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After acquiring Learjet in 1990, Bombardier quickly began developing variants of existing designs such as the Learjet 60, which rolled out in May 1992. It introduced the Learjet 45 in 1995, but that was the last clean-sheet Learjet to enter production.

A eulogy for legendary Learjet

by Mark Huber

Bombardier announced February 11 that it was taking its iconic Learjet brand off life support and ending its production. It is a sad end for the name long generically associated with business jets as much as Coke is with cola and Kleenex is with facial tissues.

More than 3,000 Learjets have been delivered since 1964 but only 11 were turned over to buyers in 2020. In recent years, moreover, production had been anemic and the product line had shrunk to one model: the 75, an upgraded variant of the model 45, which first came to market in 1998. Bombardier, currently struggling under a mountain of debt, said it will continue to support the Learjet fleet and offer upgrades—for now, at least—but needs to focus on its more lucrative Challenger and Global bizjet lines.

When Bill Lear created the Learjet in the early 1960s, he envisioned a small, fast, and simple airplane—a concept the marketplace embraced. His 20-series and the slightly elongated 30-series jets that followed sold briskly for more than 20 years, until long after he had left the company. Riding in the back of a Learjet once meant trips to the chiropractor and exercising bladder control, but it also meant the ultimate in aviation cool: speed.

Bill Lear first came to the idea of the Learjet while living in Switzerland in the late 1950s. He subsequently set up shop in Wichita, where he took big risks during the development of the Model 23, such as skipping construction of a production prototype on soft tooling. He fed his perpetually struggling company with investor money and earnings from the stereo eight-track tape player he had developed for automobiles.

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Pilot app survey

AIN surveyed readers to learn which flight planning apps they use and the features they consider to be most useful and helpful.

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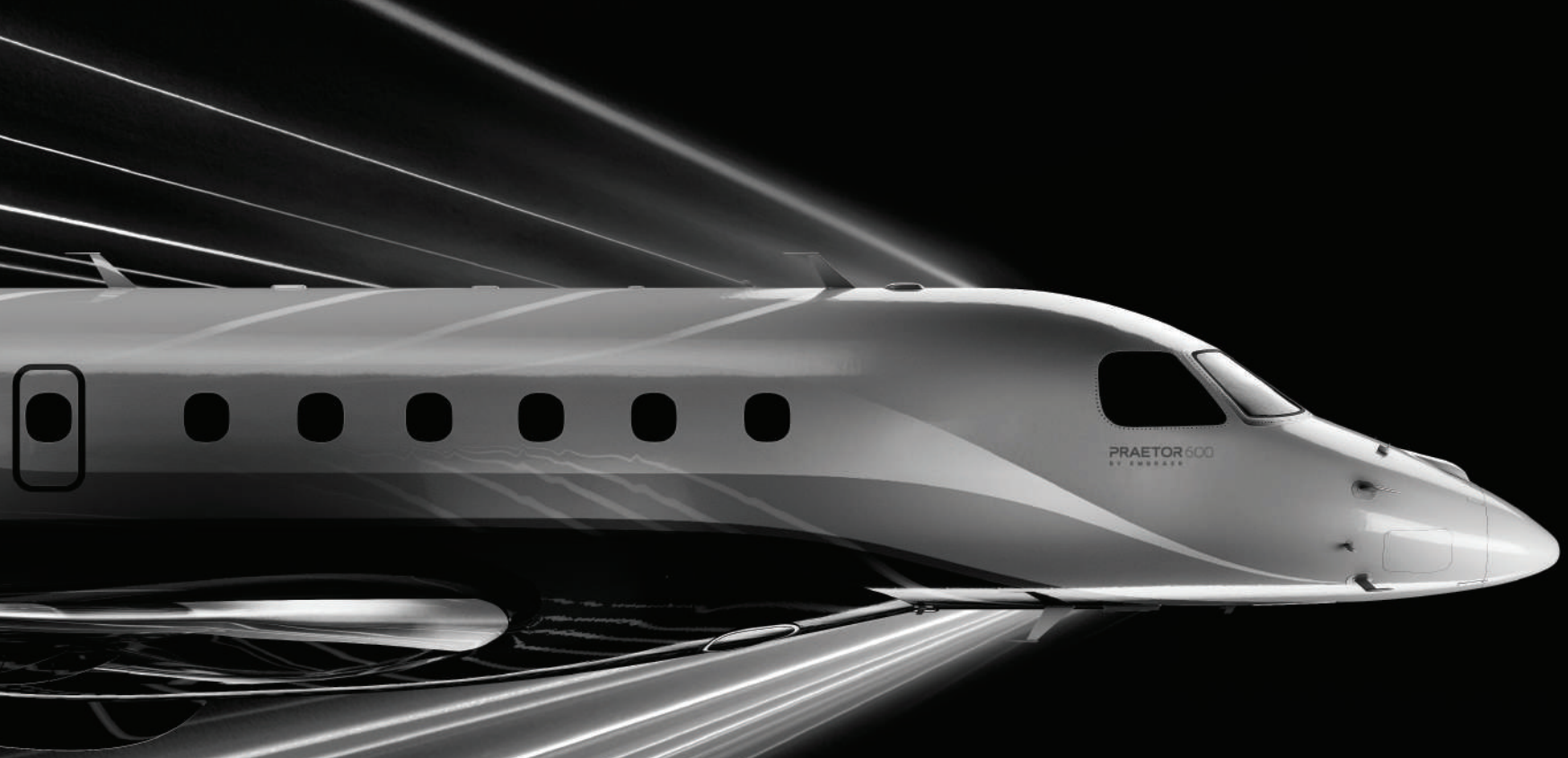

LEADING THE WAY

PRAETOR 600

BY EMBRAER

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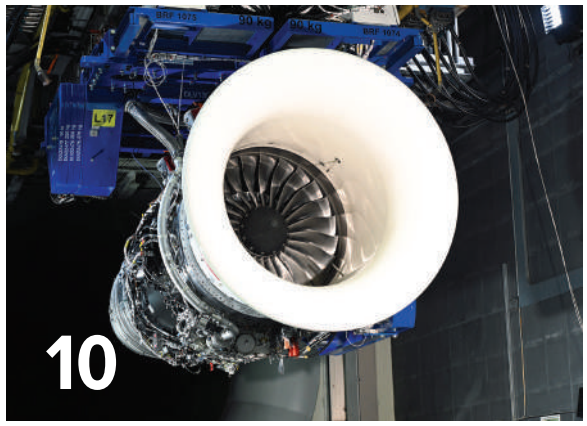

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Editor's Note: After writing the popular Torqued column in **AIN** for 16 years, John Goglia has chosen to move on to other safety-related pursuits. The only A&P mechanic to serve as a member of the National Transportation Safety Board, John shared his wisdom and canny observances with **AIN**'s readers every month and never hesitated to call it like it is. **AIN** thanks John for his efforts to educate us and promote aviation safety.

Aviation International News

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Aviation International News (ISSN 0887-9877) is published thirteen times per year (monthly plus a special NBAA Convention News issue in November). Periodicals postage paid at Midland Park, N.J., and additional mailing offices. **Postmaster:** Send address changes to Aviation International News, P.O. Box 8059, Lowell, MA 01853 USA. Allow at least eight weeks for processing. Include old address as well as new, and an address label from a recent issue if possible. Subscription inquiries: +1 (201) 345-0085 or email: subscriptions@ainonline.com.

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As We Go To Press

PW4000-POWERED BOEING 777S GROUNDED

Following Japan's grounding of all Boeing 777s equipped with Pratt & Whitney PW4000-112 turbofans, the FAA on February 21 said it would issue an emergency airworthiness directive requiring immediate or "stepped up" inspections of the airplanes in reaction to a major engine failure aboard a United Airlines 777-200 on February 20. The order came as United Airlines, the only U.S. operator of the airplanes in question, said it had grounded its fleet of 24 after consultations with Boeing and the FAA. Boeing, meanwhile, has recommended the grounding of all 69 of the airplanes in service and another 59 in storage "until the FAA identifies the appropriate inspection protocol."

ONE AVIATION GOES INTO LIQUIDATION

With most of its salable assets already in the hands of other entities, the nearly six-year run of Albuquerque, New Mexico-based One Aviation came to an end on February 18 with an order by U.S. Bankruptcy Court judge Christopher S. Sontchi to liquidate the company's remaining assets. "I've lost confidence in management," Sontchi said in converting One Aviation's reorganization effort, which began in October 2018, to Chapter 7 liquidation. Following an aborted Section 363 asset sale attempt, One Aviation received court approval in November to sell off the Eclipse 500/550 program to AML Global Eclipse LLC, with Nautical Hero Group bidding for assets related to Kestrel Aircraft.

SURF AIR ACQUIRING ELECTRIC AVIATION PIONEER AMPAIRE

Surf Air Mobility is acquiring hybrid electric aviation pioneer Ampaire in a deal worth more than $100 million. The private air travel company aims to have hybrid aircraft available by 2024 for customers booking its scheduled and on-demand services. Ampaire co-founder Kevin Noertker will be president of a new Surf Air division called AMP. Ampaire is working to convert several aircraft types to hybrid-electric propulsion, building on recently completed flight tests with its Electric EEL Cessna 337. It believes the first of these programs, which likely will include the de Havilland Twin Otter and Cessna Grand Caravan, could be certified by the end of 2023.

FOLEY: AIRCRAFT MRO BIZ TO REMAIN FLAT IN 2021

Aircraft MRO spending will remain dampened in 2021, remaining on par with 2020 at least through the first half of the year, according to industry analyst Brian Foley. However, Foley, who heads his own industry consultancy, added the latter half of the year should see some improvement. Business aviation MRO spending dropped roughly 15 to 25 percent in 2020, while the commercial sector experienced a 50 percent plunge, he estimated. While activity remains flat going into 2021, Foley said, "There's hope that the second half of 2021 will help both sectors claw back more lost ground, with business jet flight activity rising to well within 10 percent of normal and airlines improving to 'just' 25 to 50 percent off of normal levels."

GULFSTREAM TO EXPAND APPLETON COMPLETIONS

Gulfstream Aerospace is adding more than 13,000 sq ft to its completions hangar at Appleton International Airport, bringing the facility to 126,500 sq ft. The improvements will include upgrading the furniture finishing shop, consolidating completions back shops for improving workflow, and enhancing the shipping and receiving areas, as well as HVAC systems. Gulfstream expects the project to be completed in the third quarter. This follows a previous expansion of the Appleton MRO facility just two years ago.

TECH MAHINDRA JOINS SPIKE'S SUPERSONIC BIZJET TEAM

Spike Aerospace's efforts to develop the supersonic S-512 business jet are receiving a boost under a partnership with Indian technology giant Tech Mahindra. Through the partnership, Tech Mahindra will bring engineering, optimization, and composites expertise to the low-boom Mach 1.6 jet. Tech Mahindra's Aerospace and Defense Group has provided engineering support to a number of commercial, business aviation, and defense programs. Spike plans to leverage Tech Mahindra's expertise in composite airframe design, stress analysis, and optimization. According to Spike, the S-512 will be a low-boom, 18-passenger supersonic business jet.

STANDARDAERO TO BUY SIGNATURE'S ENGINE REPAIR BIZ

StandardAero will acquire the engine repair and overhaul (ERO) business of Signature Aviation for $230 million. Signature's ERO portfolio includes Dallas Airmotive, H&S Aviation, W.H. Barrett Turbine Engine Co., International Governor Services, and International Turbine Service. The deal, which comes as Signature Aviation itself is an acquisition candidate, is expected to close midyear. Based in Dallas, Signature's ERO comprises engine overhaul facilities in Dallas and Portsmouth, England, 10 regional turbine centers, one component MRO site, and two parts/distribution facilities. Combined, the ERO employs 1,100 and generated $500 million in revenue in 2020.

DAVID McINTOSH

Bombardier's Learjet 75 Liberty variant entered the market late last year, but production for the Learjet full line is winding down by the end of 2021 as part of a series of cost-cutting measures.

Bombardier to end Learjet production, lay off workers

by Kerry Lynch

The ramp-up in Global 7500 deliveries led to a 3 percent year-over-year growth in Bombardier's business aircraft revenues to $5.6 billion, but the company is ending Learjet production by year-end, laying off 1,600 workers, and consolidating completions activity in Montreal as it grapples with the debt that it was left with after becoming a pure-play business aviation company.

Bombardier president and CEO Éric Martel said the decision to end production after a nearly 60-year history wasn't taken lightly. Noting that more than 3,000 Learjets have been delivered since the brand first entered the market in 1963, he said, "The iconic Learjet has had a remarkable and lasting impact on business aviation." However, he added, "Given the number of new entrants in the light jet segment and the challenging market dynamic, we need to focus our future efforts on our more profitable Global and Challenger aircraft families."

Late last year, Bombardier said it planned to announce aggressive steps to address its debt once it became a pure-play business aviation company following the sale of its rail business—its last non-business aviation unit—to Alstom. After the sale, Bombardier was left with a $4.7 billion debt load, slightly more than the $4.5 billion anticipated last year, and significantly more than the $2.5 billion originally expected.

Bombardier had already said that it did not plan to invest in new aircraft programs in the next several years. The measures Martel estimated would help contribute to $400 million in annual savings by 2023. Savings this year are anticipated at $100 million. But the company will take a $50 million charge in restructuring costs.

The reduction of 1,600 positions will bring Bombardier's global workforce to about 13,000 by year-end. In addition to consolidating Global aircraft completion work in Montreal, the company is reviewing options for underused space in Quebec and divesting its electrical wiring interconnection systems operation in Queretaro, Mexico.

"Workforce reductions are always very difficult, and we regret seeing talented and dedicated employees leave the company for any reason," said Martel. "But these reductions are absolutely necessary for us to rebuild our company while we continue to navigate through the pandemic."

Bombardier stresses that it will continue supporting Learjet and announced a "Racer" remanufacturing program for Learjet 40 and 45 aircraft with a bundled set of enhancements that will be carried out in Wichita.

While ending completions and Learjet production work in Montreal, Bombardier will still use its expansive Wichita complex as a flight-test center and center of excellence for specialized aircraft. In addition, the service center will continue to operate.

In fact, Martel noted that services is one area where the company will still invest, and he pointed to growth activities in Singapore, London, Melbourne, and Miami.

As for results, Bombardier delivered 114 aircraft in 2020, down from 142 a year earlier. But revenues grew as Global 7500 deliveries ramped up in 2020, including a record 16 in the fourth quarter alone. Bombardier delivered 59 Globals during 2020, up from 54 in 2019; 44 Challengers, down from 76 in 2019; and 11 Learjets, down from 12 in 2019.

With the strong performance of the Global 7500, manufacturing operations alone in 2020 produced an 11 percent gain in revenues, offsetting a 21 percent slide on the services side.

Martel was further encouraged by sales activity in the fourth quarter and said it was one of the strongest in years, with 43 gross orders. In addition, he was encouraged by the newcomers to the market and said the company is keeping a close eye on how that will shape demand. Even so, he anticipates that 2021 deliveries will be roughly the same as 2020's at between 110 and 120 aircraft, and he noted that it will take the industry a few years to return to 2019 levels. ■

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Gulfstream's G700 has checked off numerous development flight tests, with five aircraft flying and 1,100 hours accumulated since the first took to the skies on Feb. 14, 2020.

Gulfstream G700 program reaches 1,100 flight hours

by Kerry Lynch

One year after Gulfstream Aerospace first flew its new G700 flagship, the flight-test program has now accumulated 1,100 flight hours and completed most of the development testing in preparation for certification flight trials, keeping the aircraft on track for market entry in late 2022.

The first flight-test aircraft flew on Feb. 14, 2020, and Colin Miller, Gulfstream senior v-p of innovation, engineering, and flight, said that the G700 flight-test program "has continued uninterrupted ever since."

That first aircraft has been used for envelope expansion, reaching as high as 54,000 feet and Mach 0.999. Jake Howard, the lead test pilot for the G700 program, noted the dive speed that Gulfstream must test to for the G700 is Mach 0.995. When asked about potential supersonic testing, he said there was no "intent to intentionally" fly beyond that speed in testing.

In addition to high speed, the aircraft also has performed low-speed and stall tests, including with wing ice shapes. Throughout the flight regime the aircraft has "performed remarkably well, flying virtually squawk free" and is meeting performance expectations, Miller said. Meanwhile, the aircraft's Rolls-Royce Pearl 700 engines are performing "fantastically well; they are extremely efficient giving us great results for speed, range, and low emissions," he added.

Gulfstream has since added four more aircraft to the program, with the fifth and final flight-test aircraft flying in late October. In addition, two more aircraft will be dedicated to interior testing and associated supplemental type certificate work. The first of these two, Miller said, is in the late stages of outfitting.

The flight-test program has completed its "initial paces" in field performance testing, demonstrating a full gross-weight balanced field takeoff of about 6,250 feet with a typical landing distance of around 2,500 feet.

Gulfstream further has flown a G700 to Van Nuys and San Jose, California, as well as Chicago, to support sales and marketing. During those trips, Miller said that the company tested the avionics in a variety of different conditions and approach procedures "proving out the robustness" of the Symmetry flight deck.

The G700 comes with a predictive landing performance system that Miller termed as a breakthrough and said is designed to shield against runway overrun and warns pilots to go around when necessary. The flight trials have further been examining the performance of the new dual head-up display (HUD) that includes enhanced vision system and synthetic vision. The enhanced vision system will be given landing credit down to touchdown and rollout, Miller said.

