since its 2017 launch, ACH has teamed with bespoke design and automotive companies to create co-branded deluxe helicopter interiors, including Hermes and Mercedes-Benz, an approach most recently seen in January's announcement of the Aston Martin Edition of the seven-passenger, single-engine ACH130. ■

Collins expecting big synergies from merger

by Chris Kjelgaard

Collins Aerospace will remain substantially intact following the completion of parent United Technologies Corporation's planned merger with The Raytheon Company and Collins CEO Kelly Ortberg believes the merger will produce substantial new revenue synergies for his company.

UTC's and Raytheon's shareholders voted last fall to approve the planned merger, which would create one of the world's three largest aerospace OEMs overall and the second-largest military OEM. The merger would bring under the new Raytheon Technologies corporate umbrella UTC's Collins Aerospace and Pratt & Whitney businesses beside Intelligence, Space and Airborne Systems and Integrated Defense and Missile Systems divisions contributed by The Raytheon Company. Assuming the planned merger partners receive all required regulatory approvals, they expect to consummate the merger in April.

At Collins Aerospace, which is expected to report higher revenues in 2019 than any of the other three planned Raytheon Technologies businesses, "there will be no major change in what we do" following the merger, said Ortberg.

Collins Aerospace, itself, expects eventually to see at least $600 million of cost-reduction synergies annually from the November 2018 merger between UTC Aerospace Systems (UTAS) and Rockwell Collins which created Collins Aerospace; it has achieved about $250 million of them to date. But Ortberg said UTC and Raytheon expect most of the major cost-reduction synergies from the planned 2020 Raytheon Technologies merger "to be primarily at the corporate level" of the parent companies.

Kelly Ortberg
Collins CEO

"The company still has and will have GPS [technological] capability. From a long-term perspective, those competencies and capabilities will still exist"

However, he added, "we do believe there will be some significant revenue synergies for us in terms of [mutually increased business generated together with] the Raytheon portfolio. But we can't do any exchange [of business planning with Raytheon] until the merger closes."

That is unlikely to be a concern for Collins Aerospace, which has already been hard at work to realize more than $1 billion of expected revenue synergies annually from the merger with Rockwell Collins. Ortberg said it expected to have achieved $175 million of those synergies by the end of 2019.

Although Collins Aerospace expects its business to be substantially unaffected overall by the planned UTC-Raytheon merger, it does already know it won't emerge from the merger entirely as it is now. In late October, officials with the U.S. Department of Justice's antitrust division asked Collins Aerospace to divest its military GPS business—which is located in Cedar Rapids, Iowa and which Rockwell Collins brought to its merger with UTAS—as a pre-condition for DOJ approval of the UTC-Raytheon merger.

"The reason for that is there is an overlap between Collins Aerospace and Raytheon in [the] military GPS" business, said Ortberg. He told **AIN** as far back as May—and reiterated to reporters in late October—that he sees providing armed forces with secure military air-to-ground communications and accurate navigation in the GPS-denied and jammed environments as representing a substantial long-term business opportunity for Collins Aerospace. Asked if the divestiture of its military GPS business might, then, represent an issue for his company following the UTC-Raytheon merger, Ortberg replied, "The company still has and will have GPS [technological] capability. From a long-term perspective, those competencies and capabilities will still exist" within a future Raytheon Technologies.

As of press time for this issue, Collins Aerospace hadn't yet identified a buyer for its military GPS business or determined when the DOJ-requested divestiture would take place. ■

AOPA pans FBO pricing report

by Curt Epstein

A recent report from the U.S. Government Accountability Office (GAO) to the House Committee on Transportation and Infrastructure on the pricing of aviation services found that while pricing at FBOs is dependent upon many variables, it has not been identified as a widespread area of concern.

Industry stakeholders interviewed for the report range from airport officials to FBO customers, to trade organizations such as NBAA, NATA, GAMA, as well as the service providers themselves. The GAO found that it's the cost to build and maintain facilities such as hangars and fuel farms as well as operating costs that influence pricing; along with other factors such as seasonal demand and competition.

Some aviation groups, spearheaded by the Aircraft Owners and Pilots Association (AOPA), have called for greater transparency of service pricing at public-use airports. They asked for an examination of FBO pricing and the FAA's oversight of related airport grant assurances, particularly 22b, which states that an airport must ensure aeronautical services are available to all users on a reasonable and not unjustly discriminatory basis. The GAO, in its year-long review, developed a statistical model to analyze variation in fuel prices in the contiguous U.S., reporting that "as of March 2019, we identified 3,070 FBOs operating at 3,016 airports located in the contiguous United States; these airports are included in FAA's National Plan of Integrated Airport Systems (NPIAS).

FBO Pricing Factors

Since 2007 the FAA has doled out more than $37 billion in grants to airports to fund capital development and is responsible for ensuring compliance with requirements, including providing airport users equal access to airport services such as fueling.

The GAO statistical model confirmed a correlation between cost and demand factors and unsurprisingly found higher overall prices charged by FBOs at airports with higher cost and demand. While on-airport competition could result in lower fuel prices at busy airports, the agency noted not all airports can support more than one FBO. The report defined an FBO as a business granted the right by the airport to operate fueling facilities, hangars, aircraft tie-downs, and other aeronautical services.

At the end of December, AOPA responded to the report, describing it as lackadaisical and stating it "misses the mark." Its primary complaint with the findings appears to be that it does not specifically back AOPA's call for FBO pricing transparency, particularly at AIP grant-funded airports. The association also stated that the report did not include in its analysis fees for other services such as ramp, tiedown, security, facility, infrastructure, and access fees. "Its lack of probing FBO fees and the satisfying of airport grant requirement issues is shockingly shallow," AOPA wrote.

The GA organization noted that while most FBOs charge fair and reasonable fees, others, particularly those in sole-provider situations, do not publish rates and charges, often surprising pilots with higher-than-expected fees.

AOPA added: "It is disappointing that the GAO, the guardian of taxpayer dollars, failed to thoroughly address all aspects of federal grant requirements. The report reflects a complete lack of contextual knowledge of the industry and how it is intended to operate." The organization also found fault with the report's assessment of market economics, which contended that pilots had the option to patronize alternative area airports if they disagreed with the pricing and fees charged by a service provider at their preferred airport. AOPA argued that community airports are meant to be available to all pilots and the traveling public on reasonable terms.

Further, AOPA said the report failed to acknowledge its assertion that charts for all public-use airports should clearly indicate available non-FBO-controlled ramp space for aircraft parking when FBO services were not desired. ■

NEWS note

Metrojet has added five Gulfstream business jets to its managed fleet, bringing its tally to 16 Gulfstream aircraft, the Hong Kong-based business aviation services provider announced. Gulfstream and Metrojet have had a partnership since 2001 with the receipt of its first GIV. In 2020, Metrojet expects to see additional Gulfstream jets enter its managed fleet.

Denzil White, Metrojet's managing director of aircraft management and charter, explained that 2019 was a tough business environment for the region. "Given the recessionary environment, Metrojet is pleased with the steady growth," White said. ■

Atlas Air crew suffered confusion, says NTSB

by Rob Finfrock

PHOTOS NTSB

In this photo, taken on March 3, 2019, NTSB investigators and members of the recovery team retrieve the flight data recorder of Atlas Air Flight 3591, a Boeing 767-300 cargo jet, that crashed in the marshland of Trinity Bay on Feb. 23, 2019, about 30 miles from Houston's George Bush Intercontinental Airport. Right, the recovered flight data recorder.

Although the National Transportation Safety Board (NTSB) has not yet issued its probable cause determination in the Feb. 23, 2019 downing of an Atlas Air Boeing 767 freighter near Houston, Texas, information contained in the Board's recently-released public docket on the investigation paints a picture of a confused flight crew working against one another trying to keep their aircraft in the sky.

Flight 3591 from Miami International Airport (MIA) had proceeded normally for most of its journey to George Bush Intercontinental Airport (IAH), with captain Ricky Blakely, first officer Conrad Aska, and jump-seater Sean Archuleta, a recently promoted captain at Mesa Airlines, discussing their respective employers and the flying qualities of the Boeing 767.

Aska, the pilot flying, reported to Blakely as the aircraft approached IAH that his primary flight display appeared to be showing incorrect aircraft orientation on the horizontal situation indicator (HSI), but the crewmembers later determined the instrument was functioning properly.

The situation deteriorated as the Boeing descended through 10,000 feet msl and maneuvered around thunderstorms circling IAH while approaching to land on Runway 26L. The aircraft's flight data recorder (FDR) noted "triaxial acceleration magnitudes increased" at an altitude of approximately 6,500 feet, "consistent with the aircraft entering light to moderate turbulence," according to the NTSB FDR specialist's factual report.

Five seconds later, the aircraft's go-around autothrottle mode activated and "the engines began advancing to go-around thrust setting," according to the report. However, neither pilot seemed aware the mode had been selected or that their aircraft was now configuring for a 2,000 foot-per-minute climb; until about 10 seconds later, when Aska suddenly pitched the aircraft nose down but did not touch the throttles.

"Whoa, my speed, my speed," Aska stated, according to the NTSB's cockpit voice recorder (CVR) transcript. "We're stalling. Stall." However, FDR data indicates the aircraft was flying normally at a computed airspeed of approximately 250 knots prior to the nose pitching down in response to the first officer's control inputs. Citing a physiologist, the NTSB noted Aska may have been disoriented by the increase in speed while operating in instrument meteorological conditions.

According to the FDR, Blakely then pulled back on his yoke as Aska continued pushing forward, resulting in "a split between left and right elevators...ranging between 2 to 7 degrees," according to the NTSB. The aircraft continued to descend, with airspeed increasing beyond 350 knots.

The plane's autothrottles switched out of go-around mode as the aircraft descended through 3,000 feet, by which time the aircraft had descended under the cloud cover and was in visual conditions. The FDR indicates both Aska and Blakely then pulled back on their yokes to the full aft position, where they remained until the aircraft crashed into a shallow bay approximately 40 miles southeast of IAH.

"Aircraft pitch was about 50 degrees nose down," the FDR report stated. "Vertical acceleration went from 0 g to 4.2 g and pitch increased rapidly until its final recorded position of 16 degrees nose down...The final recorded airspeed was 433.5 kts."

Memory boards from the cockpit voice recorder of Atlas Air Flight 3591 are inspected for signs of damage and water intrusion by an NTSB engineer from the Office of Research and Engineering's Vehicle Recorder Division at the NTSB laboratory in Washington, March 2, 2019.

Pilots' Employment and Training Histories Highlighted

Investigators also found that Aska, 44, had a problematic employment and training history prior to his hiring at Atlas in 2017. He joined the freight operation from Mesa Airlines, which he left after failing two flight simulator checkouts for promotion to captain on the Embraer 175 regional jet. One Mesa captain who evaluated him told the NTSB that Aska would "make frantic mistakes [and] start pushing a lot of buttons without thinking about what he was pushing."

Earlier in his flying career, Aska had been briefly employed by regional airlines Air Wisconsin and Commutair but had left after four months and one month, respectively, due to failure to satisfactorily complete training at both carriers. He did not list his time with those airlines when applying at Atlas, the NTSB noted.

Both Aska and Blakely, 60, also underwent remedial instruction at Atlas, with the latter enrolled in the carrier's proficiency watch program in 2015 after he initially failed his 767 checkride. Blakely was approved to fly the 767 later that year, following successful retraining on proper stall recovery and missed approach procedures.

Aska also failed his initial checkride at Atlas, due to what company pilots told the NTSB was "unsatisfactory performance in crew resource management, threat and error management, non-precision approaches, steep turns, and judgment." He ultimately passed the checkride after more remedial training, with the chief pilot at Atlas telling investigators he'd chalked up the first officer's previous difficulties to nerves and family issues.

That pilot told the NTSB that he'd intended to informally monitor Aska's performance going forward, but the carrier did not place Aska under a dedicated proficiency watch program as mandated by the FAA. ■

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identification, limited identification, and operations without remote identification to be permitted within an "FAA-recognized identification zone."

Under standard remote identification, aircraft would have to broadcast identification and location information and simultaneously transmit the same information to an approved UAS service supplier (USS). Identification can be based on the aircraft's individual serial number or a "session identification number" that would be assigned by the USS and would allow the operator a greater level of privacy.

Remote ID USS service providers would be under contract to the FAA, under an operating model similar to that already applied by the agency for Low Altitude Authorization and Notification Capability (LAANC), which manages clearances for UAS operations at designated U.S. airports.

Under limited identification, operators would have to broadcast only the location of each UAS but would be permitted to operate only within 400 feet of a ground-based control station. Aircraft without remote identification capability that are not covered by the limited exceptions to the new rule, would be confined to FAA-recognized identification zones established within specific communities.

Significantly, the FAA will not permit either existing electronic surveillance technologies, including transponders and automatic dependent surveillance-broadcast (ADS-B), or radio communications with air traffic control services, to be used for UAS remote identification. The agency decided that these potential solutions were unsuitable, "due to the lack of infrastructure for these technologies at lower altitudes and the potential saturation of the available radio frequency spectrum."

Last year, Volocopter successfully flew its VoloCity eVTOL aircraft prototype in and out of Finland's Helsinki International Airport to demonstrate its ability to safely operate in busy public airspace.

Rule Implementation Could Slow Autonomous eVTOLs

The FAA's decision not to allow compliance through these existing technologies is a significant factor explaining the three-year transition period between the effective date of the final rule and full implementation. Earlier in 2019, the FAA indicated that the effective date for the new remote identification rules would likely be in late 2021.

Some industry observers have indicated that the relatively slow timeline for implementing the rule could slow the pace of service entry for some commercial UAS operations and autonomous eVTOL aircraft being prepared for urban air mobility services. Generally, eVTOL pioneers have been slow to publicly respond to the NPRM. Some of them have set very aggressive timelines for the start of commercial operations by autonomous aircraft that now seem even more challenging given the complexity of what the FAA is proposing.

In response to the NPRM, the Association for Unmanned Vehicle Systems International (AUVSI) said that effective implementation of remote identification requirements will be critical to the anticipated growth of the UAS industry. "We have long called for the establishment and implementation of these standards, which will increase the safety and security of the airspace and advance the UAS industry beyond what is currently possible," commented AUVSI president Brian Wynne. "The importance of remote ID regulations cannot be overstated, as they are necessary to enable advanced and expanded operations such as flights over people and beyond line of sight. They also serve as the linchpin needed for future rulemakings that will pave the way for transformative uses of UAS with significant benefits for our economy and society, including widespread UAS delivery. Finally, remote ID will also help law enforcement identify and distinguish authorized UAS from those that may pose a security threat."

Several companies are well positioned to take up the proposed USS role to support remote ID implementation. In many cases, they have relevant experience of providing similar support for the expanded implementation of the LAANC program.

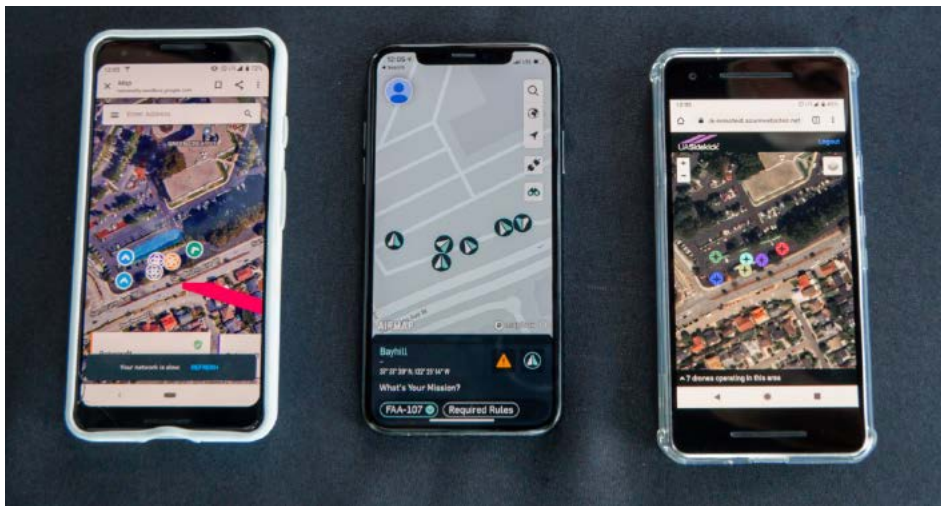
One such company is Kittyhawk, which already offers its Air Control security and compliance system to UAS operators. "Overall, the [FAA] approach is sound. They have broken it out into three areas and the layered approach makes sense," founder and CEO Jon Hegranes told **AIN**. "More advanced aircraft will need both broadcast and remote ID functions. One important caveat that you can fly offline if you have broadcast capability. If you don't have to have broadcast, you can use a network and be online. You can't fly as far, but for short distances it is reasonable."

According to Hegranes, UAS manufacturers and remote ID technology companies have "a lot more work to be done" to complete the "ecosystem" that is envisioned for safe integration of large numbers of unmanned aircraft into controlled airspace. "These rules will pave the way for much larger autonomous aircraft," he said. "Having full visibility and situation awareness [for UAS] is a key facet of this and we need machinery that can use real-time data. The next step is connecting all these aircraft. We are already doing live telemetry [to track ,UAS's positions] for some customers."

AirMap, another prospective USS vendor, applauded FAA's proposed remote ID rule and said that the LAANC program—for which it already provides service—is a proven model for how a public-private partnership can support growth in the UAS flights. "It validates a core belief we hold that the only way drones can operate at scale is if they all participate in a connected, internet-enabled unmanned aircraft traffic management [UTM] system," company chairman and co-founder Ben Marcus told **AIN**.

There are already established standards in place for remote ID and tracking technology, as defined by ASTM International through its WK65041 standard issued in July 2019. This document has been endorsed by 35 regulatory and industry organizations worldwide. According to AirMap, the standard provides, "a flexible and scalable way to remotely identify drones while protecting operator privacy."

"The proposed Remote ID rule requires nearly all drone operators to share their position and identifying information," Marcus explained. "That's important as it will ultimately enable beyond-visual-line-of-sight flights and autonomous operations. When operators share their information in a UTM system, aircraft can safely fly in proximity to one another and dynamically reroute based on highly accurate airspace information including restrictions, traffic, weather, and emergency activity. We're building these capabilities with drones now, but we know that in the future the low-altitude airspace is going to get busier with high-density drone and eVTOL operations." ■



Existing remote identification applications can display multiple drone operations managed by separate UAS service suppliers, such as Wing (left), AirMap (center), and UASidekick.

FutureFlight

This story comes from FutureFlight.aero a resource developed by **AIN** to provide objective, independent coverage of new aviation technology, including electric aircraft developments.

Bombardier mulls exit from A220 program

by Gregory Polek

Bombardier on January 16 signaled a possible complete retreat from the commercial aircraft business in a preliminary fourth-quarter earnings report that anticipates a $130 million EBIT loss during the period. The potential exit from the Airbus A220 program, in which the company still holds a minority stake, would follow the company's decision last year to sell its CRJ regional jet program to Mitsubishi and its aerostructures manufacturing business in Belfast to Spirit Aerosystems. The Canadian company said it expected both transactions to close by mid-year and generate $1.1 billion in cash.

"While the A220 program continues to win in the marketplace and demonstrate its value to airlines, the latest indications of the financial plan from [Airbus Canada Limited Partnership] calls for additional cash investments to support production ramp-up, pushes out the break-even timeline, and generates a lower return over the life of the program," Bombardier said in the report. "This may significantly impact the joint venture value. Bombardier will disclose the amount of any write-down when we complete our analysis and report our final fourth quarter and 2019 financial results."

In a statement to **AIN**, Bombardier said the joint venture remains under review by the partners and that it would release more information on February 13.

Bombardier has invested a total of $6 billion in the former C Series program since its launch in 2008. After several delays, the narrowbody airliner won Transport Canada certification in December 2015, not long after a first round of talks with Airbus over a possible combination fizzled when Airbus's due diligence failed to find a compelling case for it. Finally, in October 2017, Bombardier agreed to hand over 51 percent of the loss-making program to the European airframer for no cash consideration while retaining a 31-percent stake in what would become the C Series Aircraft Limited Partnership (CSALP). The Quebec provincial government took the remaining 19 percent.