As for the program schedule, Miller conceded the pandemic may have forced the shifting around of a few parts of the test program but that the company has been able to keep the flight tests and lab work on track to keep the program on its intended pace. This includes folding in remote work where possible.

He noted that the program is its first involving development testing to make sure the aircraft performs as expected, especially with new equipment such as the synthetic vision on the HUD. And then it moves on to company testing, which he characterized as the "dress rehearsal" for the certification trials. Miller estimated the program has completed most of the development testing and roughly half of the company testing with certification testing anticipated to begin later this year. "Almost everything on the airplane we've looked at least once already."

The aircraft, the largest in the Gulfstream portfolio with up to five living areas and 20 windows the size of those on the G650, will be certified to fly 7,500 nm and at speeds of Mach 0.925. Miller noted that he discovered that once he flew the aircraft, he immediately forgot how large it was and called it responsive and predictable. ■

NATA pushes for greater role for general aviation in vaccine distribution

A small but growing number of Part 135 operators have jumped into the Covid-19 vaccine distribution effort as rural communities continue to seek support. But much more can and needs to be done on the distribution front, said Ryan Waguespack, senior v-p of National Air Transportation Association (NATA), who added the group has been trying to connect operators with state and local health departments.

On February 18 NATA issued a call to action to encourage operators to get involved and assembled a working white paper, which notes that Congress in December appropriated $8.7 billion for distribution and the Part 135 community is "uniquely positioned to assist outlying communities."

Some of this activity is already ongoing, he said, pointing to Part 135 operations in Washington and Alaska to distribute vaccines to Native American territories and remote regions. Another operator was participating in a beta trial with the Department of Veterans Affairs to deliver vaccines in Montana. Waguespack said the VA is looking to scale these types of operations.

Beyond reaching remote regions, NATA also notes that GA airports can play a role, he said, adding Arlington Municipal Airport in Washington has opened its airport as a vaccine clinic site. NATA is advising interested operators to reach out to their state and local health departments, as well as the VA, to discuss how they can help. **K.L.**

News Briefs

In-person EBACE Cancelled, Virtual Event Planned

This year's in-person EBACE show in Geneva is the latest casualty of the Covid-19 pandemic, with co-organizers EBAA and NBAA announcing the show's cancellation last month. Subsequently, the associations announced a virtual event, dubbed EBACE Connect, on May 18 and 19. EBAA and NBAA promised an event that "will gather the industry around compelling speakers and valuable content." In addition, they will seek other opportunities to jointly promote business aviation throughout the coming year.

Textron Aviation Deliveries Mixed in 4Q

Textron Aviation recorded a mostly lower fourth-quarter 2020 with declines in jet deliveries, revenue, and profit, although it saw a slight bump in turboprop deliveries. Jet deliveries in the quarter totaled 61, down from 71 a year ago, while deliveries of turboprops also totaled 61, up from 59 deliveries in fourth-quarter 2019. Profit in the period was $108 million on revenue of $1.6 billion, which was a decrease of $26 million and $169 million versus the fourth quarter of 2019. Book-to-bill was 0.87:1, down from 1.50:1 in the third quarter. Looking ahead, the Wichita airframer is projected to achieve full-year revenue of $4.5 billion and a 5.5 percent gain in profits in 2021.

NetJets Buys Share in Sustainable Fuel Company

NetJets has purchased a stake in WasteFuel, a company that aims to convert landfill waste into sustainable aviation fuel (SAF). WasteFuel is currently developing a plant in the Philippines that is scheduled to begin production by 2025, with full capacity to convert one million tons of municipal waste into 30 million gallons of SAF a year. In addition to a 20 percent share in the company, NetJets will also commit to purchasing 100 million gallons of WasteFuel-produced SAF over the next decade. That fuel will be delivered to Los Angeles and distributed throughout the NetJets network.

Preowned Bizcraft Transactions See Late-year Boost

Aircraft valuation analyst Asset Insight reported that preowned transactions in the fourth quarter were up 34 percent quarter-over-quarter and marked a 25 percent increase in demand from a year earlier. Asset Insight's AI2 Market Report characterized the quality of the for-sale fleet in the "excellent" range and improved over the third quarter and from 2019. Turboprops and midsize jets marked the largest improvement in quality of available fleet, while light jets posted a slight decline, it noted. Pricing trends were mixed, however, with light jets posting the only year-over-year increase in the fourth quarter.

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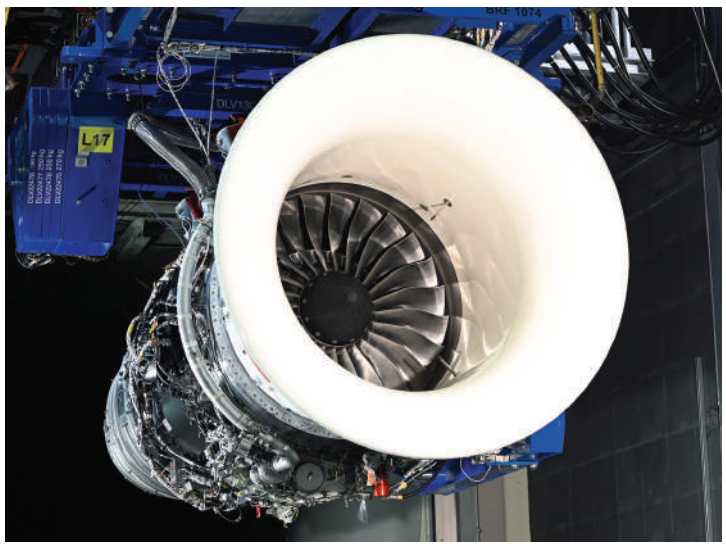
Rolls-Royce runs Pearl 700 on 100% SAF

by Curt Epstein

Rolls-Royce has successfully conducted its first tests on a business jet engine using 100 percent sustainable aviation fuel (SAF), it announced February 1. The demonstration, conducted at the manufacturer's facility in Dahlewitz, Germany, comes on the heels of a similar test using a Trent 1000 engine in the UK. This latest experiment used a Pearl 700 engine that's under development for the new Gulfstream G700 and confirmed that the company's current commercial and business jet powerplants "can operate with 100 percent SAF as a full 'drop-in' option, laying the groundwork for moving this type of fuel towards certification."



Following successful 100 percent SAF validation tests using one of its commercial Trent 1000 engines, Rolls-Royce demonstrated the ability of its latest business aviation powerplant, the Pearl 700, to run on the unblended sustainable fuel.

SAF certification is currently limited to blends of up to 50 percent with conventional jet fuel, depending on which of the several approved production pathways was used. The SAF used in this test was produced by California-based World Energy, sourced by Shell Aviation, and delivered by SkyNRG.

Unblended SAF has the potential to reduce CO_2 lifecycle emissions by more than 75 percent compared to conventional jet fuel, but its adoption may be some time in the future due to a variety of factors including production levels and the inability of some legacy engines to use the unblended fuel, resulting in a need for additional fuel infrastructure.

"Sustainable aviation fuels have the potential to significantly reduce the carbon emissions of our engines, and combining this potential with the extraordinary performance of our Pearl engine family brings us another important step closer to enabling our customers to achieve net-zero carbon emissions," the company said.

With 18,250 pounds of thrust, the Pearl 700 is Rolls-Royce's latest business aviation engine and uses a newly-designed low-pressure system for an 8 percent improvement on takeoff over the BR725. It offers a 12 percent better thrust-to-weight ratio and 5 percent higher efficiency compared to its predecessor. ■

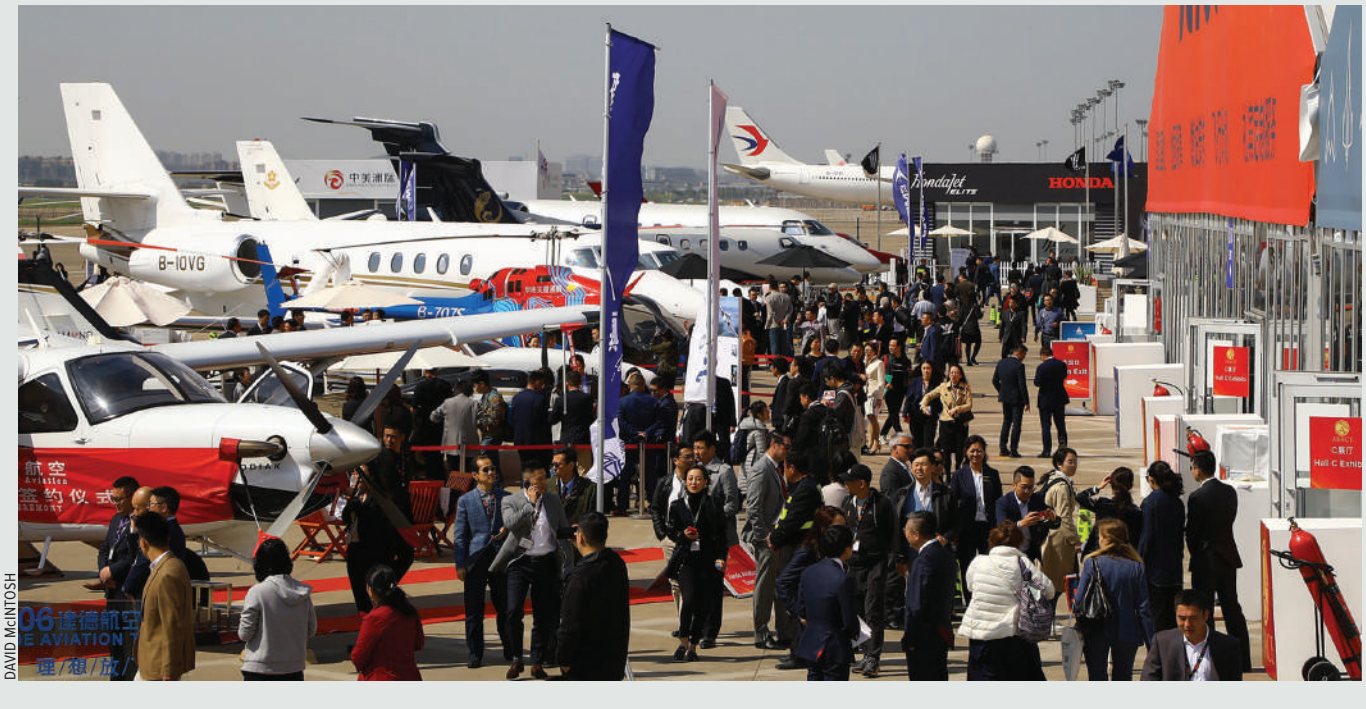
NBAA cancels 2021 ABACE and other first-half events

A day after shelving this year's in-person European Business Aviation Conference and Exhibition (EBACE) in favor of a virtual event, NBAA cancelled its remaining in-person events scheduled for the first half of the year, including the Asian Business Aviation Conference and Exhibition (ABACE) that was set for April 13 to 15 in Shanghai, China. Also canceled were the 2021 NBAA Maintenance Conference, which was planned for May 11 to 13, and the 2021 NBAA White Plains Regional Forum, scheduled for June 9.

These events join many other aviation in-person gatherings that were canceled or postponed in the first half, ranging from the Paris Air Show to Heli-Expo. As with EBACE, NBAA is planning options for virtual programs to replace the canceled events.

"We are disappointed that we will be unable to offer a robust slate of in-person events in the first half of 2021," NBAA president and CEO Ed Bolen said. "But the safety and security of our event participants have always been a core value for the association, and that is central to our decision."

NBAA already had replaced other events, including its annual Schedulers and Dispatchers show and International Operators Conference, with online forums. The next in-person ABACE is scheduled from April 12 to 15, 2022, while the 2022 Maintenance Conference is planned from May 3 to 5, 2022, in San Antonio, Texas. **K.L.**



DAVID McINTOSH

News Briefs

Gulfstream 2020 Deliveries Down

Gulfstream Aerospace finished the fourth quarter on a strong note, but aircraft deliveries for 2020 still slipped by 15.7 percent year-over-year, to 127 jets (105 large-cabin, 22 midsize). Gulfstream parent General Dynamics expects about 10 fewer deliveries in 2021 due to the continuing pandemic and G550 production ending this year. However, sales were robust in the fourth quarter, with a book-to-bill of 0.96:1, and are anticipated to continue to rebound this year, especially in the second half as business travel recovers. Aerospace backlog at year-end stood at nearly $11.63 billion, compared with $13.349 billion a year earlier. Revenues at Gulfstream and sister company Jet Aviation last year were $8.075 billion, down from $9.8 billion in 2019. Corresponding profits for the division were $1.08 billion last year, down from about $1.5 billion in 2019

CDC Mask Req Includes Charter Operators, FBOs

The Centers for Disease Control and Prevention's (CDC) latest order requiring masks while traveling extends to airports, FBOs, commercial aircraft operations, including Part 135 charter operators, business aviation advocates are advising. The order—which applies to those traveling into, within, or out of the U.S.—calls on applicable facility or aircraft operators to do their best to ensure passengers are wearing masks before they enter a facility or board an aircraft and monitor to ensure masks remain worn, NATA said. Further, operators must provide notification of federal requirements regarding masks and should disembark passengers who refuse. Part 91 operations are exempt, as are crewmembers, when wearing a mask would create a risk to workplace health, safety, or job duty, NBAA said.

Daher Steps Up TBM, Kodiak Training Efforts

Daher is bolstering its flight training efforts with the appointment of TBM mentor and factory demo pilot Wayman Luy to the newly created position of director of training and standards. In this role, Luy is tasked with developing standardized training programs for both pilots and instructors and folding in tools such as computer simulation, online learning, and e-learning for the TBM series of high-performance turboprops and Kodiak utility turboprops. In addition, Luy will be responsible for oversight of factory-approved flight training organizations. These include the U.S.-based Parkwater Aviation, which offers training courses and the world's only full-motion simulator for the Kodiak; SimCom Aviation Training, which offers TBM courses and simulator training at centers in Scottsdale, Arizona, and Orlando, Florida; and, France-based Sim-Aero A.T.O, which provides EASA-certified TBM training.

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Textron Aviation's Cessna Citation CJ4 Gen2 is the first upgrade to its decade-old CJ4. improvements include new skylights in the lavatory and aft cabin.

Textron Aviation unveils second-generation CJ4

by Jerry Siebenmark

Textron Aviation is refreshing the cabin of the largest of its Cessna Citation CJ family of light jets, the CJ4, the manufacturer announced February 9. The CJ4 Gen2 is equipped with enhanced features including new folding airstairs with a lower step to the ground, step lighting, and handrail; added seating options; new ambient lighting; and a galley with improved storage.

The CJ4 Gen2 has received current interior certification under its Model 525C FAA type certificate, and deliveries of the $10.75 million jet will begin this quarter. In addition to the improved storage, new features in the galley include an optional high-power outlet with a pull-out surface for a coffee maker, as well as additional, extendable stone countertops.

In the main cabin, new side-facing seating options include a single folding seat, a fixed two-place couch, and a folding two-place couch for additional storage of passenger belongings. Enhanced lighting in seat pockets, cupholders, and along the sidewall and floor are standard. Two CoolView skylights—a first for a Citation—provide natural light to the lavatory and aft cabin. A new lavatory vanity and sink are available through the Premier Collection design option.

Cabin improvements are capped off by an upgraded wireless cabin management system (CMS) that comes with a media server capable of streaming preloaded audio and video files, accessing SiriusXM Satellite Radio and providing moving maps. The CMS also allows passengers to wirelessly control cabin lighting, window shades, and temperature from their mobile devices. In addition, each seat features a USB charging port. Textron Aviation senior v-p of customer experience Christi Tannahill noted the improvements were made based on "collaborative conversations with our customers. And we are proud of the partnerships that led to these results."

This is the first upgrade to the CJ4, which began deliveries in 2010. More than 320 of the single-pilot twinjets are in operation today. Absent from the improvements is an upgrade to the airplane's avionics, such as the addition of synthetic vision to its Collins Aerospace Pro Line 21 cockpit or replacing it with the Garmin 3000 avionics package. The Wichita airframer noted that based on feedback from its customer advisory board, the priority for upgrades in the CJ4 Gen2 were "generally focused around the experience in the cabin."

"In addition to aircraft performance, the cabin experience is a critical element to [customers] selecting the aircraft," added Textron Aviation senior v-p of sales and flight operations Rob Scholl. ■

With Catalyst progress, Textron sets plan for single-engine Cessna Denali first flight

Textron Aviation expects the first flight of its Cessna Denali turboprop single later this year now that GE Aviation has announced another milestone in its Catalyst engine development program. GE said its European flight-test engineering team has now fired up a Catalyst engine hung on a Beechcraft King Air 350 flying testbed in preparation for ground testing. The clean-sheet Catalyst will power the Denali.

"The engine started flawlessly on the first attempt," said Catalyst product line leader David Kimball. "It reached ground idle in a stable and predictable manner without any intervention, and the fully integrated engine and prop control system worked seamlessly. This not only demonstrates progress within the program but also showcases the versatility of this engine; the Catalyst can be installed in a wide spectrum of aircraft applications with vastly different technical architectures."

GE Aviation's European flight-test engineering team with the Catalyst flying testbed.

Next in the ground-test campaign is taxiing the testbed with the Catalyst, which will include running various power-management scenarios. That will help to determine the engine's performance, operability, and responsiveness to Catalyst's full authority digital engine and propeller controls-enabled pilot inputs, explained GE Aviation staff test engineer Jiri Pecinka.

A Textron Aviation spokeswoman confirmed to **AIN** that it had recently received a flightworthy Catalyst engine and was looking forward to first flight of the Denali, which originally was expected in 2019.

"We anticipate the Denali making its official debut in 2021 as the development program ramps up, and we look forward to seeing another innovative creation—designed and built by our talented workforce—gracing the Kansas skies when the Denali takes flight in the second half of the year," the spokeswoman said.

With delays in the Catalyst program, Textron Aviation officials had previously declined to specify a timeline for the first flight of the Denali. **J.S.**

News Briefs

Jet Aviation Finalizes Hawker Pacific Integration

Jet Aviation has finalized its integration with FBO/MRO chain Hawker Pacific, which it acquired in 2018. All of the former Hawker Pacific locations are now Jet Aviation branded with the exception of the joint-venture Shanghai Hawker Pacific Business Aviation Centre, which will retain its existing name. That joint-venture operates a large FBO/MRO at Hongqiao International Airport, as well as a smaller passenger facility at nearby Pudong International Airport.

Vista Global's Charter Operations Finish 2020 Strong

Vista Global experienced double-digit increases in new memberships and bookings at its charter operations VistaJet and XO in 2020 and expects continued growth this year. VistaJet recorded a 29 percent year-over-year gain internationally in new memberships last year, with Europe accounting for 43 percent of new memberships, followed by North America at 25 percent, Asia at 18 percent, and the Middle East at 10 percent. Vista's XO on-demand platform also saw a 2020 surge in new memberships that was three times higher than in 2019. XO flight hours were also 6 percent higher year-over-year. The company said it is confident of "further significant" membership growth in 2021.

FAA Seeks Noise Input

The FAA is seeking comment on a number of noise research projects that the agency has undertaken and has released results of one such study, the Neighborhood Environmental Survey (NES), which found an increased level of annoyance from aircraft noise. Broadly, the research is exploring three main themes: effects on individuals and communities; noise modeling, metrics, and environmental data; and, reduction, abatement, and mitigations. The multi-year NES accumulated responses from more than 10,000 people living near 20 airports across the country. In contrast to earlier surveys, the NES results "show a substantially higher percentage of people highly annoyed over the entire range of aircraft noise levels (i.e., from DNL 50 to 75 dB)," the agency said.

ASL Establishes Frax Program with Vision Jet

Belgium-based ASL Group has taken delivery of a Cirrus Vision Jet G2 that will be used to establish a fractional share program. Based at ASL's headquarters in Antwerp, the jet will be operated under the company's recently restructured Blue Sky Club membership program and as its first fractional airplane, with plans to add more. "Not only do we welcome this aircraft as the newest member of our fleet, but we are also very excited to be launching our new fractional ownership model through our exclusive Blue Sky Club," said ASL CEO Phillippe Bodson.

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Wheels Up to go public at $2.1B valuation

by Chad Trautvetter

Wheels Up soon will be a publicly-traded company on the New York Stock Exchange (NYSE) thanks to a definitive agreement announced February 1 with special purpose acquisition company (SPAC) Aspirational Consumer Lifestyle Corp. The transaction, which is expected to close in the second quarter, values the private aviation firm at $2.1 billion.

When completed, the transaction will provide Wheels Up with $750 million in cash to fund operations and support new and existing business initiatives. Wheels Up will trade as "UP" on the NYSE.

"We believe this will allow us to realize our founding goal of democratizing private aviation, through our membership model, suite of products and benefits, and by bringing the shared economy to private aviation through our app," said Wheels Up founder and CEO Kenny Dichter.

He said the deal will help bring more capital for further growth at Wheels Up, which has already acquired four private aviation operators and services, including charter operator Mountain Aviation, over the past 18 months. Hinting at more to come, Dichter told **AIN**, "We're just getting started."

DAVID McINTOSH

Wheels Up is "just getting started" on opportunities to grow even larger.

Aspirational was formed and is led by experienced consumer investors, including chairman and CEO Ravi Thakran, a private-equity veteran and former group chairman of LVMH Asia. In addition, L Catterton, the largest global consumer-focused private equity firm, will be a minority shareholder of Wheels Up.

SPACs—commonly known as "blank check" companies—can speed up the initial public offering process from up to two years to about four months. ■

Rival bidders join in $4.7B bid for Signature Aviation

by Curt Epstein

The bidding war over Signature Aviation, the largest FBO chain, is continuing to unfold with the latest offer of $4.7 billion coming from a partnership of rival bidders.

Last month, Signature's board agreed to a $4.6 billion bid from GIP that edged out a previous offer from the Blackstone Group and Cascade Investment, the latter of which manages much of Microsoft co-founder Bill Gates's personal fortune and has a nearly 20 percent stake in Signature. When Signature accepted the $5.50 per share GIP offer, the FBO operator noted that it would continue to review offers, leading the two bidding groups to join and improve the offer to $5.62 a share.

While the Carlyle Group, which had owned the former Landmark Aviation FBO chain before selling it to Signature, could still weigh in with an offer of its own, this new combined cash offer—if consummated—would give Blackstone and GIP each a 35 percent ownership stake in Signature, while Cascade would increase its share from 19 to 30 percent. As with the previously accepted offer, the deal is subject to legal review and the approval of at least 75 percent of Signature's shareholders.

Signature Flight Support has more than 200 locations worldwide, and the deal also includes its Epic Fuels subsidiary, as well as the company's engine repair business that Signature Aviation has been attempting to unload. ■

The offers for Signature Aviation continue to mount, with the latest totaling $4.7 billion, from a consortium of private equity firms that had previously submitted rival bids for the company.

News Briefs

JSX To Continue Operations at John Wayne Airport

JSX will continue to operate its hop-on service at John Wayne Airport (SNA) following an Orange County board of supervisors vote to strike language from leases with FBOs there that would have prevented JSX from using their facilities for scheduled charter service. The board's action follows JSX's December 14 filing of a lawsuit seeking to continue operations at SNA. Later that month, a federal judge issued a temporary restraining order permitting JSX to continue operations at the airport. The legal flap began when the board approved new lease agreements in September between the county-owned airport and ACI Jet and Clay Lacy Aviation that prohibited JSX from leasing space at ACI for its operations there.

HAI Cancels Heli-Expo 2021

The Covid-19 pandemic has claimed another aviation gathering—Heli-Expo 2021, which was slated for March 22 to 25 in New Orleans. Helicopter Association International (HAI) made the "difficult decision" to cancel the show on January 20 after most rotorcraft OEMs said they would not exhibit due to the pandemic. "While some in our industry have urged us to carry on with the show, the majority have recently expressed discomfort with the logistics involved in business travel at this time," the association said. "HAI appreciates hearing from our diverse VTOL community, and we are grateful for the honest feedback that we've received from our members, exhibitors, attendees, and other stakeholders."

GrandView Opens Denver Base

Following the delivery of additional Phenom 300s and new bases in Atlanta and Scottsdale, Arizona, last year, charter operator GrandView Aviation opened its sixth base on February 1 at Denver Centennial Airport. This is the first of three planned expansion bases for the Baltimore, Maryland-based Part 135 operator this year. GrandView COO Jessica Naor said the company expects to open a base in Boston and another base in an as-yet "undisclosed location" this summer as it pursues a plan to become a nationwide operator. Grandview's other bases are located in Austin, Texas, and Chicago.

Daher Makes First Kodiak Delivery in France

Daher has delivered a Kodiak 100 to Héli-Béarn, marking the first delivery of the utility turboprop single to a French customer. Based at Pau-Pyrénées Airport, Héli-Béarn will use the airplane for skydiving operations. In skydiving configuration, the Kodiak 100 is equipped with a sliding door and has a capacity for up to 15 skydivers. With a climb capability of nine minutes and 30 seconds to 12,000 feet, the airplane can fly an average of four rotations per hour for skydiving operations.

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CAE has developed the Rise Training System to improve training using line-oriented safety audits, which collect data from routine line operations but under a non-punitive framework.

Business aviation training programs are slowly adapting to advanced practices

by Stuart "Kipp" Lau

Airlines around the world have long ditched maneuvers-based training programs in favor of more progressive competency and evidence-based programs. In business aviation, most training programs are better suited for a 1960s Howard 500 piston-twin-engine aircraft than today's G650 or Global 7500 business jets. Safety advocates from the NBAA are making a strong push to move away from those "cookie-cutter" maneuvers-based training standards and proficiency checks and would like more operators to adopt a scenario-based training philosophy that can be tailored to better fit a specific operation.

Innovation in business aviation training systems has been slow. Long recognized for being early adopters of advanced aviation technologies such as synthetic vision systems, training is one area where business aviation lags the airlines. Over the years, there have been some glimmers of hope, such as more advanced data collection systems in full-flight simulators, but this is lost if the training program cannot support or adapt to real-world analysis and findings.

"Box checking" training events date back to the 1950s—with only a slight refresh in the 1970s with the addition of crew resource management (CRM)—and provide little value to the operator or pilot in terms of safety. These training events require the completion of a standard set of unrelated maneuvers—year after year—to satisfy a regulation.

A decade ago, the NBAA Safety Committee began to document some significant issues with training at business and corporate flight departments including: (1) Part 142 training centers transitioning from teaching to checking, (2) the Part 61.58 proficiency check is often repetitive and predictable, and (3) there is a need to place greater emphasis on risk awareness, aviation decision making, and scenario-based training.

One former corporate pilot expressed his frustration, saying, "There's no real challenge, it's the same series of stalls, steep turns, approaches, and V1 cuts that vary little depending on the vendor." That pilot, now flying for a large fractional operation, enjoys the challenges of tailored training scenarios afforded through his company's FAA-approved advanced qualification program (AQP). Now, as an example, he says, "we fly steep approaches to the London City airport and more challenging flights into and out of places like Eagle, Colorado, which builds confidence and skills."

Some training providers and business aviation operators are beginning to embrace competency and evidence-based training (EBT) programs. This is the future of flight training—train smarter, not harder.


NetJets is implementing an advanced qualification program that will be used for pilot training in all the aircraft types in its fractional-share fleet.

Evidence-based Training

According to the European Union Aviation Safety Agency (EASA), "EBT is a methodology that identifies areas for improvement and allows re-prioritization of training topics to enhance the confidence and capability of flight crews to operate the aircraft in all flight regimes and to be able to recognize and manage unexpected situations."

CAE announced in January a new data source for its Rise Training System. By teaming with The LOSA Collaborative, CAE customers can tailor their programs based on findings from line-oriented safety audits (LOSA).

LOSA is a proactive safety program that uses peer-to-peer line observations to collect data under non-jeopardy conditions. LOSA data is rich; it is one of the most reliable methods to collect data from routine line operations. In doing so, it is one of the best sources to measure and assess flight crew performance as it relates to operational complexities and threat and error management (TEM) skills.

According to The LOSA Collaborative founder and CEO Dr. James Klinect, "Evidence-based training is all about using operational data gathered from programs like LOSA to adapt training to the real-world challenges that pilots face daily. The curriculum becomes dynamic and more effective than simple maneuver and check training."

EBT is flexible and allows the operator to customize training rather than simply checking a box. Klinect added, "EBT results in more realistic training based on operator needs instead of regulatory requirements."

Using LOSA data to support the development of EBT scenarios provides greater value to the operator by recognizing just how resource-intensive training can be. Klinect said, "EBT works by building resilient competencies and enhancing TEM performance across a number of situations in what has become an ever-decreasing training footprint for operators."

CAE's Rise program was originally established to allow instructors to assess pilot competencies using live data during training sessions. Instructors can identify proficiency gaps using evidence-based methodologies. The Rise program provides training data to the operator to further evolve its training syllabus. Adding LOSA as an information source closes the gap between training and operational data and creates a more impactful EBT experience.

Advanced Qualification Program

Fractional giant NetJets is in the final stages of fully implementing its advanced AQP for all fleet-types. According to NetJets, it is the first private operator to gain FAA approval for AQP. AQP was initially implemented on NetJets' Cessna

Citation Sovereign and Latitude fleet.

NetJets is huge; each year it must train nearly 2,500 pilots to fly its 750 jets around the world. In addition to the Sovereign and Latitude, the fractional provider operates the Citation XLS, Challenger 350 and 650, Global 5000, 6000, and 7500, Embraer Phenom 300, and Gulfstream G450. Every three months, the company hopes to phase in a new fleet type into AQP.

According to the FAA, "AQP is an alternative to 'traditional' training programs... and encourages innovation in the methods and technology that are used during instruction and evaluation." Flexibility is an attribute of AQP and allows the operator to customize training to meet its unique operation and crew demographics. AQP emphasizes scenario-based training and line-oriented flight training (LOFT). Today, 90 percent of all pilots flying for U.S. airlines are trained under the FAA AQP.

A typical AQP training footprint for a NetJets pilot is five days. The first two days involve classroom training on safety, security, and aircraft-specific systems. The next three days are spent in the full-motion flight simulator at the FlightSafety International learning center in Columbus, Ohio. Gulfstream pilots train at FlightSafety in Savannah, Georgia. These line-oriented simulator sessions involve some standard maneuvers, but also contain a few unanticipated events and random systems failures. In addition, these sessions include the FAA-mandated extended envelope/upset prevention and recovery training. At NetJets, these training scenarios change every cycle, which is typically at nine-month intervals.

In addition to AQP, NetJets employs a few other FAA voluntary safety programs including an aviation safety action program (ASAP) and a flight operational quality assurance (FOQA) program. NetJets relies on these programs to provide data to support its AQP.

FlightSafety International's Columbus, Ohio, and Savannah, Georgia, learning centers are where NetJets pilots train under the fractional-share operator's new advanced qualification program.

Is it Scalable?

According to Helicopter Association International, 80 percent of the operators in the helicopter community operate five aircraft or fewer. In business and corporate aviation, due to the size of the major fractional ownership programs and recent consolidation in the managed and charter space, this figure is probably similar. For those operators smaller than a NetJets, Wheels Up, or VistaJet, is an AQP or EBT-based program an option, considering the availability of far fewer resources at a smaller operator?

Again, the NBAA is a good place to start. In its Training Management System Guide, (first published in 2011), NBAA identifies some of the issues with training centers and Part 61.58 proficiency checks, but also offers up some solutions.

Within the guide, there is a gap analysis available that is scalable for any operator. It begins with the organization's safety management system (SMS). SMS will identify risk. A safety risk assessment may isolate threats that can be mitigated with additional training. Simulator training is an effective tool to mitigate the level of risk of the potential consequences of threats and hazards. NBAA recommends discussing these threats and hazards with its training provider.

An operator should also share its operations manual and standard operating procedures (SOPs) with its training provider. SOP compliance should be reinforced during in-house and simulator training sessions and by establishing mentorship programs. These SOPs are the foundation of a strong safety and training culture.

Benchmarking is a great way to share ideas and learn from other flight departments. Operators can meet at regional NBAA forums to explore how other flight departments (your peers) conduct safety and training activities.

There are several smaller corporate operators that go above and beyond 61.58 proficiency checks by adding an additional day of simulator training that focuses on operator-specific challenges. Likewise, more progressive operators routinely hold internal safety standdowns for continuing education or attend external events such as the annual Bombardier Safety Standdown.

Consider the (Data) Source

Data plays an important role in assessing pilot competencies or developing evidence-based training scenarios. Big data and data-driven and data intelligence or visualization are all terms that have become a bit of a cliché in society and in the flight safety and training circles. Before jumping on the data bandwagon, it is important to consider the source of data. Conversations about data that relate to training can be classified as either operational (safety) or training—there are major differences.

Operational or safety data is highly actionable for training program developers. Great sources of operational data include flight data monitoring (FDM/FOQA), LOSA, and to a lesser extent, the Aviation Safety Action Program (ASAP).

Flight data analysis and reporting, either from an FDM or FOQA program, is objective and extremely useful in developing training content. Mining that data is beneficial if there is a built-in relationship to pilot demographics (years of service, training cycles, time in the seat, etc.) and additional context provided through crew contact information (using a human factors taxonomy).

As previously mentioned, LOSA data is gold. It is hands down, if executed properly, the best way to capture data that identifies threats, errors, and how pilots handle them in a real-world line-oriented environment.

ASAP is a great program, but it is a limited data set that has a strong bias built-in. Reporting safety concerns is the primary objective of an ASAP. However, most ASAP reports are submitted based on an error that has been committed due to program incentives that may lessen enforcement actions. Yes, there are some great lessons to learn from ASAP reports, but it does not reflect true line pilot performance, only those who have erred.

Training data is best to measure the effectiveness of instruction and instructors, not necessarily the best way to develop training scenarios. This is important since data collected during training events (or line checks) captures "angel performance." In the training environment, under the watchful eyes of an instructor or evaluator, pilots are on their best behavior. Out on the line, performance is typically less than angel performance.

Both CAE and FSI have developed programs that leverage large amounts of training data for the U.S. Air Force. Ten-years ago, CAE implemented simulator FOQA (SOQA) with the Air Mobility Command on Boeing C40 and KC-135 aircraft. Last year, FSI partnered with IBM to offer the Air Education and Training Command an integrated pilot performance evaluation and training tool called "FlightSmart" on Raytheon T-6A training devices. Each program has its merits and uses powerful software tools in a training environment; CAE uses flight data analysis tools, while FSI tapped IBM's advanced analytics and artificial intelligence tools. Each concept undoubtedly enhances the training experience, but neither provides insight into actual line operations.