Last month Bombardier signaled its possible intention to withdraw from the Airbus A220 program, formerly the company's CSeries, which it sold a majority stake in last year.

Under the deal, which closed in July 2018, Bombardier agreed to fund cash shortfalls of up to $925 million over the course of three and a half years, and the partners' Class A shareholders would share the cost of any excess shortfall. The deal also allowed for Bombardier to force Airbus to take its entire stake in the program in 2026 or Airbus could oblige Bombardier to sell the stake.

Since the sale of the program, Airbus changed the name of the airplane to the A220 and decided to move some production to its U.S. plant in Mobile, Alabama. Assembly of A220s began in Mobile last August, while primary production remained in Mirabel, Quebec. In a statement issued Thursday, Airbus said it remains committed to the A220 and would continue to fund the program "on its way to break even." ■

MATT THURBER

AIN flies the top-of-the line CitationJet

by Matt Thurber

The Citation CJ4 has done quite well in the light-jet market, carving out a profitable niche for Textron Aviation with a well-performing capable jet serving both owner-pilots and professional fliers, alike.

Entering service in 2010, the $9.41 million CJ4 is the largest of the CitationJet series and the company's largest Part 23 airplane, and it brought some new design features to the lineup that set it apart from earlier models. Like larger Citations, the CJ4 has some wing sweep, 12.5 degrees, but it also retains the CJ's short-field capabilities. Other larger-jet features include electrically heated windshields instead of the bleed-air-heated systems on the M2 and CJ3+, as well as single-point refueling. The CJ4 also has an externally serviced flushing lavatory, which was optional until serial number 100, then became a standard feature.

The biggest difference between the CJ4 and its siblings is the larger jet's Collins Pro Line 21 avionics suite, which also features the MultiScan radar, which combines short-, mid-, and long-range radar images into a single easy-to-interpret picture of weather and turbulence. The Pro Line 21 avionics tend to be more familiar to pilots who grew up flying with traditional flight management system (FMS) interfaces and thus the CJ4 is well appreciated by professional pilots. The CJ4 is one of only two current-model Citations not equipped with Garmin-based G3000 or G5000 touchscreen-controlled avionics; the other is the XLS+. This may be a factor in why the CJ4 isn't as popular among the owner-flown crowd, especially those who learned to fly with Garmin avionics.

With more than 300 CJ4s delivered since 2010, the model has another advantage in its shared heritage, a common single-pilot type rating with other CJs, with just two days of differences training required when moving up to the CJ4.

CJ4 Layout

The CJ4's cabin is available in two configurations, with either eight or nine passenger seats. The eight-seat interior has a single seat opposite the main door, one double-club seating area, a single forward-facing row of seats behind that, then a belted seat in the lavatory. The nine-seat cabin replaces the single side-facing seat near the entry door with a two-seat couch with an armrest between the two seats. If flown single-pilot, the right seat on the flight deck is available for passengers, bringing the total capacity to nine or 10 passengers. The eight-passenger floorplan is standard, but there is no extra charge for the nine-passenger layout, and it even weighs slightly less, cutting 10.4 pounds from the empty weight.

The cabin width is 58 inches, and height is 57 inches, but that is from the ceiling

MATT THURBER

The spacious rear baggage compartment can hold up to 55.6 cu ft and 600 pounds. The cabin layout fits either eight or nine passenger seats, including the belted lav.

to the recessed dropped aisle. By comparison, the Phenom 300's cabin measures 61 inches wide by 59 inches, also with a dropped aisle, and the airplane can carry up to 10 passengers. The PC-24 can carry 11 passengers, with 10 in the cabin and one on the flight deck. Cabin width is 67 inches and height 61 inches, but the PC-24 has a flat floor, which gives it a more roomy feel.

The CJ4 flown for this report had the nine-seat interior, which cuts down on the storage space next to the two seats opposite the entry door. There is a double cupholder between the two seats.

Some of the added length of the CJ4 fuselage compared to the CJ3 comes in the flight deck and refreshment center area. Between the door and flight deck is a compact but spacious refreshment center, with plenty of space for a divided ice drawer, coffee container, disposable cup dispenser, trash container, bottled water and can storage, and snack areas.

The pedestal seats in the cabin all swivel and track forward/aft and inboard/outboard, but the two center forward-facing seats also are floor-tracking. Between the double-club seats are two bi-fold tables, and there are slimline bi-fold tables for the rear seating area. The club seat area can easily be expanded by moving the rear-most seats all the way back.

The cabin-management/entertainment system is the Collins Venue with a Blu ray media center with single-channel SiriusXM radio, a monitor on the right forward bulkhead, two side-ledge monitors, and environmental system controls. All lights are LED, and each seat has cabin-management and entertainment system controls. There is also a master panel on the left forward side at the top of the refreshment center. The two side-ledge monitors can be moved to docking stations at other seating areas.

For airborne connectivity, Gogo's air-to-ground system is an available option for U.S. operations, and international travelers may want to add the Cobham Inmarsat SwiftBroadband satcom.

Two external storage areas are available, one in the nose with 15 cu ft capable of up to 400 pounds, and in the tailcone with a 20- by 26-inch door and a capacity of 55.6 cu ft and 600 pounds.

CJ4 Performance

What sets the CJ4 apart is its performance, a big step up for pilots graduating from the smaller siblings and competitive with Embraer's Phenom 300 and the Pilatus PC-24. Runway performance of the CJ4 is similar to that of the CJ3+, according to demo pilot Mark Vanderpool, who is Textron Aviation's manager of flight operations, but the CJ4 is 3,000 pounds heavier and can fly 200 nm farther.

"It's designed as the ultimate owner-operator airplane," said Ben Nofziger, a Textron Aviation demo pilot who flew with Vanderpool during this trip. "It has so much flexibility, it's really the hot rod of the entire fleet."

Maximum takeoff weight (mtow) of the CJ4 is 17,110 pounds, and with full fuel (5,828 pounds) it can carry 1,000 pounds of payload. The heavier Phenom 300 (mtow 18,387 pounds) has a larger full-fuel payload at 1,561 pounds, while the PC-24's is 715 pounds (PC-24 mtow is 18,300 pounds).

The CJ4 is powered by two 3,621-pound-thrust Williams International FJ44-4A Fadec engines with a 5,000-hour TBO.

With a full load of fuel, taking off at mtow with five occupants, the CJ4 can fly 1,926 nm (NBAA IFR range, 100-nm alternate) while at high-speed cruise, which is 430 ktas at FL450. The Phenom 300 can fly 1,971 nm with six occupants, and the PC-24 2,000 nm with five occupants. With eight passengers, the CJ4's range drops to 1,701 nm.

At mtow, the CJ4 needs 3,410 feet to take off and can climb to its maximum altitude of FL450 in 29 minutes. Maximum cruise speed is 451 ktas, and this comes at FL310 and a weight of 14,000 pounds. On a sample 580-nm trip with eight passengers, the CJ4 needs 2,756 feet to take off and can then climb directly to FL450 in 17 minutes. Landing distance is 2,940 feet.

Systems and Avionics

The CJ4 is conventional in its aluminum structure with a T-tail empennage, moderately swept three-spar wing with hinged, three-position flaps, and trailing-beam landing gear. Wings and engine inlets are deiced by bleed air while the horizontal stabilizer uses pneumatic boots. Speed brakes are available for use at any speed, extending to 40 degrees, and spoiler panels extend to 54 degrees for lift-dump on the ground. Air-conditioning is via a vapor-cycle system.

The electrical system runs off two 300-amp engine-driven starter-generators, but each engine also drives an alternator to provide power for an AC flight deck windshield and side window anti-icing and defogging system. The alternators can also back up the electrical system in case of dual generator failure, with a transformer rectifier converting power to DC. Each engine Fadec has its own permanent magnet alternator.

No icing inhibitor is needed in the fuel as it is kept warm via a fuel-oil heat exchanger.

The CJ4's two lead-acid or nickel-cadmium batteries are accessible from outside the airplane, unlike the batteries in the earlier CJs, which are inside the tailcone.

Avionics are the Collins Pro Line 21 suite, which includes four 8- by 10-inch displays in portrait orientation. Two display control panels under the glareshield are for controlling the two outboard PFDs, while two cursor control panels manage functions on the two center multifunction displays. FMS control and radio tuning is via two control display units mounted forward of the throttle quadrant. Collins's Multi-Scan radar, which automatically displays a merged picture of weather no matter the airplane's attitude, is standard. ADS-B Out with a single TDR-94D transponder is now standard. A second FMS is an option, but WAAS LPV is included as standard, whether the buyer chooses one or two FMSs. Also standard is emergency descent mode, which activates if the system detects depressurization above 30,000 feet with the autopilot engaged.

› continues on next page

Cessna Citation CJ4 Specifications and Performance

Price (typically completed and equipped)	$9.41 million
Engines (2)	Williams FJ44-4A, 3,621 lbs
Avionics	Collins Pro Line 21
Passengers (typical)	1 crew + 8/9 pax
Range (w/NBAA reserves, 100-nm alternate)	1,926 nm at 430 ktas
High-speed cruise	451 ktas
Long-range cruise speed	391 ktas
Fuel capacity	5,828 lbs
Max payload w/full fuel	1,000 lbs
Maximum altitude	45,000 ft
Cabin altitude at maximum altitude	7,800 ft
Max takeoff weight	17,110 lbs
Takeoff distance at mtow (sea level, standard)	3,410 ft
Landing distance	2,940 ft
Length	53.33 ft
Wingspan	50.83 ft
Height	15.33 ft
Cabin	Volume: 311 cu ft
	Width: 4.83 ft
	Height: 4.75 ft
	Length (seating area): 17.33 ft
Baggage capacity (including cabin storage)	77 cu ft/1,040 lbs
FAA certification (basis, date)	FAR Part 23, commuter category

MATT THURBER

The CJ4's excellent runway and high-speed performance is aided by two 3,621-pound-thrust Williams FJ44-4A turbofans and a moderately swept wing.

› continued from previous page

The Pro Line 21 system is sophisticated and does everything needed in a modern business jet, but it is a little surprising that Textron Aviation doesn't offer a synthetic vision option for the CJ4, especially considering the M2 and CJ3+ both offer synthetic vision with their Garmin G3000 avionics.

In fact, the company does get requests from potential buyers about moving the CJ4 to G3000. "It's a frequent ask," said sales engineer James Beeson during a pre-demo description of the CJ4. "But we definitely see that there's space in the market for this aircraft." Customers like the Collins MultiScan radar, he explained, and many pilots who flew earlier CJ versions with Pro Line 21 are already used to the Collins avionics. "We are always innovating and talking to customers," he said, "and looking for things they are wanting and improving our products. It's not just features, but manufacturing processes, and from an ease-of-maintenance standpoint."

On the maintenance end, Textron Aviation offers its ProTech program for the CJ4, which fixes the cost of labor for scheduled and unscheduled maintenance (based on the consumer price index). By signing up for all the Textron Aviation ProAdvantage programs, Beeson said, customers get predictable costs and can write one check for maintenance.

The Collins Pro Line 21-equipped CJ4 flown for this report was equipped with the optional second FMS. Dual cupholders for each pilot add a convenience to the CJ4's flight deck.

MATT THURBER

Flying the CJ4

Vanderpool and Nofziger flew the CJ4, a recent model with only 700 hours logged, to Morristown Municipal Airport in northern New Jersey for my demo flight.

The left seat is well furnished and it's easy to adjust it to fit, especially with the adjustable rudder pedals. Like the previous CJs that I've flown, the CJ4 fits comfortably and makes me feel like I'm part of the airplane.

We taxied to Morristown's Runway 5 and took off carrying 3,500 pounds of fuel. With three occupants our takeoff weight was 14,078 pounds, 3,032 pounds less than mtow. Calculations on the Citation CPCalc app showed that we needed a takeoff field length of 2,711 feet. Flaps were set to 15 degrees, and at this weight, decision speed was 94 knots and rotation speed 97 knots.

After lining up on the runway, I advanced the power levers all the way and the Williams engines spooled up quickly. At VR, I just had to pull back slightly on the yoke and the CJ4 launched into the air. Vanderpool had warned me to watch out for rapid acceleration after takeoff, and I had to pull the power back smartly to keep the pitch to the desired 10 degrees and speed at 200 knots. I turned north toward New York Stewart International Airport near Newburgh.

I hand flew until we climbed above the FL180 transition level, setting FLC mode and 240 knots. As we passed through 17,000 feet, rate of climb was 3,200 fpm, and it was still 2,700 fpm at FL230. We leveled off at FL330 for a speed check and had to pull the power back to 93.2 N1 to keep the speed below the redline. The CJ4 settled at Mach 0.762 for a true airspeed of 447 knots, with each engine burning 775 pph.

After some shallow turns to feel the CJ4's handling at altitude, I pulled the power back for a rapid descent and engaged the speed brakes. There was a subtle rumble but no pitch change, and it was easy to keep the speed at 250 kias while descending at 5,200 fpm, then leveling off at 13,500 feet for some airwork.

I set up for steep turns at 200 knots at 13,500 feet and did a 180-degree turn to the left then right. The CJ4's handling overall is comfortable, not too light on the controls and requiring more muscle than the entry-level M2, but that is appropriate for a high-performance airplane. To me, it felt closer to a Latitude than a smaller CJ. At slower speeds, the controls are well harmonized, and flying in the traffic pattern was more pleasant.

Vanderpool pulled the power back on the right engine so I could feel the yaw, which wasn't too apparent due to the rudder bias system that automatically compensates for a failed engine while requiring a small amount of rudder pressure by the pilot.

We set up for the ILS Runway 9 approach at Stewart. Vref was 99 kias, and I hand flew the approach with the flight director guidance. The CJ4 was perfectly solid during the approach, and the landing on the 11,817-foot runway was easy, just a small amount of nose up pull as the main wheels neared the pavement, and then a smooth touchdown and gentle braking for the turn off the runway.

I taxied back to Runway 9, then took off and flew in the pattern for another landing, which was even easier than the first. After the next takeoff, we flew back to Morristown and flew the RNAV Runway 5 approach. By this time, the CJ4 felt like an old friend, although I'll admit that I would need some of that differences training to learn how to run the Collins Pro Line 21 avionics efficiently. ■

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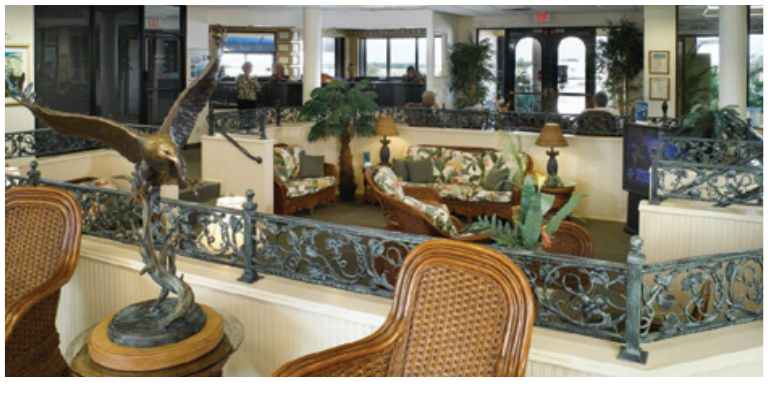

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Safran celebrates a ‘fantastic’ 2019

by Mark Huber

A senior Safran Helicopter Engines executive called 2019 “a fantastic year” and said that the company was “working very hard” on projects and programs in 2020, including eVTOL power systems. Bruno Bellanger, Safran Helicopter Engines executive vice president for programs, noted that the company certified four engines in 2019, a feat “never seen in our company in the last 20 years.” Those programs included engines for the Airbus Helicopters H160, Leonardo AW189, Indian Light Utility Helicopter (LUH), and Avicopter AC352, the Chinese variant of the Airbus H175.

The Arrano 1A engine for the Airbus H160 received EASA type certification in June after a test campaign that included more than 11,000 run hours and 2,500 flight hours. The Arrano is a new-generation engine designed to power four- to six-tonne helicopters and produces between 1,100 and 1,300 shp. Engine features include new-generation digital controls and an efficient two-stage compressor with new variable inlet guide vanes. The components improve engine thermal efficiency and yield a fuel burn that is up to 15 percent lower than comparable in-service engines, Belanger said. The “gyratory” combustion chamber uses fuel injectors made with additive manufacturing techniques (3D printing). The Arrano 1A was designed to be more easily serviced, and maintenance time required is half of that for previous-generation engines, according to Safran. The company offers operators complementary services with the engine, including its electronic engine logbook (Boost) and health monitoring. Bellanger said that more than 1,700 Safran engines across all models are enrolled in Boost.

In October, the Civil Aviation Administration of China (CAAC) certified the WZ16, a locally produced version of Safran’s 1,700- to 2,000-shp Ardiden 3C engine, which was jointly developed and built by Safran Helicopter Engines and Aero Engine Corporation of China (AECC). The engine is installed in the Avic AC352 helicopter, the Chinese variant of the Airbus Helicopters H175 super-medium twin. The AC352 first flew in December 2016 and certification is planned for 2021. Safran and AECC subsequently agreed to strengthen their cooperation on the WZ16. Terms of the deal include study of a potential joint venture in China to support and maintain in-service WZ16s, production launch of the first 120 WZ16s with an opportunity for 100 more engines, and new applications for the WZ16, including a turboprop variant for fixed-wing aircraft.

In November, Safran received EASA type certification for the Ardiden 1U engine, installed in India’s LUH (Light Utility Helicopter). LUH is a new three-tonne, single-engine, multipurpose rotorcraft designed by Hindustan Aeronautics Ltd. (HAL). The aircraft made its first flight in September 2016. The 1,430 shp 1U is an increased-power derivative of the 1,400 shp Ardiden 1H1, an engine that was co-developed by Safran and HAL and is in production with the designation “Shakti.” It powers HAL’s Dhruv and Light Combat Helicopter, and more than 250 units are in service. Since its first ground run in 2015, the Ardiden 1U has accumulated approximately 1,000 ground and flight-test hours and has performed well, said Benoit Gadefait, Safran v-p of medium-helicopter engine programs. “Recently, the [LUH] conducted hot and high tests in the Himalayas, showing its abilities to operate in this demanding environment. It took off from remote areas at more than 5,500 meters’ elevation [18,044 feet] in hot conditions—up to 30 degrees C (86 degrees F), lifting more than the expected payload.” The 1U also features what Safran calls “an innovative control system specifically designed for single-engine rotorcraft.” The engine additionally incorporates dual-channel Fadec, automatic power check, and APU mode.

Safran received EASA type certification approval for its Aneto-1K engine, as fitted to the Leonardo AW189K, in December, following a flight-test campaign that began in March 2017. The Aneto family produces between 2,500 and 3,000 shp and is intended for super-medium and heavy helicopters. Rated at 2,500 shp, the -1K has a power-to-volume ratio that produces 25 percent more thermal power than existing and similarly rated engines. Safran said this will expand the envelope of missions that helicopters such as the AW189K can perform in applications—including offshore transport, search and rescue, firefighting, law enforcement, and military transport—that demand increased hot-and-high power margins and assured performance in the transitory regime. The -1K’s maintenance regime has been optimized with fewer scheduled tasks and longer service intervals and connectivity features such as health monitoring.

The Aneto has also been selected to power Airbus’s new Racer compound helicopter. The Racer uses elements of the H160’s fuselage mated to a conventional main rotor, a box wing, and twin pusher propellers. Top speed is expected to be in the area of 250 knots.

New programs continuing under development include the Add+ demonstration engine, the technology turboprop demonstrator, and hybrid and electric propulsion for helicopters and eVTOL aircraft.

The Add+ technology demonstrator is based on the current Arrius helicopter engine but with 30 percent of components produced using additive manufacturing. Employing technologies first displayed in June with Add+, several major engine components—including nozzle guide vanes, combustion chamber, and stator rear module—are manufactured using selective laser melting techniques. This allows assemblies of hundreds of pieces to be molded into a single piece. By way of example, the accessory gearbox casing is now made of two pieces instead of 12. Add+ also integrates components manufactured by metal injection molding, such as free power turbine blades. Bellanger emphasized that Safran is already incorporating 3D components into production models, including the Arrano and Aneto. But using major 3D content will allow engineers to “think the shape of the engine quite differently,” he said.

Safran and Airbus Helicopters announced over the summer that they are teaming to demonstrate technologies that reduce noise and CO_2 emissions for future vertical takeoff and landing (VTOL) aircraft. The two companies signed a letter of intent at the 2019 Paris Air Show to jointly investigate technologies, including electrification, higher-efficiency gas turbines, alternative fuels, and advanced engine architectures that reduce the acoustic footprint of turbines as part of the EU-funded Horizon Europe program.

Bruno Bellanger, Safran Helicopter Engines executive vice president for programs

Ballenger said that the company is continuing its eVTOL “journey” with a focus on developing hybrid propulsion systems featuring a turbogenerator and electric boost motors for helicopters—technology he called “very interesting,” particularly for single-engine helicopters. “Having a backup system like this will make it possible for single-engine helicopters to operate over large cities in Europe. Additional electrical power provides the best efficiency for the cruise phase of flight and provides benefits for fuel savings,” he said.

In September, Safran announced that it was working with ZF Luftfahrttechnik and MT-Propeller, jointly developing a new turboprop engine system aimed at Europe’s unmanned aircraft market. The engine will be optimized for medium and high altitude, up to 45,000 feet, and feature Fadec and propeller control for both power and propeller pitch. It is a derivative of Safran Helicopter Engines’ Ardiden 3-based Tech TP demonstration engine. That engine made its first ground run in June at Safran’s Tarnos, France, facility. The goal of Tech TP, which is part of the European Union’s Clean Sky 2 research and innovation program, is to validate technologies required to develop a new-generation turboprop with lightweight architecture, improved fuel consumption, and lower emissions. Bellanger said the new engine would feature “high levels of design maturity and competitive operating and maintenance costs.”

Bellanger said the eVTOL work with Airbus involves a “very substantial commitment to the eVTOL, STOL, and logistics markets. Within every company in the Safran Group, there is a huge number of people investing a lot in the technologies.” He stressed that the mission would drive the technologies. “For the logistics market and low-end, on-demand mobility there is a path for a full-electric propulsion system, as there is for the low-payload, last-mile logistics market. Long distances and high payload require a hybrid solution. But we’re still investing a lot in our current thermal engines and believe we can significantly improve fuel savings and efficiencies there. We’re also working on new synthetic fuels. It comes down to a mix of several technologies.” ■

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Duncan Aviation's Matt Stolz, far left, leads a tour of the Lincoln, Nebraska-based MRO provider's training area that it established for its airframe technician apprenticeship program.

Duncan looks to future with formalized apprenticeships

by Jerry Siebenmark

Beginning this year, Duncan Aviation will launch a formalized apprenticeship program that will offer paying jobs to apprentices while preparing them over a year and a half for an FAA license as airframe technicians. The new program is an outgrowth of an effort the Lincoln, Nebraska-based MRO provider began several years ago to offer on-the-job training and instruction to new hires and existing workers interested in becoming A&P mechanics. "The apprentice program has been very important to us," Duncan president and CEO Aaron Hilkemann told **AIN**.

Three apprentices—or "tech helpers" as Duncan calls them—tested for their airframe certifications in December while five more were expected to test in January, Duncan manager of aircraft services Jeremy Rangel told **AIN**. That's in addition to another three who have successfully passed the FAA examination. "This next year [2020] will be our first full run with the [U.S.] Department of Labor [DOL] standards," added Rangel, who also oversees Duncan's apprenticeship program.

In November, Duncan's re-tooled apprenticeship program was formally registered by the U.S. Department of Labor and Department of Education (DOE). Previously, Duncan's apprenticeship program was 18 months long as required by the FAA for licensure testing. "We've actually progressed quite a few people through that process, but we started thinking about how we are going to get these guys extremely well prepared for the test," Rangel explained, "because the test is substantial and actually changed over the years and has become more and more difficult."

That's when Duncan contacted the DOE and DOL to formally develop its apprenticeship program, which has been extended to 24 months. "[DOL] gave us their guidelines and we worked with what they had and re-tooled it to match with what works for Duncan Aviation in developing A&Ps into the program we have now," Rangel added. "Through this course and on-the-job training, [tech helpers] get every gap that was missing and what we needed to get them ready for testing."

The now-extended program includes a 90-day period to familiarize tech helpers with working around aircraft and the teams they are assigned to as well as learning the culture at Duncan. After those 90 days, the tech helpers transition into the apprenticeship program.

> **"Through this course and on-the-job training, [tech helpers] get every gap that was missing and what we needed to get them ready for testing."**
>
> –Duncan manager of aircraft services Jeremy Rangel

Duncan will have two hiring rotations annually for the program and expects each of those classes to have between 20 and 25 students. Under it, they work 30 to 36 hours a week and attend classroom training for four to 10 hours a week. Military veterans who served as aircraft mechanics and attend the program under an accelerated basis are eligible to use the G.I. bill to supplement their income as tech helpers. "They can utilize that to offset starting wages that are normally not super high, so it helps them make that transition," Rangel said.

Eventually, Duncan expects to expand the apprentice program to its other full-service MRO locations in Battle Creek, Michigan and, later, Provo, Utah, which it opened last year. "We're working to formalize the process over in Battle Creek," Rangel said. "Provo's probably a little ways off as they're building themselves up and we don't want to impact them with too much more change."

Duncan also is looking at adding a powerplant apprenticeship program for those airframe technicians who want to add that credential, he added.

A Conduit to a Future Workforce

Even with the time, energy, and investment into the apprenticeship program, Rangel said the bulk of its airframe and powerplant technician hires are still those who are already certified.

"We by no means want to slow that path, because the knowledge base right there supports their growth quicker through the company and supports us better right off the bat," Rangel said of experienced A&Ps. "I would say probably 20 percent of our incomings come through the [apprenticeship] program."

While current trends suggest that an aging A&P workforce and too few programs and students exist to offset retirements and future industry needs, it's not a significant concern for Duncan at the moment. Hilkemann said Duncan's average team member has 13 years at the company and is around 39 years old. "There are some companies I know in the industry that have a much higher average age and it's going to be much more difficult [for them]," he said.

Still, Duncan's program has attracted future generations of A&Ps because some of its apprentices have come directly from high school or college. And Hilkemann thinks it will continue to be an effective conduit for Duncan's future workforce needs.

"They're getting paid for working and they get paid for...school," he explained. "So it's just been a very positive program and we've watched those people stay in the company. They're obviously very loyal. They're presented their degree, you could say, working for us and it's been a positive all around." ■

Bizav groups cheer tax credit promoting SAF

The business aviation community is resoundingly endorsing a measure included in the recently passed government-wide funding bill that industry leaders say will promote and develop use of sustainable aviation fuels (SAF). The Fiscal Year 2020 funding bill, which was signed into law on December 20 shortly after clearing the House and Senate that week, restores an expired biodiesel tax credit through 2022. The tax credit applies to qualified producers or blenders of sustainable fuels derived from biomass.

In a joint statement, the Sustainable Aviation Fuels Coalition called the tax incentive vital to the industry's efforts to research, produce, and scale SAF use. "Ten years ago, the business aviation community made a commitment to sustainability and carbon-neutral growth. Utilization of SAF by business aviation operators is an important part of this commitment," said the coalition, which includes the European Business Aviation Association, General Aviation Manufacturers Association, International Business Aviation Council, National Air Transportation Association, and National Business Aviation Association.

"NBAA's 11,000 member companies are committed to increasing the utilization of SAF in our daily operations," said NBAA president and CEO Ed Bolen. "This innovative fuel can reduce CO_2 emissions by up to 80 percent, and they are a critical part of business aviation's commitment to sustainability."

NATA COO Timothy Obitts said the tax incentives, along with other initiatives such as California's Low Carbon Fuel Standard program, "will help create the supply of sustainable aviation fuels that the business aviation industry is demanding. SAF is one of the critical pieces that will help the industry achieve cleaner skies for future generations."

The industry is aggressively promoting SAF use, GAMA president and CEO Pete Bunce further said, adding "we will continue to work with policymakers and other stakeholders to support its use."

From an international perspective, IBAC director general Kurt Edwards said the tax incentive "demonstrates continued U.S. leadership among its international peers to encourage the production and use of SAF." **K.L.**

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Expensive and failure-prone electric- and vacuum-driven instruments can all be replaced by Garmin's new GI 275 electronic displays, which fit into standard 3.125-inch panel cutouts using rear-mounting that doesn't affect the panel overlay cover.

Garmin's GI 275 is a direct steam gauge replacement

by Matt Thurber

Garmin International last month unveiled a new series of instrument panel-mounted displays that are rear-mounted into standard 3.125-inch panel cutouts, offering a simple way to replace legacy vacuum- or electric-driven instruments with capable new electronic displays. The GI 275 can replace attitude indicators, attitude direction indicators, horizontal situation indicators (HSIs), and course deviation indicators (CDIs), and it can also replace engine instruments as a primary engine indication system (EIS).

The GI 275 is FAA approved and available for purchase now. Approvals cover more than 1,000 single- and twin-engine aircraft, plus some Class IV aircraft (commuter category, for example, Beech 1900) as well as Part 25 aircraft. Prices start at less than $4,000 and vary depending on the configuration and options.

The GI 275 isn't conceptually new as other companies have developed 3.125-inch replacement electronic instruments. What makes Garmin's move unique is that the GI 275 is compatible with many third-party autopilots without needing a separate adapter and it can also display more information including synthetic vision (optional), traffic, weather, terrain, SafeTaxi airport diagrams, and multifunction display-type maps. One GI 275 can also be a four-in-one instrument that can be installed as a standby display with a 60-minute backup battery. As a standby, the GI 275 includes a VFR GPS for backup navigation.

The GI 275 offers both touchscreen and dual-concentric knob interfaces. Aircraft owners can install up to six GI 275s in their instrument panels.

For EIS use in multiengine aircraft, a GI 275 is required for each engine. Engine indications for most Lycoming and Continental normally aspirated and turbocharged engines include RPM, manifold pressure, oil pressure and temperature, cylinder head temperature, exhaust gas temperature, turbine inlet temperature, fuel flow, fuel quantity, fuel pressure, volts, and amps. The GI 275 can also provide lean-assist and exceedance alerting, which can be set up by the installer. Pilots can set advisory alerts to give notice of items such as high oil temperature, high oil pressure, high CHT, etc. Engine data can be shared wirelessly with the Garmin Pilot app on Apple iOS devices and also viewed on the FlyGarmin website for later analysis.

Garmin's GI 275 displays offer touchscreen and dual-concentric knob interfaces. Shown here are an attitude indicator (left), multifunction display (center), and HSI with map (right).

The GI 275 can be configured as a CDI or HSI and has inputs for two GPS sources and two VHF nav sources. An optional magnetometer provides magnetic-based HSI guidance. The GI 275 can interface with third-party navigators, not just Garmin units, and without an adapter. As a CDI or HSI, the GI 275 can also display MFD features including moving map, weather, traffic, and terrain. The GI 275 can also be installed as an MFD with those display features as well as interfacing with traffic advisory (TAS) and traffic alert and collision avoidance systems (TCAS). Other MFD features include Garmin's SafeTaxi airport diagrams, terrain shading and obstacles, including Garmin's WireAware database, audible and visual terrain proximity alerts, SiriusXM weather when paired with a GDL 69 datalink, and free FIS-B (ASD-B in) weather when paired with a GTX 345 or GNX 375. The GI 275 can display radar altimeter information when paired with Garmin's GRA 55/5500 and third-party radar altimeters.

Compatibility with Garmin's GFC 600 autopilot and many third-party autopilots is available now, and the GFC 500 will be added later this year. The GI 275 replaces the primary attitude indicator required for the applicable autopilots.

The GI 275 has Wi-Fi built-in and thus can receive database updates using Garmin's Database Concierge. Data is synchronized automatically with all the installed GI 275s. Pilots can transfer flight plans wirelessly and view position and other information on mobile devices via Bluetooth, but the GI 275 has to be paired with a GPS 175, GNC 355, or GNX 375. ■

TBM, Quest deliveries sagged in 2019

Deliveries softened slightly for both the TBM and Kodiak families, with Daher reporting total shipments of 68 for the combined turboprop-single product lines in 2019. This marks Daher's first report of combined results since acquiring the manufacturer of the Kodiak utility airplane—Sandpoint, Idaho-based Quest Aircraft—in October.

Daher delivered 48 TBM 910 and 940 variants in 2019, while 20 Kodiak 100 Series II airplanes were shipped. This compares with combined deliveries of 73 in 2018, including 50 TBM 910/930s and 23 Kodiaks.

North America remained the dominant market for the Kodiak, accounting for 14 of the deliveries—11 in the U.S. and three in Canada. However, three were also handed over to customers in China and another in Thailand. Two Kodiaks went to Europe.

As with the Kodiak, the majority of the TBM models went to the U.S., accounting for 38 in all. Europe was the next largest TBM market in 2019, with three going to Germany, two to the UK, and one to Russia. Another three went to Latin America (two to Brazil and another to Mexico), and one, a TBM 940, was handed over to a customer in Japan. Daher noted the delivery to Japan was the first since it had shipped several TBM 700s to Japanese customers in the early days of the TBM program. **K.L.**

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F-35 deliveries exceed 2019 target

by David Donald

Lockheed Martin delivered the 134th and last F-35 of 2019 on December 30. The number exceeded by three aircraft the joint industry/government goal set for the year of 131. It is the third successive year that the program has met its delivery targets as the industrial effort ramps up its annual production rate.

The last aircraft to be handed over in 2019 was an F-35B STOVL variant for the Marines, one of 81 F-35s to be handed over to U.S. forces during the year. Thirty aircraft were delivered to industrial partner nations during 2019, while the remaining 23 were delivered to export customers through the Foreign Military Sales program.

The 2019 figures represent a 47 percent increase over the 91 aircraft delivered in 2018, the last of which was also a Marines F-35B. In 2017 66 aircraft were handed over. The Lockheed Martin-led industrial team is targeting 141 aircraft for delivery in 2020 and is aiming to meet its peak annual rate of around 160 aircraft in 2023.

"This achievement is a testament to the readiness of the full F-35 enterprise to ramp to full-rate production, and we continue to focus on improving on-time deliveries across the entire weapons system," said Greg Ulmer, Lockheed Martin's vice president and general manager for the F-35 program. "We have met our annual delivery targets three years in a row and continue to increase production rates, improve efficiencies, and reduce costs."

The final F-35 to be delivered in 2019 was the 91st F-35B for the U.S. Marine Corps (BF-91).

The global fleet is due to surpass 500 aircraft early in 2020 and by the end of 2019 had amassed more than 240,000 flight hours. Training programs have qualified 975 pilots and 8,585 maintainers, and eight services have declared initial operating capability. Four of them—the U.S. Air Force and Marine Corps, Royal Air Force, and Israeli Air Force—have used the F-35 in action.

As the industrial program matures with new processes and automation being applied to streamline production, the unit cost of the baseline F-35A has fallen to $77.9 million, below the price of some of the aircraft's fourth-generation fighter rivals. Sustainment costs have also decreased year over year, and are now 35 percent down on the 2015 figure. Mission readiness rates are climbing too, standing at around 65 percent fleetwide and nearly 75 percent in the operational squadrons. ■

Indonesia launches armed UAV program

State-owned Indonesian aerospace company PT Dirgantara Indonesia (PT DI) unveiled a domestically developed unmanned aerial vehicle (UAV) on December 30. Designed to meet the requirements of the Indonesian Air Force (TNI-AU), the UAV bears a strong resemblance to the Chinese CASC CH-4, which is in operation with the TNI-AU in small numbers. The vehicle, which is capable of carrying missiles, has yet to be named but is referred to as the Pesawat Udara Nir Awak jenis Medium Altitude Long Endurance (PUNA MALE, unmanned MALE aircraft).

Due to make its first flight in 2020, the UAV measures 8.65 meters (28.4 feet) in length, has a wingspan of 16 meters, and has a maximum takeoff weight of 1,300 kg (2,866 pounds), with a payload of 300 kg. With a fuel capacity of 420 liters (111 gallons) for its four-stroke turbocharged Rotax engine, the UAV can stay aloft for up to 30 hours, with a ceiling of 7,200 meters (23,600 feet).

The PUNA MALE team plans to acquire commercial off-the-shelf products such as landing gear and flight control systems.

The program timeline suggests that local industry is also developing armament to be ready by 2024. **C.C.**

Louder 'Thunder' forecast for JF-17 users

by Jon Lake

December saw the ceremonial rollout of the first batch of eight two-seat, dual-control Sino-Pakistani JF-17B Thunder fighters. It also marked the inaugural flight of the first prototype of the new generation Block III JF-17.

The JF-17 Thunder is a lightweight, single-engine, multi-role fighter that was jointly developed by China's Chengdu Aircraft Corporation (CAC) and the Pakistan Aeronautical Complex (PAC) and is in production at PAC's Kamra facility. The JF-17 has not been procured by China's People's Liberation Army Air Force but does also use the alternate FC-1 designation and the Chinese name Xiāo Lóng (Fierce Dragon).

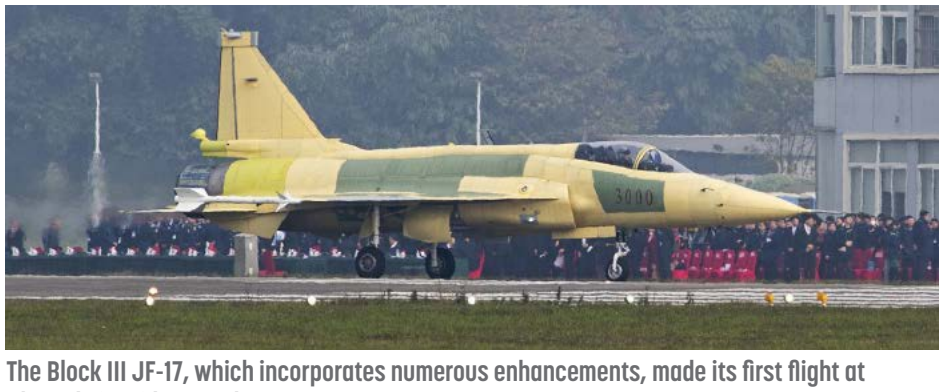
PAC completed the eight two-seat JF-17Bs at Kamra in 2019 and it will produce 14 more in 2020 and four in 2021 to meet PAF requirements. The first batch of eight JF-17Bs was ceremonially rolled out at Kamra on December 27, 2019, in the presence of Air Chief Marshall Mujahid Anwar Khan.

In Pakistan Air Force (PAF) service, the JF-17 Thunder has accumulated about 20,000 operational flying hours since its official introduction to service in 2011. Fifty Block I aircraft were delivered before production switched to the improved Block II in December 2013. The 62 Block II aircraft introduced improved avionics, a new datalink, and improved electronic warfare capabilities as well as increased weapons-carrying capacity. All but the first 24 or so also incorporated an air-to-air refueling capability. Deliveries of the Block II variant ended in June 2019, by which time the PAF had equipped five front-line JF-17 squadrons.

The Thunder has already been used operationally by the PAF, participating in operations against militants in North Waziristan. The PAF also claims that its JF-17s shot down an Indian Air Force MiG-21 and a Su-30MKI on February 27, 2019.

The PAF will also receive 50 more single-seat JF-17s, to be delivered in a new Block III configuration. The Block III prototype made its first flight on December 15, 2019, at Chengdu, and the first two production aircraft are already "in build" at Kamra. The remainder will follow at a rate of 12 per year from 2021 onwards.

The Block III features an Aurora EHUD-2 wide-angle holographic head-up display and a new electronic warfare system incorporating an S740 Airborne Missile Approach Warning System, with relocated infrared missile approach warning sensors. An air-to-air refueling probe light is fitted, and the aircraft has new LED landing lights. Some sources suggest that the airframe is strengthened and that there are further cockpit and avionics improvements (possibly including a single, large-area head-down display. The aircraft may have a revised flight management system and a new fly-by-wire flight control system.