As demonstrated, business and corporate operators have a lot of opportunities to advance their training programs, from standard and predictable proficiency checks to more advanced programs involving elements of competency and EBT programs. Obviously, there are benefits to using simulators to hone those stick-and-rudder skills, but that is not what typically causes accidents. A breakdown in crew resource management, poor decision making, or a lack of threat and error management skills is what gets flight crews in trouble.

An investment in a progressive training program will pay dividends, not only for the pilots, but those who put their trust in us, to be our best on every single flight. ■

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While there are many reasons for entrepreneurs and corporations to own business jets, the biggest is flexibility. And that benefit is more important today than ever before. That sharpened focus on flexibility also puts increased pressure on flight departments to ensure that the airplane is ready to go whenever and wherever the principal needs to travel.

Telling the owner that the company's business aircraft can't make a trip has been the death knell for many a flight operation. Aircraft availability is especially critical if the flight department has only one aircraft, which, according to the National Business Aviation Association (NBAA), is the situation with over 75 percent of its member companies.

Knowing that business aviation operations with one or two aircraft usually don't have the benefits of full-time maintainers, Rolls-Royce created its Business Aviation unit, which is single-mindedly dedicated to helping customers of all sizes meet their individual needs.

"Our business aviation organization is stand-alone and focused on what is important to these smaller operators," explains Andrew "Andy" Robinson, SVP, Customers and Services, Rolls-Royce Business Aviation. "All of our customers rely on having their aircraft available when it's needed. The airplane is a vital tool for their success.

"However, when that aircraft is grounded for maintenance, this freedom to travel is quashed, and time is lost," he adds. "Our business aviation organization is aiming for 100 percent 'averted missed trips'—meaning no aircraft running on Rolls-Royce engines and covered by our CorporateCare or CorporateCare Enhanced agreement is grounded long enough to miss a flight."

PIONEERING COMPREHENSIVE AND INNOVATIVE CARE

Rolls-Royce turboprop and turbine engines have been powering the biggest names in business aviation since 1958. In fact, today, there are over 3,500 Rolls-Royce-powered business jets in service worldwide.

"We learned early on that the needs of the business aircraft operator differ greatly from those of our airline

customers," Robinson says. "About 10 years ago, we decided to take a fresh look at the needs of these operators. We talked to airframe manufacturers, and we also sought out several operators of those aircraft who are quite influential in the marketplace.

"We wanted to learn what was important to them," Robinson continues. "What were their unique needs? Why did they buy the aircraft they have? Most of all, how can Rolls-Royce best serve their particular needs? Businesses and individuals buy aircraft as a productivity tool. Any time it's not available, there's a great cost."

Robinson explains that Rolls-Royce Business Aviation created its original CorporateCare program based on what it learned from those OEMs and operators. At its core, the program provides customers with the support and technical expertise they need to achieve their goal of 100 percent aircraft availability while controlling engine maintenance costs.

While CorporateCare has been an unqualified success, Rolls-Royce responded to customer requests for even more coverage and introduced CorporateCare Enhanced in 2018.

"CorporateCare Enhanced was developed with the mindset of, 'If we provide it, we cover it,'" Robinson says, "and our customers simply love that."

Through its many enhancements, the comprehensive, fixed-cost engine maintenance management plan responds to customer requests, including increased asset liquidity, nacelle coverage, and complete engine management, from line maintenance to shop visits.

In addition to expanded hardware coverages, CorporateCare Enhanced provides customers with a global support infrastructure that provides engine health monitoring and offers a worldwide network of authorized service centers and globally distributed spare parts and engines. And it's all managed by Rolls-Royce Business Aviation's dedicated 24/7 Business Aircraft Availability Center.

"By protecting customers from unforeseen costs and providing rapid access to any needed parts, anywhere in the world, the program plays a big role in assuring aircraft availability," Robinson says. "For example, if an owner needs to overhaul an engine, we provide a lease engine so they can keep flying."

Of course, customer needs don't begin and end with spare parts and engines. Rolls-Royce Business Aviation has built its organization around caring for its customers' needs, whether that be through delivering spare parts or providing situational-specific technical expertise and support.
At the heart of the organization's commitment to

unparalleled one-to-one customer care are the company's front-line support and service teams, including its 24/7 Operational Service Desk, On-Wing Service Mobile Repair Team, Regional Customer Managers, Technical Help Desk, and Spare Parts Administrators.

"All together, we have, I believe, the most comprehensive support network in business aviation," Robinson says. "With our customers' approval, our 24/7 Availability Center can continually monitor their aircraft through our Engine Health Monitoring System (EHMS). It's one more way we can avert problems and make sure their aircraft is ready to fly when they need it."

Along with monitoring the engine's health, the EHMS data enables Rolls-Royce Business Aviation's Germany-based technical team to create a "digital twin" of a customer's engine. With that capability, company engineers can examine the engine's real-time performance to isolate any deterioration or emerging anomalies.

THE REAL BENEFIT OF VIRTUAL TRAINING

Armed with all this real-time information, Rolls-Royce Business Aviation's technical support team can help spot potential problems before they become an aircraft-on-ground (AOG) situation. But spotting a problem is only the first step. To avoid an AOG, you need to have trained technicians on-site to make the needed repairs. For decades, technicians have traveled to Rolls-Royce Business Aviation's training centers from around the world for that training.

Then COVID-19 happened. Overnight, these visits came to a stop. But, the need to provide training didn't, so the company's technical support team took the next great leap into the future.

As part of the company's IntelligentEngine Vision, Rolls-Royce Business Aviation introduced immersive, instructor-led virtual reality technology for customer training in early 2020. The first engine to benefit from the new virtual training is the BR725.

"The immersive Virtual Training tool is nothing short of a game-changer," Robinson says. "It makes us the leader in technical training, allowing our customers to participate in the new training wherever they are in the world. In fact, the impact this training has on the industry is recognized by AIN, achieving the "Top Flight Award" of 2020.

"We ship them the VR equipment. All they need is an internet connection," he adds. "The technicians then go through all of the processes with one of our live instructors. No matter where they are in the world, the technicians can get the training they need."
As a complement to VR, Rolls-Royce Business Aviation has introduced its new-generation interactive 3D Technical Publications.

"The 3D Technical Publications platform is a big step into the future as we modernize and go beyond what our competition is doing..."

JAMES PRATER

VP, CUSTOMER SUPPORT, ROLLS-ROYCE BUSINESS AVIATION

"The 3D Technical Publications platform is a big step into the future as we modernize and go beyond what our competition is doing," states James Prater, VP Customer Support, Rolls-Royce Business Aviation. "We're introducing 3D graphics and full interactivity with the text instructions. Improved integration of tasks and procedures makes any inspection or repair process easier to follow, reducing the potential for errors caused by jumping between various materials."

"We now offer the capability to download the information onto a laptop or tablet, making it easy to take current technical information to the aircraft," he adds. "We see it as a great benefit to operators in remote regions of the world. We've demonstrated it to a number of our customers and they're very pleased with the direction our new 3D tech pubs are taking."

COMMITMENT TO ZERO EMISSIONS

While it's clear that Rolls-Royce is on a continual path to provide services and capabilities that keep its current owner/operators happy, the company is equally committed to staying ahead when it comes to emerging "green" engine and operational technologies.

"Whether it's reality or public perception, historically, corporate jets have had a big target painted on them when it comes to carbon footprints," Prater says. "Rolls-Royce is committed to pioneering new technologies that will eliminate those issues."

"As an organization, our goal is to be carbon neutral by 2050," Robinson adds. "It's an area we are taking very seriously. We're investing in new-generation fuels and in electric and hybrid technologies. The first step in reducing a carbon footprint is reducing fuel use. Our latest engines are much more fuel-efficient than the competition. And our new Pearl 700 on the G700 has a combination of technologies that deliver a 5 percent boost in overall efficiency, and we have the lowest noise and emissions in the class."

As you'd expect, the company has not turned its back on green solutions for its legacy fleet. All Rolls-Royce engines are approved to run on a 50/50 blend of standard Jet-A and sustainable fuels.

"What we are working towards now is to get approval for the use of 100 percent sustainable fuels in our engines," Prater says. "We're doing testing now with the Pearl family that power Bombardier and Gulfstream jets.

"We also now have our own division dedicated to electric and hybrid technologies," he continues. "That's how committed we are to this goal. We're planning on a world-record attempt in early 2021 to surpass 400 miles per hour with a zero-emission, fully electric airplane."

Robinson adds that "Rolls-Royce is also partnering with APUS to develop and demonstrate a hybrid-electric propulsion system. The goal for the APUS i-5 aircraft is to demonstrate the practical application of hybrid-technologies to lift a four-and-a-half-ton payload."

"By protecting customers from unforeseen costs and providing rapid access to any needed parts, anywhere in the world, the program plays a big role in assuring aircraft availability."

ANDREW "ANDY" ROBINSON

SVP, CUSTOMERS AND SERVICES,
ROLLS-ROYCE BUSINESS AVIATION

A 99.1 PERCENT AVAILABILITY RATE IS GREAT, BUT NOT GOOD ENOUGH

While many might think the goal of 100 percent availability is a bit ambitious, the fact is Rolls-Royce Business Aviation has compiled an enviable record on fulfilling that goal.

Over the past 10 or so years, the company has taken great steps in creating the tools, technologies, and training that will make missed trips a thing of the past.

"Today, we are at 99.1 percent, which is the best in the world," Robinson says. "That's something to be proud of, but it's not where we want to be. We're on the right road, but our pursuit of perfection continues."

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2019 & 2020

IN AIN ENGINE PRODUCT SUPPORT SURVEY

Medical issues and how they affect pilots
from Dr. Robert Sancetta, senior aviation medical examiner

Covid and influenza updates for pilots

As we continue to grind our way through the Covid-19 pandemic, everyone's patience and optimism struggles. However, there are some encouraging signs that both the number of cases and the burden of serious disease and deaths due to Covid is finally beginning to decline.

What does this mean for pilots and the general population? My conclusion is that while some early optimism might be emerging, we must remain on high alert and continue all public safety and infectious disease recommendations as per the Centers for Disease Control and Prevention (CDC) and federal, state, and local governments.

Pilots want to know the latest and greatest updates from the FAA in regard to Covid policies, protocols, and, of course, the coveted medical certificate extensions. The basic outline for both operational and medical protocols is as per SFAR 118-2, which was initially published on October 6 and continues through April 20, 2021 (and has been modified twice since its initial publication).

The most current update to the medical extension policy pertains to medical certificates expiring from October through January. These may now be extended for an additional two calendar months (three months for pilots residing or operating primarily in Alaska).

As of this writing, the FAA has not stated any intention to permit additional medical exemptions under the SFAR, so this aspect of today's discussions could become a moot point in the coming months.

There remains significant confusion about whether a pilot may use a medical certificate extension more than once. Permit me to clarify it here—by further confusing the situation. One aspect is simple, fortunately: an individual medical certificate can only be extended once. Easy enough, so far.

The question remains whether a pilot who has used the extension on a previous medical certificate can use it again on a subsequent medical certificate issuance. I have had a comprehensive discussion with the FAA Aerospace Medical Certification Division (AMCD), and the answer to the question of using an extension on a subsequent medical certificate is a resounding "maybe."

There really is no formal guidance for this, so here's what the AMCD policy is currently: an extension for a subsequent medical certificate is neither automatic nor guaranteed. Such requests could be considered on a case-by-case basis, but it would be best to have a good reason to ask for an extension of a subsequent medical certificate (if the prior medical certificate was indeed extended).

This process would be similar to that being used for special issuance medical certificate extensions. However, in most cases it would be simpler to just renew the medical certificate on time.

It would take the pilot, the AME, and the FAA more time and hassle to accommodate a request for an additional extension than it would be to simply go to the AME and obtain a current medical certificate at the appropriate time. If the AME had time to interface with the FAA to request an additional exemption, then more likely than not that AME has the time to do an exam and issue the pilot a new medical certificate.

The first medical certificate for which a pilot wishes to use an extension is done so automatically, without the need for FAA interface. To do so again, on a subsequent medical certificate, is clearly not automatically guaranteed. Be careful to ensure that you do not operate in violation of medical certificate duration FARs.

Availability Issues

The FAA has no intention of causing any pilot to become grounded for purely logistical reasons. Hence, it is not lost on the FAA that some AMEs are not as available as they once were, due to changes in the industry and their medical practices secondary to Covid.

If a pilot is simply unable to obtain the subsequent medical certificate in compliance with the usual medical certificate durations as per the FARs, then an accommodation might be possible on a case-by-case basis. This would entail direct contact with an FAA medical officer at the AMCD.

My most recent conversations with the FAA, as well as many pilots and other AMEs, leads me to believe that there is sufficient AME availability currently to accommodate most pilot requests for on-time medical certificate issuances.

That said, you have already read some of my previously stated disclaimers and occasional dismay at some of the more confusing aspects of the medical extension policy when it was first issued, and this discussion brings about yet more potential confusion. Please remember that the FAA continues to publish a statement on its website that pilots should accomplish their FAA medical exams on schedule if at all possible.

The purpose of the original extensions was primarily to provide relief for pilots truly unable to update their FAA exams, either because their AMEs were unavailable or because they were unable to obtain required documentation for specific medical conditions due to lack of availability of their continuity physicians. That situation is, for the most part, rectified at this time.

I have kept my AME office open throughout the pandemic, so my pilot clients have not had any scheduling difficulties. I have also been fortunate in that my clients have been able to obtain all of their required medical documentation if they are being followed under special issuance authorizations.

For pilots unable to locate an AME or obtain required medical documentation at no fault of their own, the medical exemptions have been instrumental in keeping them on flight status during this confusing and difficult time.

However, an automatic initial extension does not apply to all medical certificates. For example, time-limited medical certificates issued under a special issuance authorization are not automatically extended.

If the medical certificate has a "Not valid after (date)" limitation on it, it expires as per that limitation. But, on a case by case basis, it is possible to obtain a one-time extension.

This is not a simple process for the AME to achieve, so most of the time it is best to obtain the special issuance data and renew the medical certificate on time. Once again, if that is not possible, the FAA likely will grant an exemption to this.

The FAA has formally issued guidance regarding the two currently available vaccines (Moderna and Pfizer). These vaccines are not truly "approved," but they have each been made available through an Emergency Use Authorization.

Thus, the FAA permits pilots to receive these vaccines so long as a 48-hour waiting period is observed before flying—and, as per FAR 61.53, which guides all medical decisions, the pilot is also feeling fit to fly.

What have you heard about the influenza (flu) season this year? Almost nothing, right? Reviewing the CDC website multiple times recently, I have been astounded at how minimal the disease burden of the flu has been in the 2020-2021 season. In fact, it is noted that the impact of the flu this season is "too low" to be able to provide much statistical predictive data.

A state-by-state map of flu cases shows that no state has more than "minimal" flu impacts. The statistical changes in comparison to previous years are striking, and are almost too difficult to comprehend or believe at first glance. However, the facts are clear—there are few cases of the flu this year. Virtually all of the infectious disease-related pneumonia deaths have been due to Covid, not the flu.

One hypothesis is that the Covid-prevention strategies are indeed successful in reducing disease transmission. Obviously, we have no previous multiyear ongoing annual Covid data to compare with, but there are many years of continuous flu-monitoring statistics to consider.

While nobody enjoys that restaurants and schools have largely been closed, in the short term it appears that these strategies are quite effective in reducing disease transmission.

Mask Up

The CDC recently issued a statement that wearing either tight-fitting masks or double masking can reduce virus transmission by well over 90 percent. That is an impressive success story, especially considering how simple the solution is. Wearing face masks is inconvenient, sure, but well worth the effort.

The decline in total cases and disease impacts is perhaps a first sign of potential long-term lessening and relief from the pandemic. It will not go away overnight, but little by little progress is being made.

Contributory factors also include the increased availability of vaccines. There are also many people who tested positive for Covid who fortunately have recovered and have some natural immunity.

It is not known yet how long the immunity will last—whether from natural or vaccination-induced immune system responses—so it remains conceivable that annual booster shots might be recommended along with the routine annual flu booster.

The newer Covid variants are creating puzzling complications to the entire picture. All viruses are crafty, and they mutate as needed to survive. This is why there is an annual update to the flu vaccine.

The Covid variants seem to be particularly adept at evading efforts to provide immunity against them, hence making them more contagious than the original virus. The CDC and infectious disease research agencies are working as fast as possible to learn about these new variants and determine how best to deal with them over time. It is clear that we can't let our guard down and we should continue with the recommended mitigation strategies.

The CDC also recently published a statement that persons who have received a full Covid vaccination regimen are no longer required to quarantine after a known Covid exposure. While this sounds great, I think it still behooves people to continue to take the preventive measure strategies seriously, and the CDC indeed has published guidance supporting that assumption. ■

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Survey shows flight planning app preferences

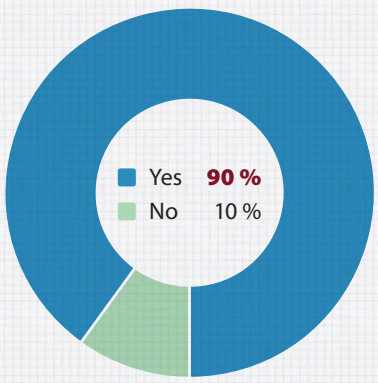
AIN surveyed readers to learn more about how pilots are using flight planning tablet apps and which ones they prefer. Most electronic flight bag (EFB) apps include flight planning capabilities, and more pilots are using apps for filing flight plans, not just in the U.S. but for flights internationally as well.