The Block III JF-17, which incorporates numerous enhancements, made its first flight at Chengdu in mid-December.

Early reports predicted that the aircraft would have a new Chinese-made active electronically scanned array radar to replace the mechanically-scanned KLJ-7V2 X-band multifunction pulse-Doppler radar. There are two options: the Nanjing Research Institute of Electronics Technology's KLJ-7A and the Leihua Electronic Technology Research Institute's LKF601E.

The aircraft is expected to incorporate a helmet-mounted display (possibly of South African origin, and perhaps to be used in association with the Denel A-Darter high off-boresight within visual range air-to-air missile). It is also expected to be fitted with an additional fuselage hardpoint intended to carry a WMD-7 targeting pod (a Chinese equivalent to the Lockheed Martin sniper pod). ■

Erickson has deployed six Air Cranes to help fight the ravaging fires in Australia–N247AC (Jerry), N189AC (Gypsy Lady), N194AC (Delilah), N243AC (Marty), N218AC (Elsie), and N154AC (Georgia Peach).

Air Cranes battling Australian wildfires

by Mark Huber

Portland, Oregon-based Erickson is flying six of its S-64 Air Cranes on Australia's record-setting wildfires. More than 12 million acres of that country have been charred during this year's fire season—six times more than that consumed during California's record-setting 2018 infernos that inflicted an estimated $3.5 billion in damages, consumed 1.9 million acres, destroyed 10,300 structures, and left 103 dead.

In Australia, some 130 blazes, mainly in New South Wales (NSW), have turned tourist beaches into refugee camps, incinerated in excess of 1,400 homes, and killed more than 23—so far, with fires predicted to linger for weeks. Damages are expected to top the $3.3 billion incurred during the nation's 2009 "Black Saturday" fires that torched 1.11 million acres. Area wildlife has been decimated. An Australian university estimates that 480 million animals have been killed in NSW wildfires since September. The country is under a state of emergency, with daytime temperatures reaching 120 degrees F and high winds combining to overwhelm the efforts of firefighters on the ground and the 160-plus fleet of aircraft attacking the fires.

The ability to fight the Australian fires was retarded by the government's underfunding of firefighting efforts and the slowness with which it responded with military assets, waiting until after the New Year to call up 3,000 reservists and devote the Australian Army's modest fleet of Boeing CH-47F Chinooks and Sikorsky Blackhawks to the cause. Also compounding the aerial firefighting—the longer fire seasons in recent years in California, South America, and the Mediterranean—that makes it harder to obtain contracted fixed-wing and helicopter water bombers from those markets, places where local fire seasons generally did not overlap with Australia's until recently.

Erickson has been working with Australian partner Kestrel for 21 years. In 2001, an Air Crane named "Elvis" saved the lives of 14 trapped firefighters there. Air Cranes flying during this season's fires are based in New South Wales, Victoria, South Australia, and Western Australia and include N247AC (Jerry), N189AC (Gypsy Lady), N194AC (Delilah), N243AC (Marty), N218AC (Elsie), and N154AC (Georgia Peach).

Erickson lost an Air Crane last year while fighting fires in Australia. All three crewmembers survived when the 1967 S-64E, N173AC (Christine) crashed while fighting the Thomson Complex Catchment fires in Gippsland, Victoria on Jan. 28, 2019.

Erickson holds the type certificate for the S-64 and operates approximately 20 Air Cranes worldwide. It also services and builds S-64s for third-party customers, delivering two to the South Korean Forest Service (KFS) in 2019, bringing that organization's fleet up to six S-64 Air Cranes. When rigged for firefighting, the aircraft is typically fitted with a 2,650-gallon water tank and a quick-fill snorkel.

Erickson began flying a S-64 Skycrane leased from Sikorsky in 1971 in support of its aerial powerline construction and heli-logging operations. In 1992, Erickson began applying the Air Crane to firefighting. That year it purchased the type certificate for the S-64E and S-64F from Sikorsky and rebadged the helicopter the Erickson Air Crane.

It also designed the microprocessor-driven Air Crane water tank for aerial firefighting. A hydraulic snorkel system can refill it from any fresh-water source in as little as 45 seconds, from depths as shallow as 18 inches while the helicopter is in a hover. Over saltwater, a separate sea snorkel with a hydrofoil ram scoop is lowered while the helicopter skims the surface at 35 knots, refilling the tank in 30 seconds and minimizing the corrosive impact of sea spray on helicopter components.

The tank allows a pilot to select multiple dispersal rates and area coverage settings that are then calibrated to the helicopter's airspeed by the microprocessor unit—levels that vary from the equivalent of light rain to a total tank dump. The system gives the Air Crane the precision-drop capabilities of a helicopter combined with the volume of a large, multi-engine, fixed-wing water bomber. With a nearby water source, a single Air Crane can drop up to 25,000 gallons an hour on a fire.

The aircraft is powered by a pair of Pratt & Whitney JFTD12-5A engines, has a main rotor diameter of 72 feet, and a 16-foot-diameter tail rotor. Deployed Air Cranes typically travel with a six-man crew—two pilots, two mechanics, and two drivers—a maintenance trailer, and a fuel tanker truck. ■

SkyCourier unharmed by explosion at Textron

Textron Aviation's SkyCourier twin-engine turboprop development program was spared from serious damage after the massive building where it is being assembled in east Wichita was rocked by a liquid nitrogen explosion on December 27. The blast could be felt and heard from several miles away. There were no fatalities, but 11 people were transported to area hospitals and another four were treated and released at the scene, authorities said.

A cause of the explosion wasn't immediately known but there was a 3-inch line carrying liquid nitrogen to the building that ruptured and "caused a rupture to another vessel and that is the one that is currently venting now," Sedgwick County deputy fire chief Daniel Wegner said. He noted the plant was on holiday shutdown so a "skeleton crew" was working at the time of the explosion. "But I don't have numbers of how many people were in the plant at this time."

Textron Aviation spokeswoman Stephanie Harder said the building houses the airframer's composite manufacturing and experimental aircraft fabrication, including the SkyCourier. The company later confirmed that the SkyCourier program appeared to be unharmed by the explosion. "While the building damage assessment continues, the location of the company's Cessna SkyCourier development program in Plant 3 appears to have not been impacted," Textron said in a statement to **AIN**.

Earlier in December, the program marked a milestone with the mating of the prototype's fuselage and its high wing. The SkyCourier's flight test program includes five other flight and ground test articles. Current testing involves the SkyCourier's landing gear and avionics, and first flight is expected sometime this year.

FedEx is the launch customer for the SkyCourier, with 50 firm orders for the airplane and options for 50 more. Configurable for both cargo and commuter operations, it is designed to carry a payload of up to 6,000 pounds with an 87-inch cargo door, a flat floor, and a nearly 70-inch-tall and -wide cabin to accept three standard LD3 air cargo containers.


JERRY SIEBENMARK

In a passenger configuration, it will have seating for up to 19 passengers, with a netted rear cabin area for luggage and equipment. Capable of flying 200 ktas, the aircraft is powered by two 1,100-shp Pratt & Whitney Canada PT6A-65SC turboprop engines and two new 110-inch McCauley propellers. **J.S.**

The U.S. Navy has selected the TH-119, a military version of the Leonardo AW119, as its new helicopter training platform.

Leonardo TH-119 wins U.S. Navy helo trainer deal

by Mark Huber

The U.S. Navy has selected Leonardo's TH-119 as its new training helicopter, the company announced on January 13. A military variant of the civil AW119, the new military trainer—the TH-73A—will replace the service's existing fleet of Bell TH-57s. The initial contract is for 32 aircraft with spares, support, and training and is valued at nearly $176.5 million. Subsequent individual year contracts are expected to bring total deliveries to 130 aircraft by 2024, with a value of $648.1 million.

Leonardo had been competing with Bell and Airbus Helicopters for the deal and those companies had offered variants of the single-engine model 407 and light twin H135, respectively. Leonardo said the delivery of the helicopters "is expected to be completed in October 2021." The aircraft will be assembled at Leonardo's AgustaWestland Philadelphia Corp.

William Hunt, managing director of Leonardo Helicopters Philadelphia, said, "Our plan since day one has been to offer the U.S. Navy the training capabilities they asked for, without compromise. We are honored to deliver on that promise, build the new fleet in Philadelphia and maintain it from Milton, Florida."

In September 2019, Leonardo had promised to build a 100,000-sq-ft facility in Milton that would support the estimated 130 helicopters the Navy requires for its primary training mission. The new facility will be built in partnership with the Santa Rosa County Economic Development Office, as well as Space Florida, in the 269-acre Whiting Aviation Park adjacent to the air station where all helicopter pilots for the Navy, Marine Corps, and Coast Guard currently are trained. Envisioned as a full-service Part 145 repair station, the new facility would offer 24/7 service, including spare parts, warranty processing and renewal, technical and product engineering, and component and airframe repair.

"The new Leonardo TH-73A helicopters are the cornerstone of AHTS [advanced helicopter training system], which is the planned replacement to address the capability and capacity gaps of the current aging TH-57 Sea Ranger helicopter training platform," said Capt. Todd St. Laurent, Naval Undergraduate Flight Training Systems (PMA-273) program manager. "The TH-73A will provide a modern helicopter training platform that will serve rotary and tiltrotor training requirements into the foreseeable future. These new helicopters will ensure the Navy has capacity to train several hundred aviation students per year at Naval Air Station (NAS) Whiting Field in Milton."

The Navy says the helicopter will meet advanced rotary-wing and intermediate tiltrotor training requirements for the U.S. Navy, Marine Corps, and Coast Guard through 2050.

In July 2019, Leonardo announced that the TH-119 received IFR supplemental type certification from the FAA. The TH-119 is equipped with Genesys Aerosystems avionics and a Pratt & Whitney PT6B engine. It is based on the AW119 civil helicopter and features an adjustable observer seat that provides a full view of the cockpit, reinforced skids with removable shoes, and has the ability for "hot" pressure refueling without shutting the engine down.

All AW119s sold worldwide are manufactured in Philadelphia. The AW119 is in service in 40 countries and has been selected by military, government, and parapublic customers, including the Portuguese Air Force, New York City Department of Environmental Protection Police, and others across Europe, the Middle East, Asia, and Latin America.

"On the cusp of celebrating nearly 40 years of operating in Philadelphia, Leonardo is thrilled the U.S. Navy has selected our TH-119-based offer and us as a local and long term partner," said Leonardo CEO Alessandro Profumo.

The TH-73A contract is the second big U.S. defense win for Leonardo in recent years. In 2018, partnering with Boeing, Leonardo was awarded a $2.4 billion contract for 84 MH-139 medium twin helicopters from the U.S. Air Force to replace the fleet of Bell UH-1Ns used to provide security at the nation's intercontinental ballistic missile (ICBM) bases and transport U.S. government and security forces. The MH-139s are scheduled to become operational next year. ■

The UVH R22, an unmanned delivery drone, has a payload capacity of 400 pounds.

R22 converted to long-range drone

Unmanned systems developer UAVOS has converted a Robinson R22 into a long-range cargo delivery drone, designation UVH R22. The unmanned aircraft has a payload capacity of 400 pounds (at less than full fuel), a maximum full-fuel range of 551 nm, and an endurance of six hours. UAVOS CEO Aliaksei Stratsilatau said the unmanned R22's night and all-weather capabilities make it an ideal platform for cargo delivery.

"Cargo companies make money only when that cargo gets to its destination, and our R22 is their guarantee at any time and in any weather conditions," he said. The aircraft can also deliver materials for disaster and humanitarian relief.

The UVH R22 has fully automatic takeoff and landing modes, cruises at 86 knots, has a maximum takeoff weight of 1,400 pounds, and a service ceiling of 13,700 feet. Payload with 71 gallons full fuel is 88 pounds. A level surface of at least 50 x 50 feet is required for operations. In addition to delivery duties, the aircraft can also be configured for agricultural applications, radio relay, video surveillance, and airborne data collection such as meteorology, hydrology, and earth monitoring. **M.H.**

News Update

Long Island FBO Offers NYC Transfer Packages

Looking to provide a congestion-free alternative for business aviation customers heading to New York City, FBO Republic Jet Center has partnered with aircraft charter/management provider Prime Jet to offer a New York Express package. It features helicopter connections to and from Manhattan and Republic Airport in Farmingdale for customers booking a Prime Jet Gulfstream charter flight into Republic. The deal adds a one-way trip for up to six passengers on a Sikorsky S-76 operated by AAG, at a cost of $1,900.

The service provides 14-minute flights to a choice of three downtown Manhattan heliports, or for those who choose not to take the helicopter option, a complimentary luxury SUV transfer into the city.

Zuccaro Retires from HAI

Following a 50-plus year career in the helicopter industry and 15 years at the helm of the Helicopter Association International (HAI), Matt Zuccaro bid farewell, calling the helicopter market an industry of survivors and touting a bright future with opportunities ahead in vertical flight. HAI announced last summer his plans to retire this year, and the new HAI president and CEO, former FAA safety official James Viola, stepped into his new role last month.

UK Rotor Ranter Fined £1,600

A highly experienced UK helicopter pilot has been fined £1,600 ($2,080) by the Civil Aviation Authority for a testy on-air exchange with an air traffic controller. Joel Tobias was flying his Airbus EC120 from Manchester to Lytham St Annes last July 31 when he radioed for permission to transition the airspace over Blackpool airport.

The controller on frequency said she was preoccupied with assisting a lost pilot at the time, and Tobias apparently grew impatient with the delayed response to his calls, which simmered into an open mic rant with controller Andrea Tolley. Tobias was then advised to remain clear of the airport ATZ, which he did not do.

In fining Tolley, the CAA noted that he failed to report position, direction of flight, and altitude, potentially endangering other air traffic in the area.

Erickson Delivers Sixth Air Crane to Korea

Helicopter operator and manufacturer Erickson has delivered the last of two S-64 Air Crane twin-engine heavy utility copters to the Korean Forest Service (KFS) for 2019. The latest delivery is designated as a K8, incorporating the company's latest modifications.

Those modifications include composite main rotor blades and a glass cockpit. The addition of the K8 variant brings KFS's operational fleet of S-64s to six helicopters, according to Erickson.

Hawaiian air tour task force formed to battle restrictions

by Mark Huber

Air tour stakeholders in Hawaii have formed a task force to deal with industry issues there following several high-profile accidents and legislative backlash from certain elected officials. The Hawaii Air Tour Task Force's mission is to address safety and noise issues related to rotor- and fixed-wing aerial tours in the state. The task force said, "Community involvement, public outreach, and transparency will be prioritized in all recommendations from the task force to industry and regulators." Initial members include the Hawaii Helicopter Association (HHA), Hawaii Department of Transportation Airports Division (HDOTA), the FAA, Helicopter Association International (HAI), elected officials and their representatives, and "other industry stakeholders."

The task force is seeking community involvement as it moves forward, said Justin Brooke, task force co-chair and president of the HHA. HDOTA is applying for grant funding from the FAA and will also commit state dollars to fund public meetings, produce a study, and make recommendations concerning the helicopter and fixed-wing tour industry. The task force's formation is the next step forward on the part of the industry, regulators, and other interested parties to address the public's concerns regarding helicopter and fixed-wing aerial tours in Hawaii.

Members of the task force's executive committee include representatives from the HHA, HDOTA, General Aviation Council of Hawaii, HAI, and the Aircraft Owners and Pilots Association. Elected officials on the task force are state senator Lorraine Inouye and state representative Chris Lee. The FAA and U.S. Army and Navy are serving as technical advisors.

Legislative Attention

Air tour operators have been under increased criticism and scrutiny following fatal helitour accidents in 2019 in Kauai and Oahu that collectively killed 10. In May, Hawaii State Rep. Cynthia Thielen (R) called on the FAA to prohibit air tours over residential areas and national parks and called for the immediate grounding of helitour flights in Hawaii pending an investigation. In August, U.S. Rep. Ed Case (D-Hawaii) proposed legislation that would all but eliminate the helitour industry nationwide. The "Safe and Quiet Skies Act" would direct the FAA to impose a series of restrictions on the industry, including flying no lower than 1,500 feet agl; prohibiting flights over military installations, national cemeteries, national wilderness areas, national parks, and national wildlife refuges; and forbidding pilots to act as tour narrators while flying. It would also require helicopters to have a noise signature no greater than 55 dbA during overflight over any "occupied area," be it commercial, residential, or recreational—a standard that no currently certified helicopter can meet. The bill would also scuttle federal pre-emption with regard to airspace and air operations by giving states and localities the power to "impose additional requirements—stricter than the minimum national requirements called for in the act—on tour flights."

Case's bill is just the latest in a series offered by congressional representatives in recent years designed to restrict helicopter operations from New York to Los Angeles that attempted to, among other things, impose minimum helicopter operating altitudes, set a curfew for hours of operation, and mandate flight paths.

The HHA estimates that helicopter operators annually contribute $150 million to the state economy. The association points out that it has endeavored to address the concerns of citizen groups and regulators by investing more than $100 million in quiet-technology helicopters such as the Airbus EC130B4 in recent decades, adopting "fly neighborly" programs as advocated by HAI, and employing the PlaneNoise noise reporting and measuring system since 2017. ■

Representives from Swift and various Bahamas agencies and ministries celebrate the deal that will see the nation buy 55 short and medium-range drones for various uses throughout the country.

Swift awarded Bahamas UAS contract

Swift Tactical Systems has won a $17 million contract to provide Bahamas government agencies and ministries with an unmanned aircraft systems (UAS) program. The deal includes the purchase of 55 short- and medium-range drones, immediate surveillance capabilities, training and support, and the establishment of a regional drone academy.

Bahamas Minister of National Security Marvin Dames called the drone program a game-changer. "We are confident the drones will change the landscape of law enforcement in the country. From following suspects of a robbery to finding the location of illegal immigrants and having an aerial view of a prison or pinpointing a drug boat, we have made it our mission and commitment to ensure this technology will be multi-agency and shared among all agencies."

Swift Tactical Systems already has experience operating in the Bahamas, flying UAVs in support of post-hurricane Dorian relief efforts there last year. It conducted UAV day and night missions to assess the overall situation on the ground and provide real-time data to enhance decision making for areas that were difficult to access.

Alex Echeverria, Swift Tactical Systems' vice president, said the company will support the Bahamian government's decision to "become the region's center of excellence domestically and abroad. Our deep bench of talented pilots and specialists understands how important it is to help government officials make faster and more informed decisions." **M.H.**

Mayhew is the new USHST co-chairman

Helicopter training industry veteran Nick Mayhew is the new industry co-chairman of the United States Helicopter Safety Team (USHST). Mayhew succeeds Raj Helweg, chief pilot of air ambulance provider Air Methods, who continues to serve on the USHST Steering Committee. Mayhew is currently general manager of the L3Harris Arlington Training Center in Texas, where he oversees a variety of rotary, fixed-wing, and unmanned high-fidelity training devices delivering flight training to both commercial and military customers.

L3Harris general manager Nick Mayhew succeeds Raj Helweg as USHST's co-chairman.

Before his position at L3Harris Technologies, Mayhew managed the Bristow Group Flight Academy in Titusville, Florida. He is a 28-year veteran of the British Royal Navy, flying the Westland Sea King helicopter, earning the rank of lieutenant commander, and serving in both Persian Gulf wars. In 2017, the Helicopter Association International honored Mayhew as the Flight Instructor of the Year.

"Nick Mayhew has been a prominent member of the International Helicopter Safety Foundation and the USHST for the past nine years," said Wayne Fry, USHST government co-chairman and FAA Flight Standards division manager for general aviation safety assurance. "He brings a wealth of experience to the co-chairman position and a track record of successful team leadership and motivation. He will hit the ground running as we continue our efforts to reduce fatal helicopter accidents here in the United States." **M.H.**

Airbus, Aston Martin team on special-edition ACH130

by David Donald

DAVID DONALD

Design teams at Airbus Helicopters and Aston Martin have been working for more than a year to create the Aston Martin Edition ACH130, which is available with four external paint schemes. The cabin is trimmed in Pure Black ultra-suede, with leather trims drawn from the Aston Martin car range, while the rear of the front seats features the brogue detailing found in the DB11 car, and Aston Martin's wings signature is embossed in some of the leather elements.