While many apps are available now for trip planning and handling, this survey focused on EFB apps that also offer flight planning capabilities. Typically pilots also use these EFB apps during flight for moving-map position monitoring, viewing maps and charts, and access to documents such as flight manuals and other materials.

There were 183 respondents to the survey, which was conducted during February.

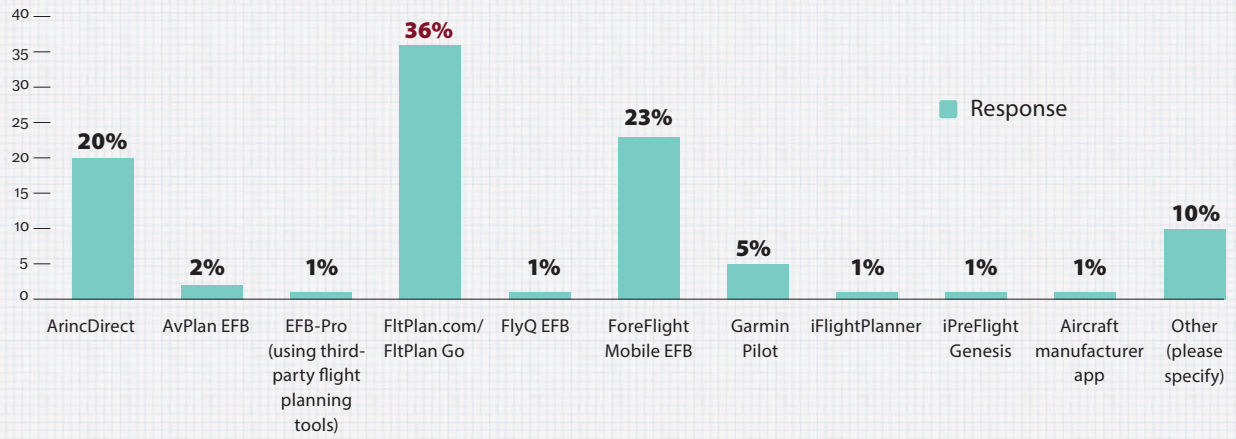
Do you use an EFB tablet app for flight planning and filing?

Of the respondents, 90 percent affirmed that they do use an EFB app for flight planning and filing.



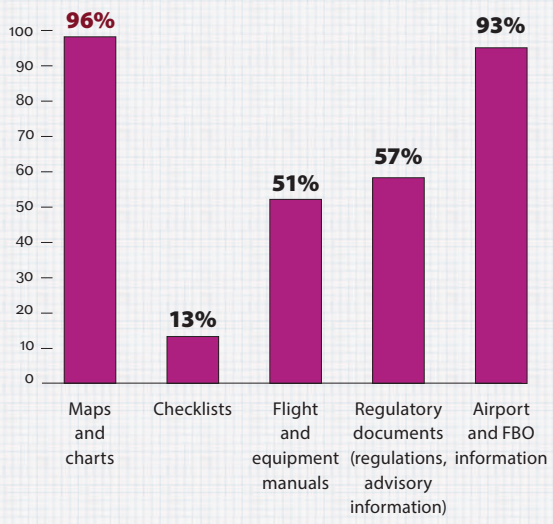
Which app is your primary tool for flight-planning and filing?

The most popular apps in this response were Collins Aerospace's ArincDirect, FltPlan.com, ForeFlight Mobile, Garmin Pilot (which also owns FltPlan.com), and cited most in the Other category, Universal Weather and Aviation's UvGO. Also listed in the Other category were Honeywell's GoDirect Flight Bag Pro, SkyDemon, and OzRunways EFB.



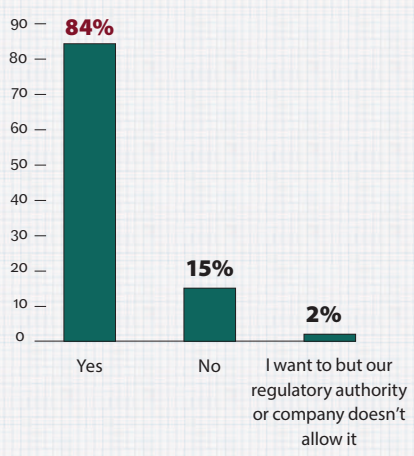
What aeronautical information do you access on your flight-planning/EFB app?

Maps and charts and airport and FBO information were the top result for this question, followed by flight and equipment manuals, regulatory documents, and with a fairly small response, checklists.



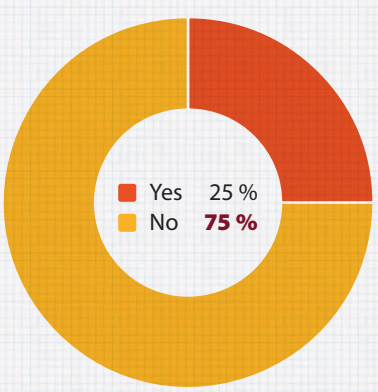
Do you use an EFB app's moving-map with own-ship position while flying?

Despite regulators trying to discourage pilots from using own-ship position displays on moving-maps in EFB apps, a majority of respondents say they are doing so. Only three respondents reported that their regulator or company doesn't allow use of this kind of app feature. Evidently, pilots benefit from own-ship position displays on their EFB apps, and they aren't shy about acknowledging this.



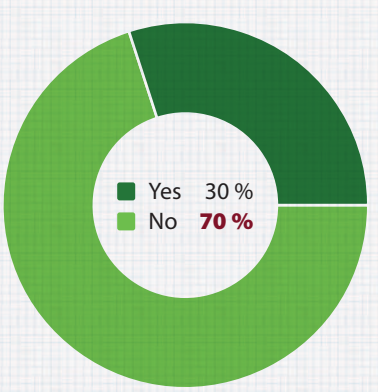
Do you carry backup printed maps/charts while flying?

While there is no specific FAA requirement that pilots carry printed charts, 25 percent of respondents say they do so for backup purposes.



Do you fly with a portable ADS-B receiver?

Only 30 percent responded yes in this question, which may in part be due to the difficulty of receiving a strong signal from ADS-B ground stations in a business jet flight deck. But that response is also understandable, given the results of the following three questions.



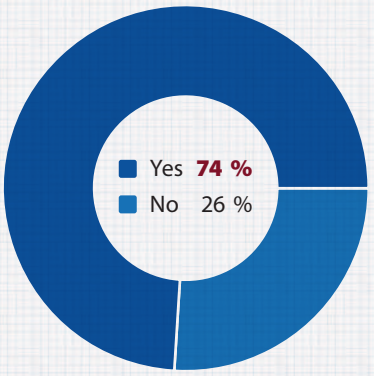
I wish my EFB would...

We asked respondents to list some of their wished-for features in their favorite EFBs. Some of the highlights:

- Many respondents want runway analysis available as part of performance calculations. Not all apps offer this, but it is a feature built in to APG's iPreFlight Genesis. FltPlan.com also offers access to runway analysis as does ArincDirect.
- "Provide tech stops with our SOPs and calculate the cost using current fuel costs."
- A frequent request was for international plotting charting capability. Apps that offer this capability are available—Scott Plot, PlogNG, and ArincDirect are some—but typically not integrated into the popular EFB apps.
- Geo-referenced SIDs and STARS is another popular request, but in fact some of these are available when using Jeppesen charts in the apps where those are available. Not all Jeppesen SIDs and STARs are geo-referenced, however.
- "Reasonably-priced scheduling and calendar functions for small flight departments."
- Many respondents asked for integration between apps so they can share data and reduce the number of apps needed. "Share data seamlessly between different aviation apps." And, "Integrated with other apps and data sources—ForeFlight w/ APG, Flightbridge, scheduling software—more one stop shop." Also, "We use multiple apps to obtain all the information. It would be extremely useful to have them all combined into one app that took you through each step in logical order and produced weather, flight plan, weight/balance, and performance and gave you the ability to easily save for reference. A fuel buy-vs-tanker program integrated into flight planning would also be helpful."
- A couple of respondents wished for better app integration with avionics, which is something that Garmin avionics and the Pilot app offers. One wrote: "I hope that Honeywell can integrate the iPad EFB with the installed certified avionics so data can be pushed to and from the EFB. That would allow the flight crew to ensure the data displayed on the EFB matches the installed avionics." And another wrote: "The ability to integrate EFB information into installed avionics would be an amazing increase to overall safety. Being able to talk to/from aircraft avionics—the information available on my EFB is substantially greater than in some of the aircraft we operate."
- "Interface more effectively with our scheduling software."
- "Decipher the archaic Notam symbology."

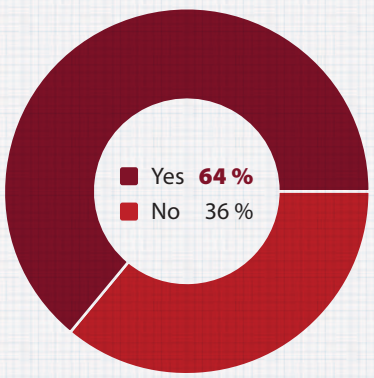
Is your aircraft equipped with ADS-B In (permanently installed in avionics)?

Here, 75 percent of respondents confirmed that they fly with ADS-B In equipment installed as part of their avionics, which generally provides better reception of ground stations compared to portable receivers.



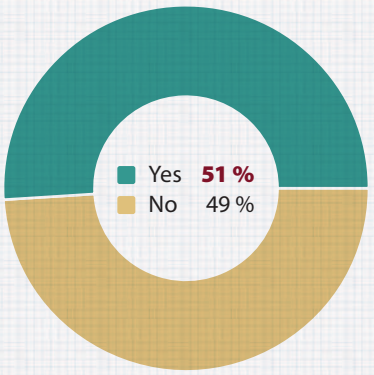
Do you obtain inflight weather information via satellite data link?

A strong 65 percent of respondents use satellite datalink to gather weather information, suggesting that this is becoming a more popular method of obtaining inflight weather information.



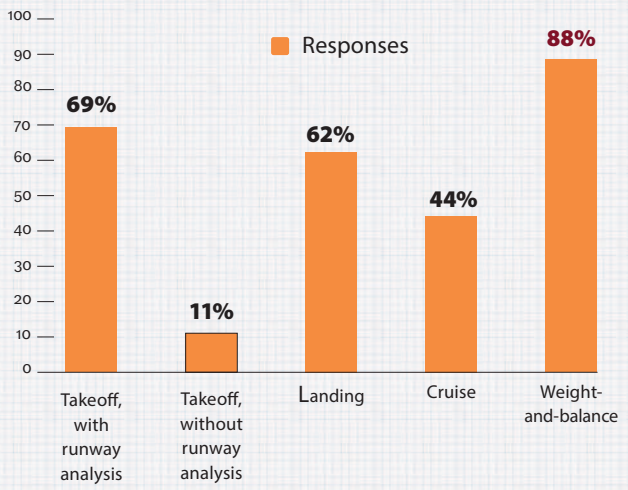
Do you fly with SiriusXM Weather equipment and subscription?

A surprising number of respondents use SiriusXM to provide satellite-based weather information to the flight deck.



If your EFB app includes performance calculations, do you use these features to calculate performance?

Many EFB apps allow fairly sophisticated performance calculation for a variety of aircraft types, and respondents indicate that they find this useful. The most-used feature is for weight-and-balance calculations, followed by takeoff performance, both with and without runway analysis. Landing calculations also ranked fairly high.



Columbia Avionics has certified a Garmin avionics upgrade for CitationJets through serial number 359. Like the JetTech STC, this package includes TXi touchscreen displays, GTN 750 navigators, and GFC 600 autopilot.

Avionics upgrade options growing for CitationJets

by Jerry Siebenmark and Matt Thurber

As the earliest of the Model 525 Cessna CitationJet series approaches three decades in service, owners and operators of the single-pilot twinjets have a variety of flight deck modernization upgrade options available thanks to supplemental type certificate (STC) programs by avionics manufacturers and installation facilities.

Collins Aerospace was among the first to offer an integrated flight deck upgrade solution for the CJ3 with its Pro Line Fusion STC four years ago. More recently, Garmin jumped in with an upgrade solution for the earliest CJs—serial numbers 1-359—by way of an STC for its GFC 600 autopilot as well as avionics STCs from JetTech and Columbia Avionics & Aircraft Services.

"There's a big demand," a Garmin spokesman told **AIN**. "A lot of people that have these aircraft really want an upgraded solution." He added that the CJ is the first turbofan to be certified for the new autopilot.

Earlier, Honeywell Aerospace had planned to offer an avionics upgrade solution for the 525 with its AeroVue integrated flight deck product. But a Honeywell spokeswoman told **AIN** the partner that was intending to pursue AeroVue upgrades for these platforms had since made the decision not to move forward.

Garmin Upgrades

Lured by the fact that little attention had been paid to upgrading avionics in early series 525s, Broomfield, Colorado-based JetTech announced an upgrade package last fall for the CitationJet (CJ) with serial numbers 001 through 359. "We were finding with the age of the CJ that frankly, no one had touched those airplanes, so we got involved," JetTech founder and partner/member Rob Irwin told **AIN**. Spurred by an upcoming STC for Garmin's GFC 600 autopilot, JetTech offers an all-in upgrade package that in addition to the autopilot also includes two G600 TXi touchscreen primary flight displays, GTN 650Xi/750Xi GPS/navcom, GTX 33/335/345/3000 transponders, GMA 35C audio panel, GDL 69A SiriusXM weather receiver, and Gi 275 standby instrument. Operators should budget about $275,000 for that package and expect about a 350-hour installation time. For those operators whose CJs already have GTNs —which Irwin said about 80 percent of the CJs have—the cost is a little less than $200,000 and installation time will be about 300 hours.

Irwin said that once engine gauges can be displayed on the TXi display, JetTech plans to expand its upgrade package to include Collins Pro Line 21-equipped 525s with serial numbers 360 through 701.

In January, Columbia Avionics in Missouri announced FAA STC approval for a Garmin avionics package for CJs serial numbers through 359 as well. Columbia's all-in package requires the installation of the GFC 600 and includes the same upgrades as JetTech's—flight displays, navigator, audio panel, transponder, and weather receiver—as well as GWX weather radar; GSR 56 Iridium satcom with weather, voice, and text; Shadin AIS 380 fuel flow system; and Mid-Continent MD302 Standby Attitude Module, MD93 clock, and TA102 USB charging ports.

Key benefits of the Garmin upgrades include the ability to fly fully coupled instrument approaches and go-arounds, including activation of the missed approach sequence. Also included is coupled VNAV, which greatly reduces pilot workload in high traffic areas while flying standard terminal arrival procedures.

Columbia Avionics president Lance Fox said the integration of the system went smoothly during the installation process. "We were able to go straight to FAA flight tests and the aircraft came back with zero issues," he explained.

Cost of the system including installation varies depending on options, he said, and downtime is four weeks. Columbia Avionics is currently seeking STC approval from Transport Canada, EASA, Mexico's DGAC, and other international regulators.

Pro Line Fusion

The sheer number of airplanes in the CJ fleet convinced Collins Aerospace to pursue Fusion avionics upgrades for the light Cessna jets. It starts with an STC for the Pro Line 21-equipped CJ2+ in April followed by STCs for the Fusion upgrade for the CJ1+ and CJ3, Nicole White, Collins senior director of business and regional avionics sales, told **AIN**.

"There were a series of factors that went into our decision to focus on this fleet," she said. "It's a very popular aircraft, which means there is a large enough addressable market for us to invest in making an aftermarket solution." Other key factors were hull value, operator profile such as the mission of the aircraft as well as ease of integration with the existing flight deck and a solid certification base. "We partner very closely with the Citation Jet Pilots organization and host working groups with their constituents, so we understood what they were looking for, and our Fusion technology meets their most important requirements," she said.

Since its introduction the Fusion upgrade for CJs has been fitted on nearly 40 CJ3s, White said. Two of the most significant advantages of the CJ3 Fusion upgrade are better situational awareness and reduced pilot workload, she said.

The Fusion upgrade replaces the Pro Line 21 portrait-oriented displays with three larger 14.1-inch touchscreen displays in landscape format. The package includes high-resolution synthetic vision as standard and Collins's airport dome, which highlights the destination airport, and extended runway centerlines with mile markers to enhance situational awareness in all flying conditions. The configurable displays also allow pilots to save certain screens for different phases of flight or based on preference—meaning they aren't having to set and reset the displays on every flight, White added. "[That] has been one of the biggest improvements we have heard from the CJ pilots using Pro Line Fusion today, from a time savings standpoint," she said.

The Fusion upgrade also supports the FAA's NextGen program, providing operators not only with CPDLC capabilities—FANS in the U.S. and ATN B1 in Europe—but also digital departure clearances at 62 U.S. airports. ACARS/AOC data link messaging capability is a value-added option with the Fusion upgrade. Operators can also take advantage of lower minima with the improved accuracy of WAAS/LPV approaches, she said. "Today more than 4,000 LPV approaches are available, increasing access to more destinations. We are also working to finalize an STC update to bring SiriusXM weather capability to the field."

Collins Aerospace is certifying its Pro Line Fusion touchscreen integrated flight deck in the CJ2+ in April and will follow with STCs for the CJ1+ and CJ3.