Airbus Corporate Helicopters (ACH) revealed its ACH130 Aston Martin Edition at an event held on January 3 at Courchevel in the French alpine skiing region. The special edition is the first result of a partnership between ACH and luxury car manufacturer Aston Martin Lagonda (AML).

Design teams at both companies have been working for more than a year to create the Aston Martin Edition, which is available with four external schemes. The first aircraft, which is being used as a demonstrator but is to be handed over to a customer in the first quarter of 2020, is painted in a Sterling Green scheme, which fades into Jet Black on the undersides. The intakes are in Skyfall Silver. Other schemes are also based on the Aston Martin car palette, based around Xenon Grey, Arizona, and Ultramarine Black.

The interior offers a higher level of comfort than the traditional ACH130, which can seat up to seven including the pilot. The cabin is trimmed in Pure Black ultra-suede, with leather trims again drawn from the Aston Martin car range, colors comprising Oxford Tan, Pure Black, Cormorant, and Ivory. The rear of the front seats features the brogue detailing found in the DB11 car, and Aston Martin's wings signature is embossed in some of the leather elements.

The two companies came together as they "share common values," according to Frédéric Lemos, head of ACH, while AML's v-p and chief creative officer, Marek Reichman, described the partnership as "two unbelievable brands creating a fantastic project."

Speaking at a pre-launch media event in December at London Heliport, Lemos characterized the project as, "how to put what makes Aston Martin so special into a helicopter," before going on to note that the companies had a similar customer profile when it came to single-engine, single-pilot helicopters.

"The ACH130 Aston Martin Edition is optimally positioned in the market for hands-on owners who draw satisfaction from personally piloting their aircraft, and it generates strong brand loyalty," said Lemos. "In the same way, Aston Martin's products are cars for drivers who relish being at the wheel and they inspire a comparable attachment to the brand. So they are the perfect partner for us in developing this superb new ACH130 Aston Martin Edition."

For Aston Martin, the project represents another avenue to explore. "We have our own set of automotive design principles but in recent years we have been learning how to apply our principles to other areas of design, such as architecture, motorcycles, and now helicopters," remarked Reichman. "This first application of our design practices to a helicopter posed a number of interesting challenges but we have enjoyed working through them."

ACH130s destined to receive the Aston Martin Edition styling are built on the regular H130 line at Marignane in France and are then delivered to Airbus Helicopters UK at Kidlington (London-Oxford Airport), where they are completed with the customer-specified paint scheme and interior. They also receive a special plaque on the instrument panel before handover. No price details have been revealed, although the basic H130 has a list price of €2.8 million.

ACH and AML have signed a three-year partnership deal, but it is likely to be extended. For AML's part, Reichman commented, "We don't enter into partnerships lightly," while Lemos added that, "We'd like to extend further... we only form long-term partnerships." For now, the partnership is focusing on the ACH130 as it best fits the customer profile, but both parties agreed that the learning process that is being experienced with the ACH130 could lead to more programs.

ACH already has a long-term partnership with German carmaker Mercedes-Benz concerning special-edition ACH145s, but Lemos sees no conflict with AML tie-up due to differing customer profiles. Speaking to **AIN**, he explained that the ACH145 was operated almost entirely by private and corporate owners who did not fly the helicopters themselves, in much the same way as they would usually employ a driver for their Mercedes automobiles. ■

BELL

The four-rotor version of Bell's Nexus could be all-electric- or hybrid-electric-powered.

Bell AerOS demo shows how urban air mobility flies

by Matt Thurber

At this year's CES show in Las Vegas last month, Bell demonstrated a model-size cityscape with scale flying versions of its Nexus passenger air taxi operating autonomously by Bell's AerOS urban air mobility operating system. Calling it a "smart city ecosystem," Bell president and CEO Mitch Snyder explained, "this year, we're demonstrating what governing, operating, working, and living in a smart city will look like."

The Bell demo at the CES Mobility Hall highlighted how "mobility as a service" software like AerOS can manage a metropolitan area's urban air mobility (UAM) activities. Bell intends to offer AerOS, which runs on Microsoft's Azure platform, to cities to speed up their adoption of UAM capabilities.

Bell has also settled on a smaller version of its Nexus passenger vehicle, with four rotors instead of the six previously shown at CES. The Nexus is designed for all-electric or hybrid-electric power, but is "propulsion-agnostic," according to Bell, "depending on customer needs." The four-rotor Nexus will initially have a 60-mile electric range, but that could be greater with hybrid-electric power.

At CES, the smart city demo included tablet stations where visitors could interact with AerOS and see how the flying models are interacting. The flying models are not controlled by individuals flying them, but by the AerOS software, which constantly assesses demand across the scale-size city and deploys the vehicles to meet that demand.

The demo shown at CES also takes into account problems that inevitably come up during passenger and cargo flying operations, for example, weather events that might require all vehicles to land immediately. AerOS also creates an optimal flight schedule based on goal-seeking optimization algorithms and artificial intelligence to anticipate passenger behavior and desires and the vehicle's needs for battery recharging to meet the schedule.

"We have to work closely with regulators," said Snyder. "We're working on the technology and regulations and with cities to progress this. But we are designing vehicles and maturing the technology, and driving that together." ■

Blade India starts helo air-taxi service in Mumbai

Blade India started helicopter air-taxi service between Mumbai, Pune, and Shirdi in late November with this Airbus H130. It added a Bell 407 recently to increase frequency and has plans to expand services to other parts of the country.

New York-based Blade Urban Air Mobility, which offers helicopter air-taxi service in New York City, Los Angeles, and San Francisco, and majority partner Delhi-based Hunch Ventures recently started preliminary routes in India. It also has firm plans to expand helicopter services in the business, pilgrim, and tourism sectors in India, Blade India CEO Amit Dutta told **AIN**.

"We work with operators who adhere to stringent quality and safety guidelines not just of the Indian regulator, the Directorate General of Civil Aviation, but of Blade U.S.," Dutta said.

He added that the short-haul pilot flights between Mumbai, India's commercial capital; Pune, an industrial and automobile center 75 miles away; and pilgrim town Shirdi using an Airbus H130 with a 268-mile range flown by a local operator was reaping a load factor of 80 percent since the launch in late November. Dutta added a large majority of customers had flown more than once in that time period.

In December the company further rationalized its service in India and added frequency with a Bell 407. "We will also look at a regular shuttle air-taxi between Mumbai and Pune—a four- to five-hour road journey compressed into 37 minutes by air," added Dutta.

He told **AIN** helicopter service during a recent concert by U2 in Mumbai cut down the congested 2.5-hour road journey to the stadium to 15 minutes. Blade India carried out 14 sorties for 89 passengers during this concert. "The Bollywood crowd loved it," he added.

"Today, travel is relevant. The issue we are offering is the cost of time," said Dutta. "The company has set up branded and hosted lounges at helipads, giving a style and luxury to add to the experience."

Blade India is now planning to expand to the southern state of Karnataka, with Bengaluru (formerly Bangalore) as its capital with a large business and "high-value tourism routes." Details on this expansion will be released by the end of this month. The product is expected to be similar to Blade Bounce, its U.S. counterpart.

"We want to change the way people perceive short-haul aviation—helicopters today to eVTOLs tomorrow," said Karanpal Singh, founder of Hunch Ventures and Blade India. **N.M.**

The optional touchscreens for the Airbus A350 will help pilots lower their workloads using familiar gestures such as pinch-zoom and panning to operate EFB applications.

First touchscreen-equipped Airbus A350s now flying

by Gregory Polek

Last December, China Eastern Airlines took delivery of the first Airbus A350 equipped with Thales touchscreen flight deck displays. The touchscreens, designed to aid crew interaction, cockpit symmetry, and information management, received EASA certification in November. Some 20 airlines have selected the option for their new A350s.

The A350 flight deck has six large displays, and airlines can opt for three of those to be the Thales touchscreens, although the two primary flight displays and center multifunction display are not available for the touchscreen interface. The touchscreens on the A350 consist of one each on the outboard side of the flight deck, for each pilot, and another display mounted on the tilt panel above the two flight management system (FMS) keyboard-cursor control units (KCCUs).

The new displays are designed to give pilots quick access to electronic flight bag (EFB) functions. The touchscreen interface adds another way to control the EFBs, which previously could only be managed with a physical keyboard that is mounted in the pilots' retractable tables and the KCCUs.

Pilots can use familiar touchscreen gestures to operate the new displays, including pinch-zoom and panning. Some of the EFB apps available to pilots include computing takeoff performance, accessing navigation information and charts during cruise, and displaying terminal charts in preparation for setting up the approach in the FMS. The touchscreens eliminate many of the previously needed cursor inputs that were necessary and allow pilots to work collaboratively using EFB applications on the lower center display while not having to switch between different displays.

Boeing, meanwhile, plans to begin delivering the 777X with five Collins Aerospace touchscreen displays in early 2021. Boeing announced the contract with Collins in 2016. ■

Garmin ups performance with GTN 650/750Xi

Garmin's new GTN 650/750Xi GPS/navcoms have received FAA supplemental type certification and are now available for immediate shipping. The Xi units replace the original GTN 650/750, which entered service in 2011, bringing touchscreen control to panel-mounted avionics and replacing the GNS 430/530.

The new GTNs are slide-in replacements for the previous versions. Prices are $12,495 for the GTN 650Xi and $17,995 for the GTN 750Xi. Pilots can learn how to use the new units with Garmin's free GTN Xi trainer app for the iPad.

The main upgrade to the GTN Xi is faster dual-core processors, which allow for quicker startup, faster map rendering, a "more vibrant display and vivid colors," and smoother touchscreen map panning. Advanced navigation features include LPV approaches and Garmin's visual approach plus support for radius-to-fix approaches. The Xi series also adds terrain alerting, with audible and visual terrain proximity alerts and optional helicopter terrain awareness and warning system, TAWS-A, and TAWS-B.

Like the earlier GTN, the Xi series can integrate with remote audio controls or transponders and display that information on the GTN screen. Fully coupled IFR approaches and VNAV profiles can be flown when the GTN is paired with Garmin's GFC 500 or 600 autopilot. Other available features include using Garmin's Telligence voice control when the GTN is connected to a GMA 35c audio panel, global voice calling and texting on the GTN display with a GSR 56 Iridium datalink, and wireless connection to mobile devices with the optional Flight Stream 510. **M.T.**

Garmin's new GTN 650 Xi has a faster dual-core processor.

News Update

FreeFlight Adds New Radar Altimeter Display

FreeFlight Systems has begun shipping its new RAD-45 radar altimeter display, which is compatible with all of FreeFlight's radar altimeters, including the RA-4000 and -4500 and FRA-6500. While the new display fits in the same panel space as the RAD-40, the RAD-45 takes up less space behind the panel, at just half the depth of the RAD-40. The RAD-45 displays agl and trend indications on a bright LED read-out, according to FreeFlight, with automatic adjustment for day or night flight via a light sensor. Other features include settable decision height (DH), which illuminates the DH LED and sets a discrete output, as well as built-in audio tone alerts and optional night-vision goggle compatibility. There are five trip-point discrete outputs for 100 to 1,000 feet, which the pilot can set and that send alerts to the navigation management system when the aircraft descends through those altitudes.

Garmin GTX Diversity Transponders Approved

The FAA has issued supplemental type certificate approval for Garmin's GTX 335D and GTS 345D diversity transponders, which are also approved under Transport Canada and EASA validation. The two transponders provide a diversity solution, with top- and bottom-mounted antennas, which reduces antenna shading during turns or maneuvering compared to a single fuselage bottom-mounted antenna. The GTX 335D is an ADS-B Out transponder, while the 345D adds dual-link ADS-B In traffic and weather, which can be displayed on compatible flight deck displays or portable devices. Garmin also offers remote-mount versions of these transponders. A separate GPS position source is required for installation. Retail prices for the GTX 335D and 345D start at $6,495 and $7,995, respectively.

Genesys STCs Displays for Bell 212/412 Helicopters

Operators of Bell 212, 412, and 412EP helicopters can install the Level A-certified, IFR-capable Genesys Aerosystems IDU-680 EFIS displays under a new FAA-approved supplemental type certificate. The displays integrate with a variety of radios and weather radar systems and use Genesys's Open Architecture System Integration Symbology for engine information and CAS message display. The displays include synthetic vision, highway-in-the-sky navigation symbology, geo-referenced hover vector, helicopter TAWS, graphical FMS, digital flight record, night-vision goggle compatibility, and search-and-rescue patterns. Final pricing depends on the configuration of the installation. Typical architecture includes four IDU-680s integrated with onboard avionics and including EICAS engine and warning displays.

Ergo Blue app solves ship location puzzle

by Matt Thurber

When an over-ocean flight experiences serious problems, knowing the position of seagoing ships could make the difference between a disaster or a survivable accident in the rare case where ditching the airplane becomes necessary. Aeronautical Data Systems (ADS) has just released the new Ergo Blue app for the iPad, and its sole purpose is to help users identify ships as an emergency aid for overseas flights.

To use Ergo Blue, the user simply inputs two airport identifiers, for example, a departure and arrival point or a diversion airport near the outbound coast and one near the inbound coast, then presses the "Vessels" button. Ergo Blue then displays the positions of ships near that route.

With airborne internet access, pilots can see real-time updates of ship positions and their tracks, but Ergo Blue also calculates predicted positions if connectivity isn't available. The information about each ship includes the time, vessel name, its lat/long position, track, speed, and distance from the aircraft. The ship position information comes from automatic identification system data, which includes a live-streamed database of 220,000 ships. ADS plans to add fixed and mobile offshore drilling rigs to the database later this year.

Pilots and operators can subscribe to Ergo Blue for $49 per week, $89 per month, or $997 per year. The weekly rate is the minimum subscription length, and it offers an easy way to use the app for the occasional over-ocean flight.

ADS has completed testing of a VHF voice and data connection directly to nearby ships under an experimental FCC license. Once this capability is fully approved, ADS will offer the additional capability for Ergo Blue to automatically contact ships via a VHF portable radio connected to the user's iPad.

The app transmits the automatic mayday distress call formatted to maritime protocols on a continuous 2.5-minute loop, according to ADS, and the message includes the aircraft's updated position. "All ships within VHF range (potentially 200-250 nm depending on altitude) will receive this call which is formatted to maritime protocols," ADS said. ■

Stevens Aerospace takes on first of several Citation XLS G5000 upgrades

by Matt Thurber

In early January, Stevens Aerospace and Defense Systems completed the company's first installation of a Garmin G5000 avionics suite in a Cessna Citation XLS. This is one of the first of 10 G5000 upgrades for the XLS to be done in North America under an STC developed by Garmin and approved in July 2019. Stevens began its second G5000 XLS upgrade later last month.

Stevens technicians did the avionics upgrade at the company's Greenville, South Carolina facility. In addition to the G5000 flight deck, the 15-year-old XLS also received fresh paint and a full interior refurbishment with leather seats, new cabinets, a reconfigured galley, and new passenger amenities, according to Stevens.

The flight deck upgrade replaces the original Honeywell Primus 1000 avionics with three landscape-oriented split-screen displays and two console-mounted touchscreen-control pilot interfaces. The Garmin digital automatic flight control system includes emergency descent mode as a standard feature. Garmin's underspeed protection is optional and it also enables fully coupled go-arounds. ADS-B Out is standard, as is PBN/RNP 0.3 and LPV/APV approach capability.

Another avionics option is controller-pilot datalink communication with departure clearance capability, which enables pilots to use wireless clearance delivery at more than 60 airports in the U.S., along with automatic loading of the clearance into the G5000 avionics. FAA Data Comm capabilities will allow pilots to communicate via text-like messaging with FAA air route traffic control centers, and this option also allows European operators to meet Link 2000+ requirements.

Other optional G5000 features for the Excel/XLS include synthetic vision, Garmin SurfaceWatch runway safety services, datalink weather via Iridium satcom, Doppler weather radar, and Garmin's Flight Stream 510, which provides Connext wireless connectivity in the flight deck. Connext enables wireless flight plan transfer and sharing of traffic, weather, GPS, and other information among multiple mobile devices, as well as Database Concierge for wireless database updates from the Garmin Pilot app.

Stevens Aerospace and Defense recently completed its first installation of a Garmin G5000 avionics suite in a Citation XLS, along with fresh paint and interior. (Photo: Stevens)

Stevens has installed a G5000 suite in a Hawker 400XP, as well as completed dozens of G1000 upgrades in Beechcraft King Airs.

"Stevens is one of a select few MROs trusted by Garmin to install the new G5000 avionics suite for the Citation Excel and XLS," said Stevens Southeast region sales manager Terry Hawkins. "The long-term collaboration with Garmin was excellent, the results were spectacular, and the customer couldn't be happier." ■

IS&S autothrottle OK'd in King Air

The FAA has awarded an additional supplemental type certificate (STC) for the Innovative Solutions & Support ThrustSense King Air B200 autothrottle, following the system's first STC in May. The new STC covers engine-out mode/Vmca mitigation as well as the use of IS&S's Integrated Standby Unit (ISU), which is required for the STC, as a standby instrument that can replace other standby systems. The engine-out/Vmca is the first STC ever approved by the FAA for this functionality, according to IS&S.

The engine-out mode/Vmca mitigation capability automatically detects the failed engine in any phase of flight and manages the power on the good engine to prevent loss of directional control.

Installation of the ThrustSense system includes IS&S's ISU, which contains the processing hardware and software that runs the autothrottle as well as the pilot controls and interface for the system. The ISU is also a certified standby instrument, with altitude, attitude, airspeed, slip/skid, and primary flight and navigation information, according to IS&S.

The ThrustSense autothrottle does not involve any structural modifications to the throttle quadrant, and it features a clutch-less design. In addition to the engine-out safety features, ThrustSense also automatically controls power settings of the King Air's Pratt & Whitney PT6A engines by matching power to the selected airspeed and protects against exceeding torque and temperature limits. **M.T.**

Airbus plans sizable A320 production hike in Alabama

by Gregory Polek

Airbus plans to increase its A320 production rate at its plant in Mobile, Alabama, from five to seven per month by the start of next year, the company announced on January 9. The increase will help Airbus meet its goal of producing 63 A320-family aircraft per month at its four assembly sites in 2021. The company said the production rate boost and continued recruiting for the A220 manufacturing team will result in the addition of 275 employees at the U.S. facility over the next year. Airbus added 600 new jobs at the Alabama site last year.

Considering plans already in place for the production of four A220s per month in Mobile by the middle of the decade, Airbus expects to assemble more than 130 aircraft in the U.S. each year.

"We have invested more than $1 billion in Mobile because of the terrific team of employees there—and because of the support and welcome we continue to receive from the Gulf Coast community and state and congressional leaders like Senator Richard Shelby, who has been with us from the beginning," said Airbus Americas CEO Jeffrey Knittel. "We look forward to building on that strong relationship with our neighbors. This goes beyond jobs to include our support of education initiatives and future workforce development that will positively impact the community for decades to come along the Gulf Coast."

Airbus opened the Mobile plant—its first U.S.-based commercial aircraft assembly facility—in 2015. Since then the factory's workforce has grown from some 250 to more than 1,000 by the end of last year. By the end of 2020, Airbus expects that number to grow to 1,300.

Airbus now employs about 4,000 people at 38 locations in 16 U.S. states. Among its other facilities in the U.S., Airbus operates an engineering center in Kansas; training facilities in Florida and Colorado; materials support and headquarters in Virginia; a think tank (A3) in California; a drone data analysis business in Georgia; helicopter manufacturing and assembly facilities in Texas and Mississippi; and a satellite manufacturing facility (OneWeb Satellites) in Florida. Over the last three years, the company claims to have spent nearly $50 billion in the U.S. with more than 450 U.S. suppliers, supporting more than 275,000 American jobs. ■

Airbus now builds five A320s per month at its plant in Mobile, Alabama.