Expanding Fusion Upgrades

Based on market feedback, there is interest from CJ1+ and CJ2+ operators to have that same technology in their Pro Line 21-equipped airplanes. Collins has responded by developing additional STCs for those aircraft and provided

› continues on page 24

LOFT adding Excel type rating program | by Rich Pickett

There is a new option for pilots seeking Cessna Citation 560XL training. LOFT, a Part 142 flight training operation in Carlsbad, California, is expanding its offerings from the current Citation 525 and Citation 560 (Citation V) programs to include initial and recurrent courses for the 560XL.

I had the opportunity to fly LOFT's new 560XL full-flight simulator recently. Built by Aeronautical Systems Engineering (ASE) in Odessa, Florida, the new ASE 2000 series Level D simulator incorporates the latest visual display and electric motion and control loading technology. LOFT v-p Richard Sears joined me in the right seat as Collin Yantos, director of marketing, operated the simulator. Our flight would be short: depart JFK's Runway 22L then vector around for an ILS. The graphics on the RSI Visuals EPIC-View D-Series visual display on this simulator are some of the highest quality I've seen.

Sears calculated our performance data (weight, V speeds, etc.) and I entered the data into the avionics.

Power levers full forward, we rocketed down the runway. Sears made the callouts and when he said "Vr" I pulled back to our takeoff pitch. Positive rate of climb, gear up, and quickly it was time to retract the flaps.

Yantos vectored us around and I hand flew the whole time. The simulator had very smooth feedback. We had loaded the ILS into the FMS, and with the approach reference speed loaded were ready for the approach. Yantos had set the ceiling just a few hundred feet above the 212-foot decision altitude. We broke out early, and Sears made the visibility callouts and I stayed with my head down until minimums. We touched down, activated the thrust reversers, and both of us had smiles on our faces.

LOFT and ASE worked two years on this simulator, leasing a Citation Excel and instrumenting it to capture data. ASE then captured the data to develop the flight model for the LOFT simulator.

LOFT has simultaneously been developing its courseware for pending approval by the FAA. The next steps are for the FAA's National Simulator Program to certify that the sim is an accurate representation of the actual aircraft, including precise sound levels in the flight deck. After that approval, the FAA's San Diego FSDO will review the program, observe a full course with students, and if everything meets their approval add the course to LOFT's Part 142 certificate. ■

RICH PICKET

ASE's new Citation 560XL full-flight simulator developed for LOFT's new type rating program.

Flight Test: Garmin D2 Air smartwatch

by Matt Thurber

Garmin has been manufacturing various types of smartwatches for a while, many of which target the sports and activity market, and naturally aviation watches are part of that mix. Until it unveiled the new D2 Air last September, Garmin's options for pilots were limited to the more expensive D2 Delta series, although prices have dropped since the D2 Air was released.

With the D2 Air Garmin now offers pilots a dedicated aviation watch at the lower price of $499 and without all the features of the more expensive Delta series (currently ranging from $749 to $1,099). If you can live without the extra Delta features, then the Air might be the Garmin watch you've been waiting for.

What sets the D2 Air apart is that it is Garmin's first touchscreen aviation watch, with a bezel size of 42.2 mm, a weight of just 46.3 grams, and a damage-resistant Amoled display made of Corning Gorilla Glass 3 with 390x390 pixel resolution.

The advantages of the D2 Air's higher-resolution touchscreen are immediately apparent. The Delta series watches have five buttons, and the learning curve is high because these watches can do so much, including using the D2 Delta as a GPS position source for the Garmin Pilot app. It takes a while to learn what each button does and to navigate the various functions. The Deltas can also connect wirelessly with Garmin avionics, including the GTN 650/750 panel-mount navigators, for flight plan transfer and receiving GPS position and other information. In addition to not providing a GPS feed to Garmin Pilot, other features that the D2 Air doesn't have include Virb camera control, moving-map navigation and Nexrad on the moving map, and Garmin Connext capability.

While the D2 Air gives up some functionality, it's well worth it, in my opinion, given the lower price and all the features that it offers.

Chief among these is the pulse oximeter, which previously was available only on the D2 Delta PX (around $1,099). This gives a reading of oxygen saturation levels, handy for pilots flying in unpressurized aircraft at higher altitudes but also for pilots who might have compromised lung function and need regular tracking of oxygen levels.

As I did when I reviewed the D2 Delta PX, I compared the D2 Air's oxygen saturation levels with a finger pulse oximeter. Generally, I found that the Garmin watch pulse-ox readings are lower than with the finger-type oximeter, but it's still helpful to see the baseline reading and observe any worsening trends.

During an airline flight, at a cabin altitude of 6,000 feet, the D2 Air read 88 percent, while the finger oximeter read 94. At 7,400 feet cabin altitude, however, both read the same at 90 percent. During a different flight, at 3,000 feet in the cabin, the Garmin read 92 and the finger unit 95. Other times, however, both the D2 Air and finger oximeter had the same readings.

There are many watch-face choices, including complications, on the D2 Air. My favorite so far, the default watch face, lets me set the watch to Coordinated Universal Time in 24-hour format, shown digitally, while the watch "hands" display the local analog time in a 12-hour format. This is perfect for a pilot and saves having to convert times when viewing weather briefings. I also like the default watch face complications that include weather information for my local airport, with temperature, cloud cover, visibility, and a wind indicator.

The D2 Air is highly customizable, from the selection of watch controls to changing watch faces and selecting widgets for various functions. The widgets appear by touching and scrolling the watch face. I can dive deeper into airport-specific information with one widget, to view TAFs and airport information such as runway orientation with wind components, runway lengths, airport frequencies, and traffic pattern altitudes. The D2 Air includes an updateable worldwide navigation database with navaids and intersections.

Other useful aviation widgets include a three-axis compass and horizontal situation indicator and altimeter with adjustable barometer setting. You can use the horizontal situation indicator (HSI) to navigate, with a direct-to function to a selected airport or by picking one from a list of nearest airports. Alerts can be set for altitude, speed, time, and distance, and there is a handy fuel timer. The Garmin Pilot app logbook can be synced with postflight information, based on flight tracking by the watch.

In addition to all the aviation features, the D2 Air includes many of the Garmin sport activity functions, with workouts, training plans, and more, but not all of the same functions as the D2 Delta series. The D2 Air also has Garmin Pay for contactless payment and music storage for up to 500 songs as well as notifications when connected with a smartphone.

Battery time on the D2 Air is up to five days in smartwatch mode or 10 hours when using the GPS and the pulse oximeter.

Overall, the D2 Air's simpler two-button and touchscreen interface make this watch much easier to use compared to the D2 Delta. To preserve battery power, the Amoled display doesn't stay lit all the time, so a wrist-raise is needed to light up the screen. But the wrist-raise doesn't always work, so sometimes a tap on the screen is necessary to light it up.

Having the pulse oximeter at the $499 price point as well as the aviation-specific features makes the D2 Air more competitive with the Apple Watch 6, which also has a pulse oximeter. Very few app makers offer Apple Watch aviation features, and Garmin has taken the lead in the dedicated aviation watch space. ■

Garmin's D2 Air smartwatch displays a variety of aviation information.

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Avionics upgrades for Citations

there aren't any additional effects from Covid-19, the company expects FAA STC approval of the Fusion technology for the CJ2+ in the first quarter of this year with STCs for the CJ1+ and an amendment to the CJ3 following closely behind. "We have launch aircraft secured for both the CJ1+ and CJ2+ developments and we are really pleased with the volume of quoting occurring at both Textron's service network and through our Collins dealer network, with operators interested in upgrading their aircraft in 2021 and beyond," White said. Collins also plans to pursue CJ1+ and CJ2+ STCs and CJ3 amendment approvals from Transport Canada and EASA.

Collins expects to improve aircraft downtime with the expansion of Fusion upgrades for the CJ. Customer feedback on the CJ3 program has prompted Collins to revisit Fusion installation design, and it now has a goal of reducing downtime by 50 percent, which would be three weeks, White said.

The upgrade is available through Collins's authorized dealer network as well as at Textron Aviation service centers. Pricing for the Fusion upgrade in the CJ3 at a Textron Aviation service center is currently $299,700, according to Textron Aviation. Pricing for the CJ1+ and CJ2+ Fusion upgrades wasn't yet available.

Other Avionics Options

For CitationJet owners not looking for an entire flight deck upgrade, there are products from Avidyne and Universal Avionics that can help add modern functionality.

Avidyne's dual-hybrid-touchscreen IFD550/540 FMS/GPS/navcoms are approved for installation in the straight CitationJet and CJ1, 1+, 2, 2+, and 3 models equipped Pro Line 21 avionics and the FGC-3000 digital flight control system. The upgrade includes auto-coupled LPV approach capability, 3D synthetic vision, and wireless connectivity to third-party apps such as ForeFlight

The IFD550 and 540 include 16-watt VHF communication radios and dual VHF navigation and ILS capability, along with the option of dual Avidyne SkyTrax 322 remote-mount or SkyTrax 340 panel-mounted Mode-S transponders for ADS-B Out.

Avidyne's new Atlas FMS is undergoing certification and will be offered for larger Citations as well as other aircraft models. While Avidyne isn't yet targeting the CJ market, a company spokesman told **AIN**, "We need to gather a little more market intel before investing in that effort."

The Universal Avionics UNS-1K FMS was installed in the straight CitationJet and under an STC in some CJ1s, according to Robert Randall, director of strategic business development. Now Universal offers an STC to upgrade those UNS-1K FMSs to the modern UNS-1Lw, -1Ew, or -1Espw SBAS-FMS with LPV monitor.

A Columbia Avionics STC is also available to upgrade CJs with Universal's EFI-890R flight displays with synthetic vision.

Universal Avionics is interested in speaking with CJ1 and CJ2 owners who are interested in a fully integrated Universal flight deck, Randall said. This would include Universal's InSight avionics suite with synthetic vision and EGPWS, UNS-1Lw SBAS FMS, and CPDLC and digital clearance via the UL-801 Communications Management Unit and Universal cockpit voice recorder. The upgrade would retain the existing autopilot, flight director, and radios. Universal could also STC its SkyLens head-wearable display as part of such an upgrade. ■

New fliers boost Sentient Jet's 2020 jet card sales

by Jerry Siebenmark

Sentient Jet doubled its jet card sales in 2020 due almost exclusively to new private fliers entering the market and expects other trends that emerged last year to continue into this year and beyond, CEO Andrew Collins told **AIN**. "With the new entrants, with the rise of the popularity of the jet card model in 2020, and then you couple the fact that we had grown our organization from a sales perspective and additionally there was the federal excise tax holiday, we ended the year selling $450 million in jet cards," Collins said. "So that's a pretty significant jump from where we were the year before."

Following the emergence of Covid-19 in the U.S. early last spring, "volume fell through the floor," Collins said, and "we really wondered where the business would head." But later in the spring, the company noted a rise in demand from clients who hadn't previously purchased or used a jet card from Sentient, which he attributed to personal travelers seeking warm-weather destinations or locales where they could socially isolate from the pandemic, such as West Palm Beach, Florida, and Aspen, Colorado.

Traditionally, those new entrants account for a third of Sentient's business. But the demand was such in 2020 that they accounted for two-thirds of its business. "I think anybody in the industry that had an experience with the rise...in new entrants, the real focus they're going to have to be in tune to is retaining this new user base in 2021 and beyond," Collins noted.

Two trends have emerged from the pandemic that Collins thinks are here to stay. One is that personal travel trips are going to last longer, which he said Sentient noted last year. Specifically, what was once a four-to-six-day average stay for Sentient leisure clients increased to eight to 12 days in 2020 (which the company determined by looking at the number of one-way rates used by its jet card clients versus two-way, or roundtrip, rates).

Andrew Collins
Sentient CEO

"I think anybody in the industry that had an experience with the rise...in new entrants, the real focus they're going to have to be in tune to is retaining this new user base in 2021 and beyond."

The other trend that emerged is the changing definition of home and why trips by personal travelers may last longer. Technology such as Zoom and Microsoft Teams has enabled more people to work or attend school virtually, which means they don't have to always be tied to a certain location. "I think one thing the pandemic did is it redefined where home might be for somebody...and private aviation gives you more control over how to redefine that," Collins explained.

Looking ahead, Collins expects business travel will return in 2021, but at a measured rate. "I would tell you that 90 to 95 percent of the travel we saw in 2020 was really derivative of personal travel," he said. "That trend continues into 2021. My guess is you'll start to see a slow return to business travel at the beginning of the second quarter and it will be smaller teams that are more transactional oriented, doing due diligence or consultants, and you won't see a return to robust business flying [until] deeper into this year if not into 2022."

Since December, Sentient has noted a "robust amount of flying" that Collins said has continued into January. He expects that also will continue into February. "And that's traditionally the last of the winter peak months so we're busy, we are hiring, and are looking forward to the expanded market share that happened in 2020." ■

GA airports facing growing pressure on many fronts

by Kerry Lynch

Three years ago, the fate of Coleman A. Young International Airport outside of Detroit looked bleak. The facility had fallen into disrepair and had little community support. But when officials started discussing possibly repurposing the facility for other uses, the aviation community quickly organized and began an education campaign on how it could contribute to the local community.

The result, said Alex Gertsen, director of airports and ground infrastructure for NBAA, was a "180-degree turnaround." The city has now submitted an airport layout plan that would include lengthening the runway and a number of safety enhancement measures.

"It is incredibly exciting to see this success for an airport that was really struggling," Gertsen said, adding that with plans in the works, "It will be a state-of-the-art airport."

"For 10 years it was really difficult," Jason Watt, the city's airport director, told NBAA. "Now I can see how bright the future looks for this airport. The challenge has been met with a significant reward, and that makes it all worth it."

Gertsen highlighted this airport as an example of how general aviation airport advocacy can and does work. He also stressed the importance of continuing that advocacy especially during the Covid-19 pandemic, which has brought new concerns and threats to the general aviation airport community. Those concerns come in addition to the long-standing battles that have continued over the fate of certain of these facilities.

Pandemic's Pinch on Revenues

A key concern that emerged during the pandemic is the decline in revenues at business and general aviation airports that came with the noted drop-off in operations.

According to FAA data, business aircraft operations had hit a 10-year high of 4.53 million in 2019. In 2020, this had fallen to 3.5 million. "We are nowhere near where we were a year ago," said Christa Luca, NBAA senior v-p of government affairs, in a webinar during NBAA's virtual BACE late last year.

Perhaps one of the most notable declines is the nation's busiest business aviation facility, Teterboro Airport, which saw traffic plunge by 50 percent from 140,000 in 2019 to a little more than 70,000 last year. Van Nuys in California saw traffic slide from 58,000 in 2019 to 47,000 in 2020, while operations at William P. Hobby Airport in Houston experienced a decline from 49,000 to fewer than 37,000.

Many of the business and general aviation airports have experienced similar declines even as health and safety concerns have driven new customers into private flying. A key reason for this is the fact that overarching corporate policies have kept a large number of Part 91 operations grounded. The good news is most companies have hung on to their flight department personnel and infrastructure. Even so, Gertsen said, "It has been a challenge to the industry."

Gertsen concedes that there are pockets where traffic has ticked up, particularly in recreational destinations. One such example is Palm Beach International, which experienced a slight year-over-year increase in operations. This is also true at some airports that host substantial flight training activity, he added.

But even at those locations, the types of operations have changed. The ultra-long-range aircraft that required heavy fuel lifts have quieted. Shorter trips mean fewer fuel sales and revenues. "Across the board, there are airports that are struggling," he said.

This has extended to businesses that serve those airports. Many airport businesses had asked for deferred rents, Gertsen said, noting one airport manager mentioned to him that now those businesses are asking for rent forgiveness rather than payment plans to catch up.

Concerned about this dynamic, the National Air Transportation Association (NATA) released a white paper, "Recommended Practices for Airport Sponsors and Commercial Aviation Businesses in Addressing Leasehold Issues in Response to Covid-19," for airports and their businesses struggling with revenue, employee retention, and financial uncertainty during the pandemic.

The aim of the paper is to foster collaborative approaches in addressing solutions, and NATA officials say they have heard that "there have been great communications between airports and commercial aeronautical businesses on this front."

NATA also had worked with the FAA on the issue and the agency had updated its Information for Airport Sponsors Considering Covid-19 Restrictions or Accommodations document a number of times and included sections on rent abatement and deferral.

Meanwhile, recognizing the severe funding shortfall concerns, Congress allotted two tranches of relief aid to airports. The CARES Act set aside $10 billion for airports, but of that, only $100 million was marked for general aviation airports. This led to numerous groups appealing to lawmakers for additional assistance. NATA president and CEO Timothy Obitts noted that with the general aviation set-aside, "thousands of general aviation airport sponsors [were] eligible to receive $30,000 or less under the Cares Act, with many receiving only $1,000."

Traffic at Teterboro Airport dropped from 140,000 in 2019 to a little more than 70,000 in 2020.

Todd Hauptli, president and CEO of the American Association of Airport Executives, agreed, saying the Cares act amount was "nowhere near what is needed going forward."

Congress responded with a second tranche in the sweeping appropriations and relief bill passed in December. This time, $2 billion was set aside for airports, with $45 million directed to general aviation. A third tranche appeared to be on its way through President Joe Biden's $1.9 trillion relief package. House managers included another $8 billion for airports, including $100 million for general aviation and non-primary commercial airports. House aviation subcommittee chairman Rick Larsen (D-Washington) supported this additional aid for airports, stressing that the pandemic is still ongoing.

"The important role GA airports play in our transportation system has been realized in Congress," said Jim Coon, senior v-p of government affairs and advocacy for the Aircraft Owners and Pilots Association (AOPA). "Members representing communities with GA airports understand the vital link airports provide to thousands of communities across the country."