EU resumes work on Boeing-Embraer merger probe

The European Commission has resumed its review of Boeing's proposed acquisition of 80 percent of Embraer's commercial aircraft division, two months after halting work on the in-depth probe. "The clock has been restarted in the Commission investigation into the joint ventures proposed by Boeing and Embraer on January 6, 2020," a Commission spokesperson told **AIN**. "The new decision deadline is April 30, 2020."

In November last year, the European Union's antitrust regulator "stopped the clock" on the probe. That procedure in EU merger investigations activates if the parties fail to provide, in a timely fashion, an important piece of information that the commission has requested from them. Once the parties supply the missing information, the clock restarts and the deadline for the commission's decision gets adjusted accordingly.

In an emailed statement to AIN, Boeing and Embraer stressed they "have been engaged with the European Commission and other global regulatory authorities since late 2018," adding they have received unconditional clearance to close the transaction from "almost all jurisdictions," including the U.S., China, and Japan. "We continue to cooperate with the European Commission as it assesses our transaction and look forward to a positive resolution," they said.

The deal needs approval by competition authorities in nine countries. Seven jurisdictions—the U.S., China, Japan, South Africa, Kenya, Colombia, and Montenegro—have approved the tie-up, without demanding changes to the deal. Only the EU and Brazil have not yet cleared the proposed transaction.

Boeing and Embraer pre-notified the EU of their plan to combine their commercial aviation activities in April 2018 and formally notified it of the deal in August 2019. The sides initially had expected to close the transaction by the end of 2019 but needed to revise the timeline in October after the EU informed the airframers it would conduct an in-depth investigation into the deal. Brussels launched the Phase II probe because its initial investigation raised concern that the tie-up might remove Embraer as "a small but important competitive force in the concentrated overall single-aisle market."

To eliminate its concerns, the commission's competition division has requested more than 1.5 million pages of documentation and data on some 1,200 sales campaigns over the past 20 years, sources familiar with the case told **AIN**, describing the information request as "very voluminous" and representing a multitude of the documentation requested and analyzed by the other regulators that scrutinized the proposed transaction. **C.B**

News Update

Max Crisis Leads to Layoffs at Spirit

Uncertainty surrounding the return to service of Boeing's 737 Max has led key supplier Spirit AeroSystems to lay off some 2,800 workers starting January 22. The initial announcement came a little more than two weeks after the largest employer in Wichita said it would suspend production of the troubled aircraft's fuselage, pylons, wing leading edges, thrust reversers, and nacelles.

"We do not know how long the pause in production will last, or what the production rate will be when it does resume," Spirit said in a statement to **AIN**. The company's biggest program, the 737NG/Max, accounted for 56 percent of Spirit's $7.2 billion in net revenue in 2018. The Tier I supplier employs about 12,500 workers at its Wichita headquarters.

JetBlue To Launch Carbon Offset Program

JetBlue Airways will begin offsetting carbon dioxide emissions on all its domestic flights starting in July, an initiative CEO Robin Hayes said the New York-based operator needed to undergo to prepare for a "new climate reality." JetBlue expects to offset 7 to 8 million tonnes of emissions per year.

According to JetBlue, it will become the first large U.S. airline to offset emissions on all of its domestic flights. However, several European airlines already have established similar programs.

Since January 1, Air France and British Airways started to offset 100 percent of the CO_2 emissions on their domestic flights. In November last year, UK low-cost carrier EasyJet started offsetting the carbon emissions from the fuel used for all of its flights.

JetBlue plans to begin using sustainable aviation fuel (SAF) on its flights from San Francisco International Airport starting this summer, JetBlue said on January 6. It has agreed to purchase SAF from Finland's Neste.

Hyundai To Take Control of Asiana Airlines

South Korea's Hyundai Development and investment bank Mirae Asset Financial Group announced plans to complete their planned $2.2 billion acquisition of the country's second-largest carrier, Asiana Airlines. Late on December 27, the companies said they expect to complete the takeover by April 2020.

The joint bidders will pay 333.8 billion won ($278 million) for the 31 percent stake in Asiana currently held by Kumho Industrial. They will also spend 2.21 trillion won to purchase newly issued shares in the Asiana group, which also includes Air Busan, Air Seoul, Kumho Resort, and Asiana IDT. Hyundai is projected to end up controlling 61.5 percent of Asiana's equity, with Mirae holding 15 percent.

New Boeing CEO Calhoun details goals for 2020

by Gregory Polek

David Calhoun laid out his priorities for the year in a January 13 letter to Boeing employees as the former GE executive formally assumed the role of president and CEO of the U.S. aerospace giant. As expected, his first concern lies with returning the 737 Max to service. "We'll get it done, and we'll get it done right," he proclaimed.

Calhoun also called for an effort to rebuild trust among the company's "stakeholders," focus on values, operate with excellence, maintain production health, and invest in the future, including achieving the conclusion of Boeing's planned Embraer partnership.

Calhoun moves into the chief executive's office at perhaps the most critical time in Boeing's history, and just days after the release of more than a hundred damning emails and instant messages between employees expressing contempt for management and regulators.

The messages expose efforts within the organization to obscure potential complications with the new flight-control system blamed for the crashes of two 737 Max jets within the span of five months, resulting in the death of 346 people and the worldwide grounding of the model.

David Calhoun, president and CEO of Boeing.

"Many of our stakeholders are rightly disappointed in us, and it's our job to repair these vital relationships," said Calhoun of the trust repair exercise. "We'll do so through a recommitment to transparency and by meeting and exceeding their expectations. We will listen, seek feedback, and respond—appropriately, urgently, and respectfully."

Calhoun, 62, assumes the chief executive's role from Greg Smith, who took over as interim CEO from the ousted Dennis Muilenburg.

Calhoun's resume shows various senior leadership roles within several large-scale enterprises including at the Blackstone Group, Nielsen Holdings, and GE. During his 26-year tenure at GE, he led multiple business units including GE Transportation and GE Aircraft Engines. He has served on the Boeing board of directors since 2009 and served as chairman from October 11 to December 22, 2019. ■

The Airbus Beluga XL can carry 30 percent more cargo, by volume, than its predecessor and fly to a range of 2,200 nm.

First of Airbus's BelugaXLs is placed into service

by Cathy Buyck

Two months after the Airbus BelugaXL gained European Union Aviation Safety Agency (EASA) type certification, the OEM's first whale-shaped oversized air transport entered service, the company announced on January 13. Airbus plans to introduce a further five BelugaXLs by 2023, providing the European airframer the much-needed extra transport capacity it needs to support the ongoing production ramp-up of its commercial aircraft programs. The company delivered 863 aircraft to 99 customers in 2019, outpacing its previous output record set in 2018 by 8 percent and marking the 17th yearly production increase in a row, according to the company. Its backlog at the end of 2019 stood at 7,482 aircraft.

Like its predecessor, the BelugaST—also known as A300-600ST Super Transporter—the BelugaXL will carry complete sections of Airbus aircraft from different production sites around Europe to the final assembly lines in Toulouse, France, and Hamburg, Germany. Two Rolls-Royce Trent 700 turbofan engines suspended on underwing pylons power the aircraft, which has a range of 2,200 nautical miles (4,074 km) and a maximum payload of 51 tonnes.

Based on the Airbus A330-200 freighter, the BelugaXL incorporates several newly developed elements, including its lowered cockpit, a highly enlarged cargo bay structure, and a modified rear and tail section. Because it is 7 meters longer and one meter wider than the ST version, the XL allows for 30 percent extra transport capacity and can carry two A350 XWB wings while the ST can carry only one. The aircraft's wingspan extends 60.3 meters, overall length stretches 63.1 meters, and its height tops 18.9 meters.

Besides the new BelugaXL, Airbus's current Beluga fleet consists of five STs. ■

Flybe reaches rescue deal with UK government

by Cathy Buyck

Flybe and the UK government on January 14 reached agreement on a deal to keep Europe's largest regional carrier operating, following talks that reportedly included a request by the carrier's shareholders to receive a reprieve to pay the airline passenger duty (APD) on its domestic services for three years—for a total amount of around £100 million.

All parties remained tight-lipped on the content of the package, though the government vowed it would launch a review of the amount of APD levied on domestic UK routes and of the country's regional connectivity needs. "The reviews we are announcing today will help level up our economy. They will ensure that regional connections not only continue but flourish in the years to come," chancellor Sajid Javid said.

"[I'm] delighted we have been able to work closely with Flybe to ensure Europe's largest airline is able to continue connecting communities across Britain," transport secretary Grant Shapps said on Twitter. The department for Transport will undertake an "urgent review into how we can level up the country by strengthening regional connectivity," he added.

Lucien Farrell, the chairman of the consortium that owns Flybe, said the three shareholders—Virgin Atlantic, Stobart Group, and investment firm Cyrus Capital Partners—had "committed to keeping Flybe flying with additional funding alongside government initiatives," while Flybe stated it was "delighted with the support received from the government and the positive outcome for our people, our customers, and the UK."

Flybe's financial difficulties revived the longstanding debate on the need to reform the UK's APD system. In fact, the chief executive of the Airlines UK trade group asserted that Brexit creates the possibility to shelve or lower the passenger tax on domestic flights. Under EU rules, member states may not differentiate between domestic flights and flights between EU countries because it considers the bloc one single aviation market. Applying a lower rate for domestic flights amounts to illegal state aid, according to EU regulations.

"One of the advantages of leaving the EU is the possibility of cutting or removing APD on domestic travel," noted Airlines UK CEO Tim Alderslade. The UK levies £13 per passenger departing from a UK airport for flights in the EU. "Levying £26 in tax when, in the case of Flybe, the average fare is £52, is not sustainable when so many other costs on airlines are increasing," Alderslade added.

Following a series of delays, the UK now plans to leave the EU on January 31. However, a transition period will come into play until December 31 and most, if not all, EU legislation will still apply until then, limiting the UK government's scope to remove or cut the domestic APD in the short term. Environmental groups criticized reports that the government might shelve or cut APD on domestic flights.

"Cutting air passenger duty encourages flying and should not be messed with/reduced in order to save a struggling airline," commented Greenpeace U.K. chief scientist Doug Parr. ■

From left to right, Australia's Premiair Aviation engineering manager Andrew Ross, Premiair managing director Paul Montauban, Textron Aviation senior v-p of global customer support Kriya Shortt, and Textron Aviation v-p and general manager of APAC service Gabriel Massey.

Textron Acquires Australian MRO, Expanding Its APAC Footprint

Nearly 11 months after expanding Premiair Aviation Maintenance's authorized service, Textron Aviation has acquired the Australia-based MRO's three locations in a bid to boost its service offerings in the Asia-Pacific region, the Wichita airframer announced. "Throughout the past year, we substantially increased our regional footprint, capabilities and parts availability," said Textron Aviation senior v-p of global customer support Kriya Shortt. "The Premiair team demonstrated their commitment to quality, relationships and customer care as an ASF, and now we are excited to welcome them to Textron Aviation." Financial terms of the deal were not disclosed. Premiair operates facilities in Melbourne, Coolangatta on the Gold Coast, and Jandakot in Western Australia. From those facilities, Textron Aviation will be able to offer aircraft maintenance and support for its three brands—Beechcraft, Cessna, and Hawker—including avionics services and upgrades; scheduled and unscheduled maintenance; structural and component repair; and overhaul and refurbishment. In the past year, Textron Aviation has added about $100 million in parts inventory and plans to expand its exchange and overhaul parts by about $30 million this year. It also expanded its parts warehouse in Singapore; added a new parts warehouse in Australia; and named PhilJets Aero Services in Manila as its authorized service facility in the Philippines.

Air Service Basel Adds Cirrus SF50 Authorized Mx

Air Service Basel has been approved to provide authorized maintenance and its Continuing Airworthiness Management Organisation (CAMO)+ services for the Cirrus Vision Jet SF50, making it the first authorized service center for SF50s with either European Union Aviation Safety Agency (EASA) or FAA registrations. "It is important for us to be prepared to serve the new Vision Jet SF50 owners and to provide the most sophisticated and personalized aviation experience across the Cirrus aircraft series," said Air Service Basel CEO Claudio Lasagni. The Switzerland-based MRO has been a certified Cirrus Partner for 15 years, offering full service for the Cirrus SR22 series, including full Garmin avionics services. It also has EASA Part 145 approval for full line and base maintenance and received FAA repair station approval at the end of last year. The addition of SF50 service was the logical next step, according to the company. "We are looking forward to supporting the Cirrus Vision Jet customers," Lasagni added.

Private Equity Firm Acquires AeroRepair

Private equity firm GenNx360 has acquired a controlling ownership stake in Manchester, New Hampshire-based AeroRepair Corp., a specialist in wheel and brake MRO services to business, commercial, and general aviation. "There is immense growth potential in the airline MRO sector and we have already identified several organic and inorganic growth initiatives along with AeroRepair's management," said GenNx360 managing partner Daphne Dufresne.

AeroRepair also offers landing gear, battery, and other component MRO services through sister company Hemico, which also provides parts manufacturer approval (PMA) engineering services and designated engineering representative (DER)-approved repairs. Besides Manchester, AeroRepair operates five other locations—Atlanta, Indianapolis, Phoenix, Montreal, and Calgary—and employs nearly 200 workers."[GenNx360's] expertise in business services and deep industry knowledge in this space will be a great asset as we continue to build our portfolio and expand into new markets," AeroRepair CEO Daniel Bell said. He is among the current management team that will continue to operate AeroRepair.

Air Service Basel has been approved to provide maintenance and its Continuing Airworthiness Management Organisation (CAMO)+ services for the Cirrus Vision Jet SF50.

New SierraTrax Service Shops Mx Rates for Customers

Maintenance tracking outfit SierraTrax has unveiled a new service for its customers that shops the best rate for maintenance on their turbine aircraft, the Wichita-based firm announced. Called Maintenance Marketplace, the service allows multiple MROs to bid on scheduled maintenance, SierraTrax co-founder and CEO Jason Talley told **AIN**. "and automates that [process] for our subscribers and customers." As scheduled maintenance on a customer's jet comes due, SierraTrax sends out a request for maintenance proposal to participating MROs. Responses from those MROs are then passed on to the customer who can follow up directly with the MROs. "It makes it very easy for them to solicit four, five, or six different proposals without having to deal with the sales pressure...and to be able to understand what the pricing looks like in the marketplace," he said. So far, SierraTrax has about a dozen MROs participating in the new service, according to Talley. There is no cost for MROs to participate and no additional cost to SierraTrax customers. Founded in 2017, SierraTrax primarily serves individual turbine aircraft owners and operators, as well as operators of fleets of 15 or fewer aircraft. It is a recommended service provider for Textron Aviation.

Commercial Aviation Firm Acquires Appearance Group

Wichita-based aircraft cleaning and maintenance company Appearance Group has been acquired by Texas-based The PrimeFlight Aviation Services group of companies, which specialize in airport and airline services. The transaction between privately held Appearance Group and PrimeFlight, a portfolio company of venture capital firm Carlyle Group, was completed on December 17. Appearance Group was purchased by Matt Henry and his father, Don Henry, in 1999 and employs about 250 people in 16 states. Established in 1991, it is an FAA Part 145 repair station and specializes in cleaning and detailing exteriors and interiors of business jets, as well as paint restoration, paint sealant, leather refinishing, and minor repair to leather cabin seats and other leather soft goods. Headquartered in Sugar Land, PrimeFlight provides major airlines and airports with ground handling services, aircraft services, into-plane fueling, deicing, and terminal services. It also offers a range of cleaning services for general aviation.

Stevens Readies AOG Teams for Major Sporting Events

Stevens Aerospace and Defense Systems increased its AOG capabilities to support business jet owners and operators attending major college football bowl games, beginning with the Chick-fil-A Peach Bowl on December 28 in Atlanta, the Greenville, South Carolina-based MRO provider announced. Stevens relocated some of its more than 45 technicians and 17 mobile units to cities that hosted the games. "These events give our customers the added confidence that we'll be easily accessible for planned and unplanned maintenance events," Stevens AOG services v-p Randy Smith said. Stevens operates permanent AOG locations in a dozen U.S. markets that form a crescent stretching from the Atlantic Coast to Colorado. Other college bowl games the company supported were the Capital One Orange Bowl in Miami; Outback Bowl in Tampa, Florida; TaxSlayer Gator Bowl in Jacksonville, Florida; and the National Championship game in New Orleans. It also plans to deploy mobile AOG teams for other, major sporting events in 2020, including the Super Bowl on February 2

Nomad Technics completed an ADS-B Out installation on this Maltese-registered Bombardier Challenger 850 during its six- and 12-month inspection.

in Miami; the Masters on April 9-12 in Augusta, Georgia; the Kentucky Derby on May 2 in Louisville, Kentucky; and the Charlotte Coca-Cola 600 on May 23-25 in Charlotte, North Carolina.

Duncan Creates Online PMA Library

Duncan Aviation has created an online parts manufacturer approval (PMA) library comprising more than 75 PMAs that are available for sale, the Lincoln, Nebraska-based MRO provider announced. PMAs in the searchable library can be found by aircraft, PMA category (such as Aircell, airframe, installations, and interiors), or viewing the full list. The PMA library is in addition to Duncan's searchable online library of STCs produced by its engineering and certification departments. Those can be sold as a complete STC package or as individual PMA parts. Since going live with the PMA library, Duncan said it has received multiple requests for quotes, including dust panes for Cessna Citation 550s and 560s and Gogo kit modification parts for a Wi-Fi system.

Nomad Completes ADS-B Install on Challenger 850

Nomad Technics recently completed an ADS-B Out installation and six- and 12-month (1,000- and 2,000-hour) inspection and defect rectification on a Bombardier Challenger 850, the Basel, Switzerland-based MRO announced. The Maltese-registered Challenger operates under a commercial air operator certificate (AOC). Under a European Union Aviation Safety Agency (EASA) mandate, aircraft flown in Europe are to be equipped with ADS-B Out by June 7, 2020. The FAA mandate in the U.S. was January 1. Nomad said the ADS-B installation was completed during the inspection process and the Challenger was returned to the owner on time.

Southeast Aero Wins PMA for Garmin G5000 Harnesses

Southeast Aerospace (SEA) has received parts manufacturer approval (PMA) from the FAA for the manufacture and distribution of complex harnesses required for Garmin G5000 avionics installations, according to the Melbourne, Florida-based MRO provider. The cost and time involved in manufacturing the harnesses prompted SEA to seek the PMA.

The G5000 harnesses are an intricate component of the installation for Citation 560XL/XLS and Beechjet 400A, according to SEA. Because of the harness's complexity, each one is tested using automated harness test equipment while each wire is laser-marked and connectors are tagged to ease installation for technicians. Located at Melbourne International Airport (MLB), SEA operates from five hangars that total 100,000 sq ft.

West Star Aviation recently completed the green-and-yellow livery on a customer Embraer Praetor 600, its first on the super-midsize model.

ExecuJet MRO Malaysia Gains Philippines Certification

ExecuJet MRO Services Malaysia has received Civil Aviation Authority of the Philippines (CAAP) certification for line and heavy maintenance on Dassault, Bombardier, and Gulfstream business jets, the Kuala Lumpur maintenance provider announced. Aircraft covered by the certification include Dassault Falcon 2000EX and Falcon 900EX; Bombardier Challenger 300/350 series and Learjet 45; and Gulfstream G200 and GIV jets. Ivan Lim, v-p of MRO Services Asia for Execujet Malaysia, explained the Philippines is the third-largest market in Southeast Asia for business aviation, after Malaysia and Singapore, with about 50 business jets—a number that is expected to grow. The Kuala Lumpur facility and its mobile response team also are close enough geographically to support Philippines customers in AOG situations, he added.

The ExecuJet MRO Services Malaysia facility is located in Kuala Lumpur.

West Star Completes First Praetor 600 Paint Job

With its green and yellow livery, a recently completed custom West Star Aviation paint job is *not* for a Green Bay Packers fan, officials of the MRO confirm. But it is the MRO's first paint finish on a factory-delivered Embraer Praetor 600. West Star Grand Junction (Colorado) technical sales manager Joe Carr told **AIN** the customer specifically requested his company to paint the livery on the new, super-midsize twin. And the customer, he added, was not an individual, but a company requesting those specific colors and not because of an affinity for a certain NFL team. But because there were three additional colors—green, yellow, and black—involved, the painting process took longer than normal. West Star's facility at Grand Junction Regional Airport has four paint booths and two strip bays. At any given time it paints between five and eight airplanes.

Berry Aviation Expands Mx Capabilities with New Hangar

Following the receipt of Part 145 repair station certification from the FAA and European Union Aviation Safety Agency, Berry Aviation has opened a 31,000-sq-ft maintenance hangar at San Marcos (Texas) Regional Airport. The new hangar offers 19,300 sq ft of aircraft maintenance space, as well as a 3,500-sq-ft component repair and overhaul area and 2,800 sq ft for a parts department. Its repair station certification includes airframe, powerplant, propeller, and accessories, with FAA authorization to work on Beechcraft King Airs, as well as some Cessna Citation and Bombardier Learjet models, among others.

Clay Lacy Keeps Busy with Phenom 10-year Inspections

Clay Lacy Aviation is seeing several 10-year inspections for Embraer Phenom 100s at its Embraer-authorized service centers at Van Nuys Airport (VNY) in Los Angeles and McClellan-Palomar Airport (CRQ) near San Diego, the FBO/MRO announced. The company—which also provides aircraft sales, charter, and management services—said it completed its first Phenom 100 inspection in October and had additional inspections in December and into 2020. The inspection and gear overhaul typically takes four weeks. It includes complete interior removal and opening of all inspection panels. The landing gear is removed and sent to a certified specialist. The process provides for upgrading avionics and connectivity, as well as seat reupholstery. The company also is marking its 10th year as an Embraer service center. During that time, it has completed 20,000 hours of Phenom maintenance. It currently supports more than 100 Phenom 100s and 300s. That includes the Phenom fleets of JetSuite, NetJets, and Flexjet, as well as the West Coast Embraer Phenom demo fleet. ■

Ross Aviation has acquired the former Signature Flight Support FBO at California's Jacqueline Cochran Regional Airport. In addition to its existing FBO, the company will continue to operate the second facility as Ross Aviation South, expanding its holdings there to 40 acres, and giving it the flexibility to move staff from location to location as needed.

Ross Aviation Buys Rival in California

Ross Aviation has acquired rival Signature Flight Support's facility at California's Jacqueline Cochran Regional Airport, which gives it two FBOs at the Palm Springs-area gateway. The new location expands Ross's leasehold on the airport to approximately 40 acres. It will continue to operate the new location, which includes a 9,000-sq-ft, two-story terminal with offices, 25,000 sq ft of community hangar space, and 17,500 sq ft of T-hangars as Ross Aviation South, retaining most of the former Signature employees. Between the two locations, the company now has more than 122,000 sq ft of hangar space, and agreements with its hangar tenants can boost that number by another 20,000 sq ft of large aircraft storage capability.

"We see [Cochran] not only as a primary airport serving the Coachella Valley but also as an excellent alternative to other facilities in the region, which are becoming increasingly congested," said Brian Corbett, Ross's recently named CEO. "We anticipate hosting traffic from a variety of previously traditional destinations in the area, and now have the ramp space and hangar capacity, along with outstanding passenger and crew facilities, to accommodate them comfortably throughout the year." The airport briefly had three separate FBOs, as the Desert Jet Center debuted its new multimillion-dollar facility in October, replacing the temporary trailers that it had been operating from.

Belgian FBO To Add Antwerp Hangar

Belgium-based aviation services provider ASL Group, which began offering FBO services last year at several European locations, has broken ground on a 26,000-sq-ft (2,400-sq-m) hangar at its facility at Antwerp International Airport. It will join the company's existing hangar, which opened in 2006 to support the company's initial private jet charter business. The new structure features a 131-foot-wide, 26.9-foot-high door and is located directly across from the original hangar. It is expected to be completed in the third quarter.

"With the growth of our fleet and with the expansion of our services, this new hangar marks even more the importance of Antwerp for the future of our company," said company CEO Philippe Bodson. In addition to Antwerp, which Bodson noted is ASL's most important base, the company also provides FBO services at the Netherlands' Maastricht and Groningen Airports, as well as some handling at Liege Airport. Services include short- and long-term parking (outdoors, with limited hangar space available); refueling; line service, including cleaning, dishwashing, laundry, and lav service; line maintenance; customs and immigration (in coordination with airport police and customs); catering; flight-planning facilities; crew lounge; and car rentals.

ASL group plans to erect a new 26,000-sq-ft hangar to accommodate its growing jet charter and FBO operations at Antwerp International Airport.

Dallas-area Airport To Extend Runway

Dallas-area dedicated GA gateway McKinney National Airport (TKI) has received a $15 million grant from the Texas Department of Transportation for the expansion of its lone runway. The project, which will commence in 2021 at the conclusion of the environmental review and design processes, will add 1,500 feet to the current 7,002 feet of Runway 18/36. Over the past year, city-owned TKI reported more than 156,000 operations, but due to the existing runway length, large aircraft taking off from the North Dallas airport during the height of summer are occasionally forced to depart with their tanks less than full. The 20-year planning period for operational activity at TKI calls for increased use of such aircraft with heavier loads and longer leg lengths. With numerous alternatives in the Metroplex boasting longer runways, the airport's executives wish to remove that concern from the minds of customers who might be tempted to try other airports.

"Today, business aircraft intending to operate out of McKinney must add congestion to one of the commercial service airports if their operations require additional runway length," said TKI director Ken Carley. "Extending the runway by 1,500 feet will benefit the entire DFW area by allowing the airport to more effectively serve its role as a reliever for the region's commercial service airports."

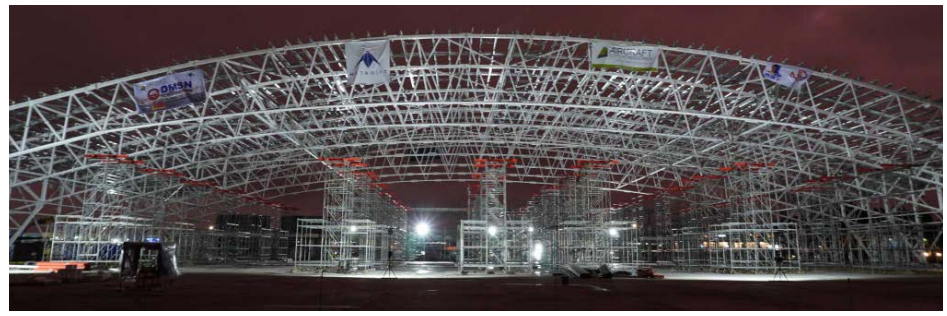
Indiana Genav Airport To Begin Runway Expansion

Indiana's Huntingburg Regional Airport is set to begin a two-year extension project on its lone runway—a project that has been planned for more than a decade. The $12 million project, funded by federal, state, and local grants, began in November and includes the reconstruction of 700 feet of 5,000-foot Runway 9/27, along with extending it and its parallel taxiway by 500 feet. To accomplish this, a Dubois County road at the end of the runway will be lowered, with a tunnel created for the runway extension to pass over it. The first phase of the work also calls for new LED runway lights and other navigational aids. Meanwhile, a second phase will see the runway widened from 75 to 100 feet. This expansion is intended to spur further growth at the dedicated general aviation facility, which has seen a boom in large-cabin aircraft traffic over the past several years.

"It's said that general aviation is the largest airline in the United States because more business is flown with private aircraft than any other," said Curtis Brown, project manager for Woolpert, which has been contracted by the county to provide engineering, design support, and construction management for the work. He added, "GA is often overlooked, but these airports are critical to the economic welfare of state and local businesses across the country."

Philippines Hangar Reaches Construction Checkpoint

Hong Kong-based aviation services provider Metrojet reached a construction milestone last week in the development of its new aircraft hangar and maintenance facility in the Philippines, with the completion of the stressed arch roof framework of the 75,347-sq-ft hangar. The technology employed in the roof's structure has been designed to meet the highest international standards for typhoon and seismic loadings.



Metrojet has completed the roof framework on its new hangar at Clark International Airport in the Philippines. The stressed-arch design is intended to protect the 7,000-sq-m structure from damage due to high winds.

When completed, the building, with its 360-foot clear span opening and 70-foot-high apex will have the capacity to simultaneously accommodate up to 10 ultra-long-range business jets, including Airbus ACJs and Boeing BBJs. It will be equipped with an NFPA 409-compliant fire-suppression system to meet the world's most stringent safety standards. Scheduled to open in the second quarter, the complex at Diosdado Macapagal International Airport (formerly Clark International Airport) will include nearly three acres of ramp space in front of the hangar, a dedicated taxiway, and an adjoining 27,000-sq-ft, two-story FBO terminal.

Bahamas Airports See Progress in Storm's Wake

The Bahamas' Leonard M. Thompson International Airport, one of the two aviation gateways on Hurricane Dorian-ravaged Abaco Island to supply fuel, has reopened to international operations. Known colloquially as Marsh Harbor Airport, the facility, along with its 5,000-foot runway, suffered damage last summer to its terminal, which serves both commercial and private operations. The primary issue, however, was rebuilding the perimeter fencing that was destroyed and replacing baggage screening equipment to meet U.S. TSA requirements, according to Algernon Cargill, the Bahamas director of aviation.

Abaco's Treasure Cay Airport, which was popular with private jet operators for its 6,900-foot runway, has remained closed to international operations since the August storm, and the government noted it plans to make the airport, which previously had limited commercial service, into a dedicated GA airport. It is looking to select an FBO services provider to rebuild the devastated airport and take over operations on a lease and revenue-sharing basis. Cargill told **AIN** he has had discussions with interested parties, but there is no timeline as to when a deal might be reached.

Privately owned Grand Bahama International Airport also recently reopened. The airport, which was inundated with water, had its commercial terminal destroyed. All flight operations there have since shifted to the FBO building, which survived the storm relatively intact. Private aviation traffic continues to be processed there as well.

Family-Owned Iowa FBOs Are Purchased

Illinois-based investment firm CL Enterprises has acquired family-owned aviation services provider Carver Aero, which operates the lone FBOs at Iowa's Davenport Municipal and Muscatine Municipal Airports, both of which offer 5,500 foot main and 4,000-foot secondary runways. The locations will retain the Carver Aero name, and the company told **AIN** it has plans to further expand the brand. Davenport, which sees approximately 77 operations a day, has a modern 7,500-sq-ft terminal that includes a passenger lobby, pilot lounge, a pair of snooze rooms, a 30-seat conference room, flight planning area, showers, and crew cars. The location has a 20,000-sq-ft heated hangar, which can shelter midsize business jets on down.

In Muscatine, the FBO is open from 7 a.m. until 6 p.m. and occupies the 4,000-sq-ft city-owned terminal with a passenger lobby, pilot lounge, snooze room, shower facilities, 16-seat conference room, and crew cars. A 6,400-sq-ft hangar with a 16-foot-high door can accommodate aircraft up to a Citation V, and the location includes 80,000 sq ft of ramp. The purchase also included Carver's Part 135 operation, which currently lists a Cessna Citation Ultra along with a Beechcraft King Air 350, 200, and 90 on its certificate, and a Part 145 repair station at the Davenport location.

New Development Ahead for Virginia Airport

Virginia's Richmond Executive-Chesterfield County Airport will see some new development over the next few years. Longtime service provider Dominion Aviation Services will break ground on a new 12,000-sq-ft hangar shortly, ahead of a planned relocation from the dedicated GA airport's terminal, which it has occupied since 1991. It expects to complete a new $3 million complex with hangars capable of sheltering large-cabin jets and a new 6,000-sq-ft terminal in 36 to 48 months. Construction will start as soon as the airport completes necessary infrastructure on the undeveloped south side of the field. The county-owned airport will soon be undergoing a project to lengthen its 5,500 foot Runway 15/33 by 800 feet. ■

Iowa-based Carver Aero has sold its two FBOs, including this modern facility at Davenport Municipal Airport and a second location at Muscatine Municipal Airport, to CL Enterprises, along with a Part 135 charter certificate and Part 145 repair station. The company is the lone aviation services provider at both airports.

FBO PROFILE: McClellan Jet Services

Even with more than 200,000 sq ft of hangars capable of sheltering nearly anything with wings, McClellan Jet Services, the private airport-owned FBO at California's Sacramento McClellan Airport, is fresh out of aircraft storage space.

Facility benefits from its military lineage

Located just six miles from California's capital, Sacramento McClellan Airport has had a long history on its way to becoming one of the country's largest privately owned airports.

Like many airports, it started out as a U.S. military airfield. First opened in 1935, its vintage administration building now serves as the terminal for the airport-operated McClellan Jet Services. The base served to arm and ship warplanes headed to fight in World War II, as well as to provide maintenance. It became McClellan Air Force Base in 1948 and served as a major aircraft repair and overhaul facility until its closing in 2000 when it was transferred to Sacramento County.

McClellan Jet Services opened its doors as an FBO in September of the following year. In 2017, the company's parent McClellan Business Park negotiated with the county to purchase the entire, nearly 1,200-acre facility.

Some signs of the airport's former existence and purpose, such as the non-standard military pavement markings, were removed and recently repainted to meet civil regulations. But others remain, such as the runway's size (10,600 feet long by 200 feet wide).

Another telltale indication is the massive fuel farm, which can hold more than 1.2 million gallons of fuel in two 630,000-gallon tanks. The FBO currently only uses one of them and rents the other out to a local fuel transport company for diesel storage. It has a pair of 10,000-gallon jet-A refuelers along with one 7,000-gallon and two 5,000-gallon trucks, one of which arrived new in January. The 40,000-gallon avgas supply is served by a 1,200-gallon and a 1,000-gallon tanker. .

The facility has 38.5 acres of ramp, and of the 1 million square feet of hangar space remaining on the airport (down from a peak of 1.5 million), it controls 207,000 sq ft, which can easily accommodate aircraft up to a Boeing 767. Three of the facility's five hangars can each shelter five large-cabin business jets at the same time. Home to approximately 40 turbine-powered aircraft ranging from a BBJ to a Pilatus PC-12, plus a variety of piston-powered airplanes, the FBO is at full capacity, according to Scott Owens, executive vice president and COO of McClellan Jet Services and Sacramento McClellan Airport.

"We're busting at the seams," he told **AIN**, adding that they recently had to reclaim some hangar space that was being used for warehousing to make room for additional aircraft storage. While there are still hundreds of thousands of square feet of hangar space in play on the airport, most is occupied by private flight departments, maintenance providers, and air ambulance operators, as well as a mix of federal, state, and local government flight operations. As the main staging area for the region's aerial fire fighting operations, McClellan is home to the world's largest fire-retardant reload base.

That government traffic pushes the Shell-branded FBO's fuel flowage to an average of 3.5 million gallons a year.

The facility is open 24/7, and its 25 employees undergo NATA Safety 1st line and customer service training. The 12,000-sq-ft, two-story terminal offers a passenger lounge, pilot lounge with two snooze rooms, a flight planning area/business center, 25-seat conference room, onsite car rental, and three crew vehicles.

As a privately-owned, non-tower airport, McClellan does not not charge any landing, ramp, or facility fees, making it the only one in the Sacramento-area to eschew such user costs.

Currently underway at the airport is a $1 million project to replace the "archaic" electrical vault. "When we are done with the electrical, from the vault all the way out to the approach lights, runway lights and taxiway lights, everything will be upgraded," said Owens. **C.E.**

by David Jack Kenny

PRELIMINARY REPORTS

No Survivors in Hawaii Air Tour Crash

EUROCOPTER AS350B2, DECEMBER 26, 2019, LIHUE, KAUAI, HAWAII

Six tourists and the pilot were killed after their helicopter struck a ridgeline during an air tour of the famed Na Pali coast, an area of extremely rugged terrain and widely varying microclimates. The flight was reported missing at 6 p.m., about 40 minutes after its expected return time. Poor visibility and high winds hampered initial search efforts; the wreckage was eventually located around 9:30 the following morning in a remote area of steep terrain. Six bodies were recovered before deteriorating weather forced suspension of the search. The last victim was found the following day.

The NTSB reported that the aircraft fell about 100 feet after striking the ridge at an altitude of approximately 2,900 feet. The tour was being flown by the operator's 69-year-old chief pilot. (*For details of the NTSB's preliminary report see page 24.*)

Five Deaths in Louisiana Cheyenne Accident

PIPER PA-31T, DECEMBER 28, 2019, LAFAYETTE, LOUISIANA

A Piper Cheyenne II crashed barely one minute after taking off from the Lafayette (Louisiana) Regional Airport, killing the pilot and four of the five passengers. The surviving passenger was hospitalized with injuries described in press accounts as including burns over 75 percent of his body and a dislocated shoulder. A motorist whose car was struck by the aircraft also suffered serious injuries, and two employees of a post office at the accident site were struck by shards of flying glass.

The airplane took off from Runway 22L at 9:20 a.m. on an instrument flight plan to Atlanta's Dekalb-Peachtree Airport. ADS-B data provided by the FAA showed that it climbed out at rates between 1,000 and 1,900 fpm while making a slight right turn toward its assigned heading of 240 degrees. Thirteen seconds after takeoff it began rolling back toward wings level, then continued rolling left. It reached its peak altitude of 885 above ground level in a 35-degree left bank and continued rolling left while descending. The last observation showed it descending through 600 feet at 2,000-3,000 feet per minute while banked 70 degrees to the left. The pilot did not respond to a low-altitude warning from the controller.

Local weather at the time included vertical visibility of 200 feet, ground visibility of ¾ mile, five-knot winds from the southeast, and identical temperature and dewpoint of 19 degrees Celsius.

FINAL REPORTS

Spurious Torque Alert Misinterpreted by Crew

PILATUS PC-12, JANUARY 6, 2016, SAVANNAH, GEORGIA

The pilots misinterpreted a torque exceedance alert as low torque and then attempted a precautionary landing without following the operating handbook's troubleshooting procedures, causing substantial damage including a post-crash fire when the airplane struck a ditch while landing in the grass perpendicular to the runway, according to the NTSB. Takeoff performance was normal, but after a positive rate of climb was established, both pilots noted a red crew alerting system (CAS) torque warning. The torque gauge read 5.3 psi, while nominal torque for the day's conditions was 43.3 psi. With the airplane 200 feet above the ground with 2,700 feet of runway remaining and the landing gear still extended, the pilot flying chose to reduce power and turn left to land in the grass between the runways and the terminal.

Data retrieved from the airplane's avionics suite showed a sudden spike in indicated torque from 45.0 to 71.0 psi, triggering an engine caution alert. Other engine indications remained normal. Four seconds later the torque reading decreased to 47.3 psi and other engine indications also decreased, consistent with a reduction in power.

The NTSB noted that the PC-12's CAS provides alerts only for excessive torque, and the response to a torque alert specified by its operating handbook is to reduce power, landing "as soon as possible using minimal power" if the alert does not resolve. The stable values recorded for other engine parameters led the Board to conclude that both the torque exceedance warning and low torque indication resulted from equipment errors.

Panel Dimmer Implicated in Fuel Starvation

AIRBUS HELICOPTERS DEUTSCHLAND MBB-BK 117 B-2, JULY 1, 2017, PERRYLAND, MISSOURI

Dimming the panel lights for a flight at dusk may have prevented a medevac pilot from seeing the low-fuel or master caution lights, according to the NTSB. The pilot, three crew members, and the patient being transported suffered only minor injuries when the helicopter landed hard and rolled over following an emergency autorotation in response to a dual engine stoppage. Investigators subsequently found the switches controlling the fuel transfer pumps in the "off" position. These pumps transfer fuel from the main tanks to the supply tanks that feed the engines directly and are normally activated before takeoff.

The aircraft had been fitted with a night-vision-goggle-compatible interior lighting system installed under a supplemental type certificate, which included infrared filters over the instruments and annunciator panel. Subsequent examination found that with the panel lights dimmed, the low-fuel warning and master caution lights could not be seen. The transmitters that activate the low-fuel annunciators also illuminate the master caution light but do not trigger any audible warning tone.