"We're very thankful for the action on Capitol Hill in recognizing the needs of airports," Gertsen agreed, but said the industry would continue to push for investments to help these facilities. "As we look into 2021, we will look for additional funding opportunities. We want to make sure aviation is included."

He noted the Biden Administration has expressed a strong interest in moving forward with infrastructure investment, recognizing this can help provide a boost to the economy. Transportation Secretary Pete Buttigieg had expressed those sentiments as well during his confirmation hearings, calling infrastructure investment "part and parcel" of economic recovery.

Pandemic Plays into Perception

While airports try to shore up their bottom lines, they still face perception issues. The pandemic has brought a mixed reaction on this front.

Early into the crisis, the pandemic sparked some challenges with local leaders citing health and safety concerns in attempting to curb operations at general aviation facilities, Gertsen noted, citing airports in Puerto Rico and Idaho as examples. But advocates, working with the FAA, were able to ward off some of these efforts.

Despite these challenges, general aviation airports took on new importance and recognition during the pandemic. Importantly, as airlines have cut back schedules, reaching smaller cities or more remote locations has become more difficult. At some airports, airlines have drawn down flights to once a day. Business aviation has been able to fill that void and it is another reason why more people have been drawn to business aviation, noted Dan Hubbard, senior v-p of communications for NBAA.

At the same time, these airports have been able to spotlight other benefits during the crisis, as personal protective equipment is able to reach remote locations through these facilities. A broad swath of the business aviation community got involved, donating supplies or flights, to ensure this equipment got distributed.

Angel Flight volunteers were among the many to step up to ensure personal protective equipment (PPE) could get delivered to medical facilities in remote regions.

"The Covid pandemic has helped local leaders and communities realize, even more so, the important role airports play from both an economic and humanitarian standpoint," Coons said. "The ability to move medical personnel and PPE to assist in the fight against Covid has again shined a bright light on the importance of GA airports."

Concerned about perception issues and the need to highlight the benefits of the airports, NATA kicked off a series of General Aviation Advancing America (GAAA) gatherings that are bringing together airport, aviation business, civic, and business leaders together. These events foster discussions to communicate the contributions of the industry to local communities. The association already has reached more than two dozen locations across the country through the initiative.

"The challenge is really improving community relations and getting communities to recognize that the airport is a crucial junction for economic development and access," said Ryan Waguespack, senior v-p of aircraft management, air charter services, and MROs for NATA. He added that along with PPE, "now we're pushing that your runway is an opportunity for vaccine distribution and getting it into rural America."

Despite the humanitarian and access benefits, noise and perception issues persist. While a slowing of traffic has generally brought down the overall noise from business jets, Gertsen said the quieting of jets has highlighted other aircraft, particularly piston-powered ones.

"With fewer flights in the air, when you do have a flight it becomes more noticeable," he said. "Communities might have had more jets and helicopters pre-Covid. Now they are noticing piston aircraft."

NBAA has focused on this aspect through webinars and podcasts to remind pilots to fly neighborly and remain conscious of noise abatement procedures when approaching an airport. This is particularly important since the pandemic has affected personal habits with many more working at home. People living near airports will notice aircraft far more if they are exposed to overhead flights at times when they would have otherwise been at work.

Recent FAA research has underscored the importance of this, finding "aircraft noise often results in higher levels of annoyance compared to the same level of noise from ground transportation sources."

Fight for Survival Continues

While new concerns emerged, many of the long-standing battles have continued during the pandemic—with a few facilities facing possible extinction. "We're still very much going strong advocating for Santa Monica and East Hampton," Gertsen said.

Business and general aviation advocates suffered a setback in their fight to save Santa Monica Airport (SMO) in California last year when the U.S. District Court for the District of Columbia dismissed a case seeking to overturn a 2017 FAA agreement that paved the way for the closure of the airport after Dec. 31, 2028. The agreement essentially freed the city of Santa Monica from legal obligations to run the airport in perpetuity and enabled the city to shorten the runway to 3,500 feet.

Despite the ruling, general aviation advocates stressed the fight is not over. Christian Fry, president of the Santa Monica Airport Association, told listeners of an NBAA webinar that the timeline is becoming more imminent. "We're on the better side of eight years." But at the same time, he tried to dispel the notion that the fight is over, and the airport closed.

He said SMO is still busy, hosting about 80,000 operations a year. While the airport does generate noise complaints, about 70 percent of complaints come from less than a half-dozen households, he said.

"We're working on trying to help people understand closure is not mandated," he said. In fact, Gertsen added that there have been some recent changes in the city council that may become more favorable toward the airport. Meanwhile, NBAA is continuing to appeal a Part 16 finding over the use of airport revenues by the city of Santa Monica while it took steps to limit use of SMO.

"The challenge is really improving community relations and getting communities to recognize that the airport is a crucial junction for economic development and access..."

– Ryan Waguespack, senior v-p of aircraft management, air charter services, and MROs for NATA

MATT THURBER

Before shortening the runway to 3,500 feet, SMO accommodated large jets.

Across the country at East Hampton Airport (HTO) on Long Island, New York, less than a year remains before grant assurances expire, freeing the town of East Hampton to close the facility. Gertsen was encouraged that the aviation industry has coalesced in their efforts to convince local authorities of the importance of the facility, despite what he called efforts by the town to splinter that support.

It also has gotten a boost from a local organization, the East Hampton Community Alliance, which is advocating for a range of businesses and on a number of issues in the town. HTO has become one of its focal points and has released a study highlighting that the airport in 2019 supported 872 jobs, $34.9 million in labor income, and $77.5 million in aviation-related business output.

Jeff Smith, chair of NBAA's Access Committee and a chief pilot actively involved in the Eastern Region Helicopter Council, last year outlined an overwater initiative developed in coordination with the aviation community and air traffic control. "We know, the operators know... that there's an end date and we still have to mitigate and get this community compatibility going if we are going to save the airport," he said during an NBAA webinar.

In Hawaii, Dillingham Airfield is also facing potential closure after state transportation officials said they had planned to end its operating lease in June instead of in 2025. The state operates the facility under a lease with the U.S. Army. That notice mobilized airport supporters, who have touted that the facility is home to 11 businesses and produced $12 million in economic output, AOPA noted.

AOPA is urging support for state legislation to create an airport authority to run the facility. "AOPA believes that this would be the best solution for a prosperous future for general aviation at Dillingham, and we will be strongly supporting legislation expected to be introduced at the start of the 2021 Hawaii legislative session," AOPA Western Pacific regional manager Melissa McCaffrey said.

Airport advocates are also carefully monitoring calls for closing Whiteman Airport in Los Angeles that surfaced after an aircraft crashed in a neighborhood near the airport. Gertsen noted that this is requiring an education process to help the community understand airport grant obligations, as well as the airport's role in the community. "We don't want to downplay the accident, but there needs to be an understanding of the role the airport plays," he said.

Further north in California, Santa Clara County in November voted to stop accepting airport grants for Reid-Hillview Airport to free it from airport obligations. At this point, the airport is under obligations through 2031, providing time for continued advocacy.

While the fight for survival at these facilities continues, a new concern emerged when Orange County officials put operational limitations in new FBO leases at John Wayne Airport. Essentially, these provisions would have prohibited JSX from operating its hop-on scheduled charter service out of those facilities.

Gertsen said the limits raised concerns about violations of airport grant obligations surrounding access. However, JSX was able to secure a temporary restraining order and local officials ultimately shelved the restrictions.

Activism and Education

Most airport activists agree that much of the success of an airport is education and working with the local community. Waguespack noted that during his GAAA tours, "You can tell when the airport community is vibrant. The [facility] is growing and prospering. There is a direct correlation to community engagement."

He added that he's walked into certain environments with aviation business, city, and airport leaders "and the tensions are palpable." This translates into what they see on the airport. "Is it a booming airfield? Are there new businesses coming in or is it not?"

He cited an example of Greenville Downtown Airport in South Carolina as a success story in this area. An airport official there decided the community needed more involvement, so she facilitated the building of a park at the airport to draw in families. "And then a restaurant comes," Waguespack said, "and the community comes out. This feeds into flight training, and then businesses and workforce. It's not a nuisance when they wrap in the community involvement. It elevates the airport."

Waguespack emphasized that there is a real need for education and how an airport communicates the value it brings. He noted some states have done an "incredible job" at developing economic impact studies on the values of airports. But this varies across the country.

AOPA's Coon said this has served as the basis for its Airport Support Network, which is now 2,000-volunteers strong. These volunteers work throughout the country to spread the message of how airports contribute to job creation, economic development, and gateways for access to communities.

"While we have not given up on SMO and we continue to work with HTO, relations with most all airports across the country, thousands of them, are very positive," Coon concluded. ■

Preparing for the future adoption of SMS

by Kerry Lynch

A few months after FAA Administrator Steve Dickson outlined plans to release regulations requiring safety management systems (SMS) for Part 135 charter and 145 repair station operations next year, the FAA is said to be "far along" in this rulemaking effort. The question is, though, are the vast and varied numbers of Part 135/145 operators ready for it?

The FAA, which has required SMS for Part 121 scheduled carriers since 2015, has long encouraged other operations to voluntarily adopt such programs and has had a program in place to help facilitate implementation. Along with the FAA's voluntary program, a number of companies have developed detailed software to help organizations implement their own SMS. And, SMS is a foundation of IS-BAO.

Even so, a large number of operations are expected to need to adopt SMS, or at least more fully adopt it, once the rulemaking is released. The exact number is unknown because so many have incorporated plans through private program providers.

Looking at just Part 135, the FAA's database recognizes just under 2,000 certificated operators. Of those, 26 programs are accepted into the FAA's voluntary program with another 157 in the works. Meanwhile, more than 1,000 business aviation operators have achieved IS-BAO recognition, but only about 30 percent of those involve certificated air carriers worldwide.

This lack of adoption came sharply into focus during the National Transportation Safety Board's investigation into the Jan. 26, 2020, Island Express crash that killed basketball player Kobe Bryant, his daughter, six other passengers, and the pilot. The NTSB called the accident preventable and said, "We have long believed in the benefits of SMS. Although the company used some SMS tools, it did not implement the entire program."

With an eye on these concerns and on the looming regulations, the National Air Transportation Association (NATA) teamed up with the U.S. Department of Transportation's (DOT) Transportation Safety Institute (TSI) to develop a week-long course on SMS for the 135/145 community.

In tandem, NATA created a new Air Transport Safety Manager certification through the International Society of Safety Professionals (ISSP) for members who take the course and an associated certification exam. The certification program is designed to help elevate the professionalism and status of safety managers.

"Business aviation is a unique space, providing new challenges every day and opportunities to engage in continuous improvement," said NATA senior v-p Ryan Waguespack. "This collaboration with TSI, along with our new SMS pilot program, allows NATA and its members to take our shared mission of advancing aviation business safety to a new level."

Based at the expansive Mike Monroney Aeronautical Center in Oklahoma City, TSI is not part of the FAA but is a separate organization within DOT that provides a host of courses across multiple modes of transportation. The TSI menu includes a bevy of aviation safety management, accident investigation, and other courses, making it the right fit for NATA's vision of an in-depth course on SMS.

Huge Need For Training

NATA and TSI initially lined up four weeks for the course at its Oklahoma City location, but Roger Hood, course manager for TSI's Aviation Safety Division, expects the course to continue on into the future. "We understand there's going to be a huge need for this training," he said. "We have very high demand."

Because class sizes at Oklahoma City have been limited during the pandemic and some people may not want to travel, TSI is looking at alternative sites to accommodate others, he said. In addition, the course is spurring interest in some of TSI's more specific programs and follow-on courses.

DAVID McINTOSH

NATA and TSI invited me to audit the course and I took the opportunity, choosing a week in January. I have covered SMS but taking such a course would give me a better understanding of what is involved and what it might take to incorporate. And in fact, it also got me thinking about my own organization's safety protocols.

Before we (the students) attended the class, we were instructed to read and familiarize ourselves with Part 5, the FAR created to house SMS regulations, along with the accompanying Advisory Circular 120-92B.

Course managers wanted to make sure we had a basic knowledge of the regulation because the week-long training takes a deep dive into it with a "how-to" approach. This is important because the FAA's SMS rulemaking for Parts 135 and 145 is believed to be largely based on Part 5.

Reading through the regulation and AC, it struck me that every section had language on the scalability of the required elements of SMS. The AC acknowledges the differences in size and complexity of operations and the volume of data available but says Part 5 "allows organizations of different sizes to meet those requirements in different ways. The SMS functions do not need to be extensive or complex to be effective."

Whether it accomplishes that goal remains to be seen. In January NATA launched a Voluntary SMS Implementation Project to evaluate the application of SMS across the Part 135 charter and Part 145 repair station communities.

Hood opened the class with introductions, highlighting the depth of experience of the instructors—most of whom remained with the class throughout the week, on hand to answer questions or go over individual concerns. This included D Smith, the manager of TSI's Aviation Safety Division.

Students also introduced themselves. A number represented well-known charter operators and MROs, or maintenance divisions within operators. Some of these students have SMS but were trying to enhance their programs. Others were part of the way there, and others were at the beginning or looking to enrich their education.

The Four Pillars

The FAA says an SMS is intended to provide for a systematic approach to achieving acceptable levels of safety risk; it is essentially a decision-making process that relies on four pillars—a safety policy, safety risk management, safety assurance, and safety promotion.

A safety policy is essentially a contract establishing the commitment to SMS. This commitment must come with buy-in from the top of the organization, the course stresses. The safety policy must be signed by the "accountable manager," someone who has financial and decision-making responsibilities for the entire organization. This is typically a senior leader and lays the commitment for the safety program at the hands of the top layer of the company.

On the first day, Hood provided an overview of the safety policy. Not just a statement that an organization wants to be safe, the policy needs to include safety objectives, the commitment to that objective, a clear statement of the resources that will be dedicated to carry it out, a commitment to a safety reporting element, a definition of unacceptable behavior, and provisions for an emergency response plan. An organization must communicate this policy to employees and continually review it to ensure it meets the needs of the organization.

The class provided examples of different approaches to a safety policy, including TSI's own safety policy along with those of Jet Linx and Million Air.

While opening with safety policy, the class delved into the other three pillars of SMS.

Kodey Bogart, owner of KB Solutions Safety Management, and Smith provided a presentation explaining risk management, including the difference between risks and gambling (one involves informed assessment, the other guesswork), and stressing that this is an ongoing process.

Risk management involves identifying the hazard and assessing the risk associated with the hazard, including the likelihood and severity. It also looks at controls and potential outcomes.

There are color-coded matrices available that enable safety managers to visualize the severity and likelihoods associated with the risk to help guide informed decisions. Having the ability to make informed decisions is critical because most organizations do not have unlimited resources to devote to every risk.

Jerry Kosbab, president of AeroDirections who is renowned in the safety community for his expertise with the "BowTie" approach to risk management, gave an overview of this method. We were to look at a hazard, defined as something that is a normal part of business but has the potential of harm if control is lost, and then determine a "top event" that occurs from that hazard. The top event is described as "a deviation from the desired state or activity" but one that recovery is still possible. That is the center of the BowTie.

At the left of the BowTie are threats involved with the hazards and possible preventative mitigation controls. To the right of the BowTie are "recovery controls" (what you do in response to the top event) and consequences.

We had class exercises on forming a risk matrix as well as BowTies, and you realize how different organizations can take markedly different approaches to risk management. These approaches can be granular (my class group worked on a BowTie surrounding the introduction to bag loaders) to something much broader, such as new ownership.

Another takeaway for me throughout the risk management sessions is that an

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Satcom Direct Plane Simple antennas set to debut

by James Wynbrandt

Satcom Direct is readying release this year of its first two Plane Simple satellite communication antennas, bringing lower-cost high-speed connectivity options to a wider array of airframes. The SD Plane Simple Ku antenna, slated for June introduction, will provide connectivity via Intelsat's broadband Ku-band satellite service, while the SD Plane Simple Certus LEO antenna, coming in the fourth quarter, will access Iridium's new Next low earth orbit (LEO) L-band constellation and its high-speed Certus service. Satcom Direct president Chris Moore called the pair "exciting, milestone products."

A longtime authorized service reseller of its satcom services, Iridium named Florida-based Satcom Direct an authorized hardware OEM two years ago, and Satcom Direct unveiled the Plane Simple line of modular, agnostic, open-architecture antennas in February 2020. These and forthcoming Plane Simple antennas will be comprised of two line replaceable units, including the SDR Gateway 2.0 router, which integrates the modem, and the antenna. As the portfolio's name implies, the products are designed to be simple to onboard, reducing associated costs. "We've been conscious to minimize the invasiveness of installations," Moore said.

Supplemental type certificate approvals for a variety of aircraft are in development for both systems and will be available at product release.

The Certus LEO antenna will be among the first connectivity options providing access to Iridium's Next LEO constellation, offering high-speed connectivity aboard airframes from turboprop singles and larger. The small form factor fuselage-mounted antenna will also be the first Certus high-gain antenna, providing a more focused beam and better connectivity than available from low-gain antennas. Meeting Iridium's performance requirements for Class H2 systems, the antenna will support the highest current and future Certus data rates.

The new Iridium core digital and radio frequency module, the Certus 9810 transceiver, delivers a top speed of 704 kbps, some 10 times the speed of classic Iridium, supporting hi-def video streaming and other bandwidth-intensive applications. With Satcom Direct's acceleration tools, it "will seem like more than a megabit per second," said Moore.