Seventeen minutes into the flight, the helicopter yawed left "with a hard-upward bump." Engine, generator, and battery discharged warning lights illuminated. The nose pitched up and rolled right and the pilot entered autorotation but had to alter his glide path to avoid power lines and a ditch. The helicopter landed right skid-low and skidded about 100 feet before rolling onto its right side. After evacuating the occupants, the pilot saw fuel streaming from one of the belly drains and shut down the fuel and electrical systems to reduce the risk of fire.

Missed Turn Led to Nature Air Disaster

CESSNA 208, DECEMBER 31, 2017, PUNTA ISLITA, COSTA RICA

Confirming prior reports, the NTSB found that the flight crew's failure to make an immediate right turn after takeoff placed the airplane in a narrow valley with no exit, flying toward terrain it could not outclimb. Both pilots and all 10 passengers were killed when the Nature Air Caravan stalled into the ground as the crew attempted to reverse course. Investigators' analysis of surveillance footage suggests that the airplane reached a bank angle of 75 degrees at a groundspeed of about 82 knots, well below the published stall speed for a 60-degree bank.

Another company airplane that left 15 minutes earlier made the right turn, departing the valley through a gap in the surrounding hills and arriving without incident at the Juan Santamaría International Airport in San Jose.

The reasons the crew chose to take off from Runway 03 of the privately-owned airstrip rather than the unobstructed departure over the ocean from Runway 21 remain unclear. Two windsock frames were present at the field but no windsocks were installed at the time. The nearest certified weather station, some 25 miles away, reported winds from 090 degrees at four knots with gusts to 12, but a witness on the scene estimated winds there at 10 to 15 knots. The 3,000-by-30-foot runway does not have parallel taxiways, instead, requiring a back-taxi and use of a turnaround pad for southbound departures.

While the company's General Operating Manual called for airport-specific training for pilots "operating to or from airports with special characteristics," it did not list those fields. However, the witness reported having spoken with the pilots of both airplanes before they took off, and that they'd acknowledged the need to turn right and toward the eastern pass when taking off from Runway 03.

Flight Control Failure Traced to Corrosion

EUROCOPTER EC135T1, FEBRUARY 26, 2019, OWEN ROBERTS INTERNATIONAL AIRPORT, GRAND CAYMAN, CAYMAN ISLANDS

Undetected corrosion caused a fracture of the longitudinal axis tie bar in the main rotor actuator assembly, leading to a hard landing that damaged the tail boom, landing gear, and transmission deck. The helicopter had just lifted into a four-foot hover when the pilot felt a vibration in the cyclic followed by "a strong rearwards force, which he was unable to overcome." He immediately lowered collective, and the helicopter landed hard. The pilot shut down both engines and applied the rotor brake, and the crew evacuated the ship without further incident.

The EC135's main rotor actuator consists of three parallel hydraulic circuits that deflect the swashplate in the longitudinal, lateral, and collective dimensions via a system of tie rods, forks, and bellcranks. The system does not receive any routine maintenance while installed in the helicopter.

Split compression rings of varying thicknesses are used as shims to standardize actuator length so that replacing an actuator mechanism does not require adjusting the swashplate linkages; the gap between the ring segments could allow moisture to enter and pool against the outermost O-ring in precisely the area where the fracture occurred. Metallurgic analysis found pitting corrosion on the surface of the tie bar and intercrystalline corrosion and crack propagation on the fracture surface.

High concentrations of sodium and chlorine were also found, consistent with moisture penetration in a highly saline marine environment.

Following the accident, EASA issued Emergency Airworthiness Directive 2019-0087-E requiring a one-time removal and inspection of "a specific group of actuators" and mandating replacement of any tie bars that show evidence of corrosion or have exceeded their authorized time in service. ■

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VLADIMIR KARNOZOV

A number of special-mission Tu-204s and Tu-214s are already in service with Russian government agencies. This command post Tu-214 is operated by the Presidential Air Detachment.

Russia mulls idle jetliners for anti-sub conversions

by Vladimir Karnozov

The Russian navy has prepared a revised specification for a next-generation anti-submarine warfare (ASW) aircraft that permits using the Tupolev Tu-204/214 narrow-body twinjets as a platform. Dubbed PLAK, the Russian acronym for "antisubmarine aviation complex," the future asset could be broadly similar in performance to the U.S. Navy's Boeing P-8A Poseidon, which is based on the Boeing 737-800 platform.

As well as being close to the P-8A in size and payload/range characteristics, the Tu-204/214 is also available cheaply on the secondhand market. Over 20 such jetliners are stored following their withdrawal from commercial airline service. Another dozen could be assembled by the Tu-214 manufacturing plant in Kazan (KAPO), and that of the Tu-204 in Ulyanovsk (Aviastar), using pre-manufactured parts from their stocks.

The ready availability of the Tupolev jetliners makes this option look more suitable than ordering all-new ASW aircraft of a special design, such as the A-40/42 Albatros amphibian developed by Beriev to Soviet navy specifications. Since the mid-1990s, the Russian navy has wavered between the Tu-204/214 and A-40/42, as both options have benefits and advantages.

Although more expensive to build and maintain, and requiring costly ground infrastructure, the amphibian aircraft can employ recoverable (non-expendable) "combat robots." A fashionable novelty in marine warfare, these are unmanned surface vehicles (USVs) carrying sonars and magnetic and other anomaly detectors, along with other sensor equipment to sniff for hostile surface and submersible warships in the search area. These "combat robots" would supplement ASW equipment such as acoustic sonobuoys.

The Russian navy has long been seeking suitable platforms that would supplement and then replace the three dedicated ASW aircraft of Soviet origin. Today, the service operates a handful of Be-12 "Mail" flying boats, 20 Tu-142 "Bear-Fs," and 15 of the Ilyushin Il-38 "May" (an adaptation of the Il-18 airliner), including eight recently converted into the Il-38N version featuring the Novella (non-exportable Sea Dragon) sensor suite.

Even though all the three continue to be upgraded, their current fleet has become increasingly worn-out and outdated. While the surviving Be-12s are to be replaced by SAR and patrol versions of the Be-200 amphibian twinjet, a suitable replacement for the other two types has yet to be selected. The PLAK using the Tu-204/214 platform is viewed as an affordable option and also shares commonality with other special-mission platforms already in service with the Russian armed forces. These include a pair of Tu-214R reconnaissance aircraft with phased-array side-looking radars and a pair of Tu-214ON photo-reconnaissance airplanes employed on the "Open Skies" program. Also, other governmental bodies—such as the Presidential Air Detachment—use the Tu-204/214 aircraft in flying control post, relay, and liaison versions.

Last year, the chief of aviation with the Russian navy, General Igor Kozhin, spoke of the need to induct a next-generation ASW aircraft by 2030. The minister for industry and trade, Denis Manturov, responded in August with mention of a special Tu-204/214 version able to meet the given requirement. As a consequence, Tupolev has resumed work on the Tu-204P project, which began in the early 1990s and subsequently experienced several halts and restarts. The design house insists that the jetliner platform offers sufficient range and on-station patrol time, while ensuring good levels of comfort and working conditions for the crew.

In its turn, Beriev points to the Be-200's and A-40/42's ability to operate from water, which makes possible operations such as the open-ocean rescue of crews of crippled submarines and surface ships, and the ability to deploy and recover "combat robots". ■

by Gordon Gilbert

Within 6 Months

February 5, 2020

Europe: Controller-Pilot Datalink Com

Europe will require aircraft operators to equip for controller-pilot datalink communications (CPDLC) starting February 5.

Feb. 18, 2020

EASA: Halon Banned

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

March 2, 2020 **NEW**

FAA: UAS Remote ID

An FAA notice of proposed rulemaking (NPRM) will require remote and automatic identification of unmanned aircraft systems that would provide position information to receivers on the ground. The resulting new rules are expected to be fully implemented by the end of 2024. Exceptions will apply to amateur-built UAS, drones operated by the U.S. government, and UAS weighing less than 0.55 pounds. Comments on the NPRM are due on March 2.

June 1, 2020

EASA: Drone Regulations

Technical and operational requirements for drones are covered in these rules. For example, new drones will have to be individually identifiable, allowing the authorities to trace a particular drone if necessary. They also cover each operation type, from those not requiring prior authorization to those involving certified aircraft and operators, as well as minimum remote pilot training requirements. The new rules, effective June 1, replace existing national drone rules and requirements in European Uunion member states.

June 7, 2020 **4 Months to Deadline**

Australia/Europe: ADS-B Out Mandate

The ADS-B Out retrofit requirements in Australia and Europe take effect June 7. In Europe, 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. In Australia, this mandate applies to foreign-registered aircraft flying under IFR. Australian-registered aircraft had to be compliant starting January 2.

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 include alcohol testing of flight crews during ramp checks, are applicable to commercial air transport operators and go into effect August 14.

Within 12 Months

Oct 1, 2020

Australia: Rest and Duty Times

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

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.

Beyond 12 Months

March 25, 2021

Australia: Flight Operations

Ten new flight operations regulations will consolidate the operating and flight rules, as well as certification and management requirements, for a variety of aircraft and operations in Australia. The rules will apply to all pilots and operators in Australia and will commence on March 25, 2021. The regulations covered include: general operating and flight rules; certification and management of commercial aircraft operating certificates; and small and large airplanes and rotorcraft.

Jan. 1, 2023 and Jan. 1, 2028

Aircraft CO_2 Emissions

Standards for CO_2 emissions apply to deliveries of current in-production large aircraft starting Jan. 1, 2023. All covered in-production airplanes must meet the standard by Jan. 1, 2028. Jet airplanes with an mtow under 12,500 pounds, and piston-engine airplanes and turboprops below 19,000 pounds mtow, are exempt. ■

Compiled by Kerry Lynch

MARIA FERRARA

MATTHEW DE FOE

SCOTT MEYER

TOMMI KRELL

CASEY CRAFTON

GE Capital Aviation Services (GECAS) named Pat Sheedy to take the helm of its Ireland-based helicopter leasing business, Milestone Aviation Group, as CEO. He succeeds **Greg Conlon**, who recently was promoted to GECAS president and CEO. Sheedy steps into his new role with 19 years of international financial services experience, the majority of which was spent with GE's Aviation Risk Management business with a focus on emerging markets. He most recently was chief risk officer and head of portfolio and underwriting, and before that, he was senior v-p and regional risk manager for GECAS in Dubai.

FLYdocs named **Carl Davis** chief technology innovation officer. Davis has more than 10 years of experience as a chief technology officer including for Bibby Financial Services (Verus360 division) and analytics company DC-Storm (a Rakuten acquisition).

Dassault Aviation named **Charles Wemaëre** v-p of worldwide spares, responsible for spare parts and logistics efforts for the global Falcon fleet. Previously deputy manager, Wemaëre joined Dassault in 2011 as a spares sales director following an extensive career in the automotive industry.

Scott Meyer joined *Flying Colours* as v-p and general manager of its St. Louis, Missouri facility. Meyer brings nearly 30 years of international aerospace and aviation management experience to his new role, formerly serving as CEO of Comlux America in Indianapolis and as executive v-p of business development for the Comlux Group.

The Aerospace Industries Association (AIA) named **Alison Lynn** v-p of communications. Most recently director of product communications for the American Chemistry Council, Lynn also has served on the staff of U.S. Rep. Mac Thornberry (R-Texas) as communications director and later as the spokesperson and director of member initiatives for the House Committee on Armed Services.

Safe Flight Instrument Corporation promoted **Maria Ferrara** to v-p of manufacturing. Ferrara joined Safe Flight in 2005 and most recently was director of quality assurance.

NBAA is adding to its board of directors two new members: **Kate Fraser**, who is head of safety for California-based eVTOL developer Joby Aviation, and **Charlie Precourt**, a former astronaut who is v-p and general manager of propulsion systems at Northrop Grumman Innovation Systems. Before her work at Joby, Fraser led aviation policy for Uber and has worked with regulators and policymakers to pave a path for UAM and has served with the FAA's Office of Accident Investigation and Prevention. Precourt previously was involved in four space flights and has held several management positions with NASA.

The *Aerospace Industries Association* (AIA) elected Collins Aerospace CEO **Kelly Ortberg** chairman of the board of governors for 2020. **Kathy Warden**, chairman, CEO, and president of Northrop Grumman, is the new vice chair.

RTCA added **Nathan Boelkins**, **Michael Ingram**, and **Lorne Cass** to its board of directors. Boelkins oversees the Commercial Avionics portfolio for Collins Aerospace; Ingram is v-p and general manager of Honeywell Aerospace Cockpit Systems; and Cass is v-p of operations and industry affairs for American Airlines.

The *DuPage Airport Authority* (DAA) appointed **Mark Doles** executive director. Doles has served with DAA for more than 30 years in many roles, including as director of the DuPage Flight Center.

Hong Kong-based *Metrojet Limited* hired **Kobus Swart** as director of flight operations.

Metrojet Engineering Clark appointed **Sarith Vaikuntanas** general manager of its MRO in the Philippines, replacing Wesley Slate who has held the position since September 2018.

FlightSafety International promoted **Matthew De Foe** to manager of the company's Paris Le Bourget training facility. De Foe has served with FlightSafety since 2008, beginning as an instructor on Bombardier jets in Tucson, Arizona, later becoming program manager, director of training, and UAS business development and ultimately assistant manager in Tucson and West Palm Beach, Florida.

FlightWorks appointed **Mike Jefcoat** as director of operations. Jefcoat has more than 25 years of Part 121 and 135 aviation experience, with a background with airline and flight school operations. In addition, FlightWorks named **Kevin Bryant** chief pilot. Bryant also has more than 25 years of aviation experience, including with Part 91, Part 121, and Part 135 companies.

West Star appointed **Tommi Krell** director of employee communications and component marketing for the company's component repair business units, including Dallas Aeronautical Services, Flite Components, and Avant Aerospace. Krell, who will continue to direct corporate communication across West Star, joined the company earlier this year after serving as head of global MRO marketing for Jet Aviation.

Woolpert hired **Vivek Khanna** to serve as the firm's Texas aviation design practice leader. Khanna has held multiple senior management and engineering roles in the aviation industry with a background in general aviation and commercial airports

Garrett Ondrus joined *Skandia* as regional sales manager, representing western U.S. and all of Canada.

Guardian Jet named **Casey Crafton** technical services manager. Crafton most recently served as an assembly technician at Pratt & Whitney and as a lead aircraft technician at Embraer Executive Jet Services.

FlightSafety International promoted **Richard Hallows** to assistant manager of its Farnborough training facility. Hallows joined the Farnborough center in 2014 as an instructor in the Sikorsky S-92 training program and most recently was assistant director of standards.

Air Service Basel named **Benedict Staehelin** head of customer relations and projects. In addition, **Pirmin Schärli** is now maintenance lead.

Western Aircraft promoted **Beau Hawkins** to avionics sales manager.

C&L Aerospace named **Miguel Delgado** regional sales manager for Latin America and the Caribbean.

AssuredPartners Aerospace added two new aviation insurance executives: **Doug Bontrager** based in Indiana and **Kris Parsons** in Atlanta. Bontrager will focus on aerial applicators and other commercial aviation businessest. Parsons has 19 years of experience in aviation insurance.

Southern Cross Aircraft added **Denise Alonso** to its aircraft sales team. Alonso, who will represent Southern Cross in Brazil, has held roles with charter fractional ownerships, airport real estate, and manufacturers.

Western Aircraft promoted **Steve Myers** to jet service manager and **Steve Rozbora** turboprop production manager. Myers has served with Western Aircraft for 13 years, holding roles previously as lead and team lead. Rozbora previously spent 21 years with Honeywell.

The Mason City Airport Commission appointed **David Sims** airport manager of Mason City Municipal Airport in Iowa. He succeeds Pamela Osgood, who is retiring after serving as airport manager for 17 years. Sims has spent the past 13 years serving in airport operations at Mason City.

Peter Schmitz joined *The Loomis Company* as an aviation broker. Schmitz previously served as aviation practice leader at Lockton and the global CEO for Aon's Aviation Specialty.

Daniel Klass was named assistant director for *Dubuque Regional Airport* in Iowa. Klass has more than 30 years of aviation experience, first working at the airport in 1987 with Crescent Aviation and then Dubuque Air Service before moving into Dubuque Regional Airport operations.

Rachel Hill joined the *Aircraft Electronics Association* as director of advertising. ■

FINAL FLIGHT

Murray Q. Smith, who made his mark on aviation journalism steering his *Professional Pilot* magazine for more than five decades, died on December 25. He was 89. "As you may know, he had to step down from his captain position due to medical reasons, although he still visited the office regularly. He will be truly missed around here," the magazine said in announcing Smith's passing. "We want to reaffirm our full commitment to this industry and assure you that *Pro Pilot* will carry on with Murray's mission."

Honored during the 9th annual Living Legends of Aviation Awards in 2012, Smith was well known within aviation circles as he remained deeply involved in the magazine that he launched 53 years ago. Aimed at issues affecting pilots, managers, and dispatchers, the magazine perhaps is best known for its reader surveys.

"For decades, Murray Smith and his team have brought well-deserved attention to the people and companies that represent the best of our industry," said NBAA president and CEO Ed Bolen. "His boundless energy and insight will be missed."

For Smith, flying was a life-long passion, and he held his ATP and CFI certificates until the day he died. Born in Chicago, Smith joined the Leo Burnett Advertising Agency after obtaining a degree in journalism from the University of Illinois and began his career as a technical writer, according to Airport Journals. But shortly after that, he joined the U.S. Navy and, among other things, was tasked with writing reports on evaluations of autopilots, flight directors, and weather radar, Airport Journals reported. This was all experience that eventually would play into his venture a decade later as he founded *Pro Pilot*.

Smith is survived by his wife Marcia "Eleni," who has been the assistant to the publisher and directed advertising sales for the magazine, along with his two sons, David and Alexander. ■

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FEBRUARY

AIR OPS EUROPE 2020... February 4-5, Brussels, Belgium. Info: https://airopseurope.aero/air-ops-europe-2020.

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

RTCA SC-135 ENVIRONMENTAL TEST... February 17-20, NIAR at Wichita State University, Wichita, Kansas. Info: (202) 330-0654; email: rmorrison@rtca.org; rtca.org/content/upcoming-committee-meetings.

NBAA LEADERSHIP CONFERENCE... February 24-26, Orlando, Florida. Info: nbaa.org/events/2020-leadership-conference.

MARCH

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

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

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

NBAA SCHEDULERS AND DISPATCHERS CONFERENCE... March 10-13, Charlotte Convention Center, Charlotte, North Carolina. Info: nbaa.org/sdc.

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

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

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

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

SUN 'N FUN... March 3-April 5, Florida Air Museum, Lakeland, Florida. Info: www.flysnf.org/.

APRIL

AERO FRIEDRICHSHAFEN... April 1-4, Messe Friedrichshafen, Friedrichshafen, Germany. Info: aero-expo.com/aero-en/.

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

REGIONAL AIR CARGO CARRIERS ASSOCIATION SPRING CONFERENCE... April 21-23, Hilton Scottsdale Resort, Scottsdale, Arizona. Info: raccaonline.org/racca-spring-conference-registration/

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

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

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

MAY

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

JUNE

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

PILATUS OWNERS AND PILOTS ANNUAL CONVENTION... June 11-13, Lansdowne Resort and Spa, Leesburg, VA. Info: pilatusowners.org/popa-annual-convention/.

CBAA CONVENTION... June 16-18,-Toronto, Canada. Info: Tel: (613) 236-5611; cbaa-acaa.ca/CBAA/Events.

JULY

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

EAA AIRVENTURE... July 20-26, EAA Aviation Museum, Oshkosh, WI. Info: eaa.org/airventure.

OCTOBER

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

INTERNATIONAL AIR SAFETY SUMMIT... October 19-21, Marriott Rive Gauche Hotel & Conference Center, Paris. Info: flightsafety.org/events/

NOVEMBER

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

DECEMBER

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

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