LEO constellations hold some advantages over geostationary satellite connectivity. Orbiting some 45 times closer to earth, the satellites have correspondingly lower latency, or lag time on bi-directional traffic; their proximity allows smaller and lighter antenna footprints that reduce power requirements and drag; and they're less susceptible to terrestrial weather interference. Coverage is also better over higher-latitude polar areas.

Satcom Direct also sees a market for the Certus service as a cabin system backup or for dedicated cockpit connectivity aboard larger platforms equipped with Ka-band systems, or for aircraft that operate at higher latitudes where geostationary coverage is unreliable or unavailable. Hardware and service plan prices for Certus service have yet to be announced but Satcom Direct, as both an authorized hardware OEM and value-added service reseller, will be able to offer attractive turnkey packages, Moore said.

The Plane Simple Ku antenna, designed for super-midsize and larger business jets, also provides access to the Intelsat FlexExec Ku-band broadband network. Satcom Direct developed the electronically steered, phased-array, 12-inch, tail-mounted antenna in partnership with German aeronautical antenna specialist QEST (Quantum Electronic Systems).

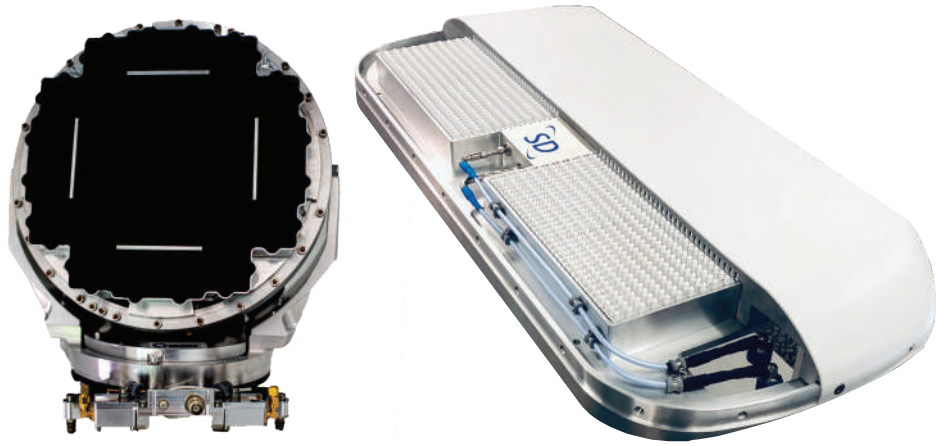
Operating in a lower frequency range, Ku doesn't offer as much bandwidth as Ka-band systems, which remain the "gold standard of onboard connectivity at the moment," Moore said. But Satcom Direct sees "a gap in the market for customers with a GIV or a Global who may have struggled to justify the higher installation and service costs of Ka-band."

Combined with its SD Pro platform and connectivity management tools, aircraft with Ka-band connectivity could use a supplementary Ku service to manage data loads, for example offloading the low-latency data communication demands of multiple passengers to the Ku constellation as needed, automatically. For those interested in secure communications and data integrity, Satcom Direct's Comsat division, which handles its military and government services, is the exclusive satcom services provider to the Air Force Space Command's Enhanced Mobile Satellite Services program.

The Ku service could also serve as a portal to a range of Internet of Things-based services that Satcom Direct can customize for larger customers, according to Moore.

Though MROs will obviously have a say in installation costs, Satcom Direct is "targeting a sub-$400,000 install," hardware included, for Plane Simple Ku antenna systems, Moore said. Satcom Direct is the new antenna's exclusive provider and was set to begin flight testing the Ku installation on its Gulfstream jet near the end of February.

Satcom Direct is also partnering with QEST on its forthcoming Plane Simple Ka TMA, for midsize to large-cabin jets (slated for service entry in the fourth quarter of 2022), and the Plane Simple Flat Panel fuselage-mounted phased-array antenna for light and larger jets (for service entry around 2023). ■



Satcom Direct's Plane Simple antennas are designed for high-speed airborne connectivity while taking up as little space as possible, thus increasing availability for smaller aircraft.

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organization must dig deep and think critically about all of its operations to ensure that safety is part of the fabric.

Terry Taylor—a 40-year aviation veteran with safety management experience at the FAA, Embry-Riddle Aeronautical University, TSI, and his own Chameleon company—explained the difference between the SMS pillars of safety risk management and safety assurance: risk management answers whether the system is capable of operating safely, effectively, and within the requirements of the regulations; safety assurance answers whether the organization is following the system as designed, is it operating safely and effectively, and does it have the data to back that up.

Safety assurance is constantly monitoring and ensuring that a company's risk management is working. To get there, there must be continuous and periodic monitoring, as well as auditing and comprehensive evaluations.

As for safety promotion, Jet Linx director of safety Sheryl Clarke explained a safety culture must be deeply ingrained and automatic, she said, noting that without a strong safety culture, the other three pillars will not matter.

She stressed that simply buying an SMS software program and then placing the program on a shelf will not work. Instead, the program must not only have the buy-in of leadership but front-line employees. Safety managers should have ties to all departments. Employees must be trained and participate.

Key to this is the concept of just culture. Employees must feel safe in their jobs to participate, particularly in reporting, without reprisal. Just culture goes beyond reporting. It is a key part of how employees feel in their jobs and parlays into human factors. Do they feel secure enough to make decisions that are in the best interest of safety?

"It is impossible to punish your way into a good safety culture," Smith said. "It's impossible to punish your way out of human errors."

He stressed that organizations need to build a culture where safety is part of the entire fabric of an organization. Safety isn't a priority, Smith said, noting priorities change and can be negotiable. A safety culture must be a principle, a guiding philosophy.

Expanding on that was Dan McCune, associate v-p of safety at Embry-Riddle. He noted that "everything revolves around safety culture" at Embry-Riddle. He characterized this culture as "doing the right thing when no one is looking."

In human factors, he continued, errors have a reason, whether skill-, rule-, or knowledge-based. Nothing happens in a vacuum and rather than punishment, organizations need to root out those underlying reasons to correct them.

Participants who registered through NATA were given the opportunity to obtain Air Transport Safety Manager (ATSM) certification. We were handed a study guide that reinforced the lessons through the week. Near the end of the week, we took the exam to further reinforce the concepts.

The nascent ATSM certification likely will evolve over time, Smith said, with possible continuing education components and other requirements. But for now, I count myself among the early certification holders.

Importantly, I learned the class wasn't simply a high-level overview of SMS, but a how-to course where instructors want to give participants resources and tools so they can effect a positive safety culture and fully implement SMS and be ready for the FAA.

Other sessions are planned for April 12-16 and July 12-16. ■

Former Learjet officials react to end of iconic era

by Jerry Siebenmark

When Jeff Miller came to Learjet in 1993 as director of public affairs, the Wichita airframer was once again on solid footing: it had recently been purchased by Bombardier, which was providing "a lot of resources" for product development. It was "a vibrant place" and, during Miller's three-year stint there, that product development led to the introduction of the Learjet 60 and Learjet 45.

Bombardier, he said, was "in an investment mode and quite willing to invest in new models, so it was an exciting time to be at Learjet."

But Miller, like other former Bombardier Learjet employees who spoke to **AIN** following the company's announcement that it plans to end production of the iconic business jet brand, said it didn't come as a huge surprise that its Canadian parent planned to end the brand's 58-year run after years of slipping delivery numbers for the Learjet 75.

From Miller's perspective, Learjets are "probably some of the most beautiful, capable business jets ever built. It's sad to me that they'll not be built anymore."

Business aviation industry analyst Rolland Vincent, who was head of strategy and analysis for Bombardier from 1991 to 1997, shared Miller's sentiment but concluded that without any new aircraft planned for the Learjet line, its fate was predetermined.

"I think this is a decision the management team has been facing for quite some time...the competition at the light end of the market has been tough," said Vincent, who is now president of Rolland Vincent Associates and director/creator of JetNet iQ. "We haven't seen the response that needed to be made from Bombardier in that segment. Bombardier didn't have an airplane there so this was coming."

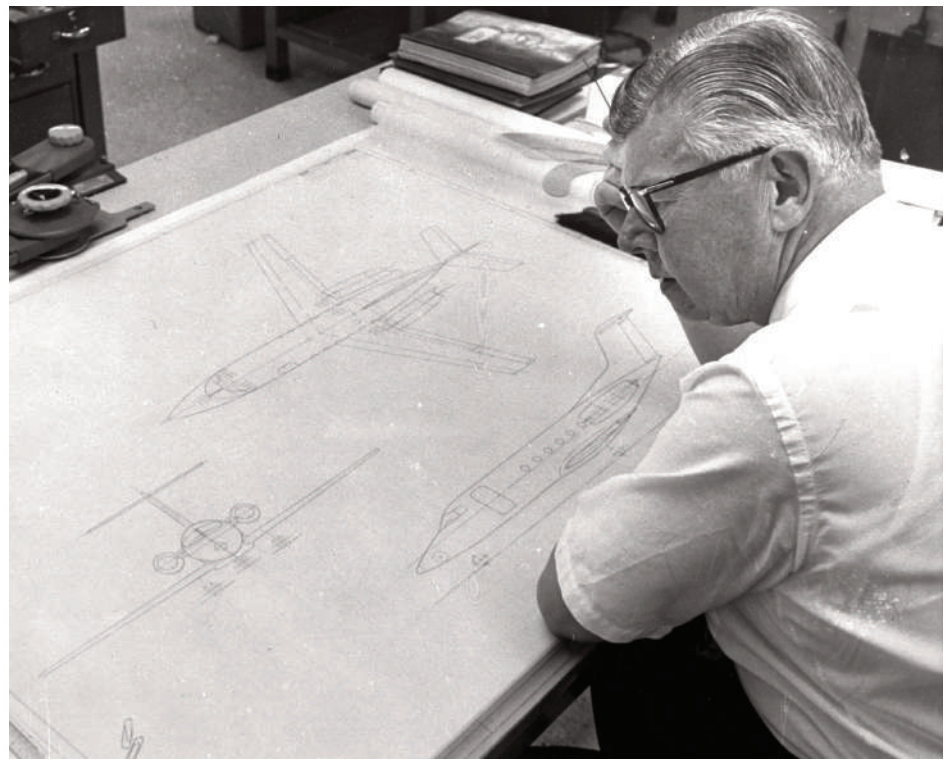
Vincent added that there is still value in the Learjet brand and that perhaps with a partner willing to provide the capital, Bombardier could still do something with it. But, he added, "I think right now the strategy is to stop the bleeding, to turn the ship around, to pay down some of that debt. They've got $10 billion in debt, a lot of it at high interest rates, so the issues are financial right now for the company. They're not strategic in that sense."

Dave Franson, U.S. public affairs director at Learjet from 1997 to 2004, said today's announcement marks the end of an era. "The Learjet put business aviation and especially business jets on the map," commented Franson, president of the Wichita Aero Club. "There were other business jets—the Jet Star comes to mind—but Learjet became the iconic business airplane."

> **"I think this is a decision the management team has been facing for quite some time..."**
>
> – Rolland Vincent, analyst

He said that Learjet founder Bill Lear came to Wichita in 1958 to speak to a Society of Automotive Engineers session on business airplanes, where he told Beechcraft and Cessna, "'If you guys don't build an airplane that will compete with the new jet airliner, the 707, I will.'"

Further, when Franson joined the Wichita aviation industry in 1974 by way of Cessna, "we hadn't been building jets very long. If you think about it, the Citation I think was begun in 1969. By the time I got there, we had them in production but there weren't that many sold. Learjet was the target basically. We had to try and catch up to the Learjet."



Bill Lear established the Learjet factory in Wichita in 1962 after the city offered him its first-ever industrial revenue bonds for a 64-acre complex on the west side of then-Mid-continent Airport.

Like his other former Learjet colleagues, Franson said he could see that Learjet's days were numbered based on Learjet 75 delivery numbers, which had steadily trended down to a dozen or fewer in the past three years.

"When I worked at Learjet, we used to say that you had to do about three dozen airplanes a year just to keep the lights on in the factory," Franson said. "So, if you do the math, obviously it's been a pretty dark factory." ■

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Legendary Learjet ends production

For some pilots, the airplane was too hot to handle. "The takeoff and landing speeds were like [those of] fighters," said aerodynamicist James Raisbeck, who founded a company that offers Learjet modifications. "The stall speed was 120 knots and when it stalled [the airplane] would roll suddenly." Several design changes tamed some of these tendencies in the follow-on Models 24 and 25, but 20-series Lears retain a deserved reputation for demanding much of their pilots.

The Learjet 45 was the last clean-sheet design from Bombardier's Learjet division to make it into production, and nearly 650 of the 40/45 series were manufactured.

Lear sold his 60 percent share of Learjet in 1967 for $27 million to the Gates Rubber Company. Under Gates, Learjet would launch one of its most popular models, the 35, and one of its most criticized, the 55.

By the time Bombardier acquired the brand in 1990, Learjet had devolved into dysfunction. But Bombardier was already familiar with Bill Lear's work through its previous acquisition of state-owned Canadair, then the maker of the Challenger line of business jets, a design that Lear himself had initially developed as the LearStar 600. Bombardier moved quickly to launch variants of existing models that addressed sales-hobbling deficiencies and began development of a clean-sheet design called the Model 45, which mated a midsize cabin with light jet operating economics.

The Canadian airframer stumbled badly in bringing that airplane to market, missing program deadlines and promised delivery dates. The first Model 45s didn't reach customers until 1998, and when they did there were problems beyond the usual teething pains associated with low serial numbers. The nadir came in 2003, when the FAA grounded the entire Learjet 45 fleet for a month while Bombardier fashioned a solution to a defective jackscrew-and-nut assembly in the horizontal stabilizer that could lead to loss of aircraft control.

Learjet made its second major—and perhaps fatal—misstep when it unveiled the all-composite Model 85 in 2007. That airplane never made it to market. While it looked like a Learjet, it had performance akin to a much slower Hawker. Potential customers were nonplussed, and Bombardier killed the program in 2015 after throwing $1.4 billion at it.

In 2019, Bombardier made a last-ditch attempt to keep the Learjet production line open, revealing the Liberty—basically a Model 75 that eliminates features, some standard equipment, and two passenger seats in exchange for a greatly reduced price: $9.9 million versus $13.8 million for the original. Industry analysts and some long-time Learjet customers threw shade on it. Speaking of Learjet in October 2019, Flexjet chairman Kenn Ricci told Bloomberg News, "All good things must come to an end." ■

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With the current Flying White Houses growing long in the tooth after serving for more than 30 years, their replacements–Boeing 747-8s–are taking shape in a massive Boeing Defense hangar in San Antonio, Texas.

Nat Geo special examines new Air Force One 747-8

by Curt Epstein

With the current pair of Boeing 747s known as Air Force One now passing three decades in service, their replacements are already undergoing the extensive modification needed for them to assume the role of the airborne transport for the President of the United States. To document the process National Geographic has produced a film that debuted on the Nat Geo Channel on February 15th, and **AIN** was able to receive a review copy of the program.

Titled *The New Air Force One: Flying Fortress*, the hour-long program details the evolution and some of the history of the aircraft that have carried the call sign Air Force One and weaves this narrative around an actual mission flown by the former administration. As the narrator repeatedly informs the audience, National Geographic's camera crews were given unprecedented access aboard the aircraft and were able to interview the crew and staff assigned to it as they describe their jobs and the limitations they face operating and maintaining the 30-year-old jet. A crew chief explains how vital parts needed to maintain the two aircraft in "like-new" condition are becoming difficult to obtain as some vendors are no longer supporting the 747-200 fleet, of which few remain in service.

From the front office, with its analog instruments, to the cramped galleys and medical bay, which was never designed to accommodate today's diagnostic and therapeutic equipment, all those assigned to work on the airplane express their excitement about the promised improvements.

The legacy 747s (or VC-25As, as they are known under their official Air Force designation) were first used by President George H.W. Bush in 1990, and video is shown of his first tour of the aircraft, astounded by the size and then-capabilities of it. After his death In 2018, that same aircraft carried his body from Washington, D.C., where he lay in state, to his home state of Texas, where he was interred.

The replacement aircraft, based on the 747-8, the latest and final passenger version of the four-engine jumbo jet, are due to enter service in 2024; but before then, the two aircraft are in the process of a massive remanufacturing that will convert them from standard passenger aircraft into the Flying White House.

At the Boeing Defense Facility in San Antonio, Texas, the effort to modify the two jumbo jets—which were originally white tails stored in the desert after an airline's deal with the airframer went sour—is being performed in the "Big Texas" hangar, the largest freestanding high bay hangar in the world. Among the work being done is the complete removal of the interiors, including many systems. Thousands of miles of wiring are being replaced by metal-armored cables to shield against electromagnetic interference from a nuclear blast, while military-grade communications, encryption, and defense systems are installed.

To power all the new equipment, the new Air Force One will require the installation of larger more potent generators, requiring the removal of the four next-generation GE engines, (which despite the narrator stating each consists of more than a million parts, actually contain approximately 10,000). While those engines are 16 percent more efficient than their predecessors, they generate 17 percent more thrust, 39,200 pounds more according to the film, which will extend the range of the aircraft by 1,000 miles, to 8,800 miles.

The new 747s also have cranked wing tips, which help increase its speed closer to near Mach 1, while improving the airplane's short-field performance.

At 18 feet longer than its predecessor, the 747-8 is the world's longest passenger aircraft and due to its extended upper deck, the new Air Force One will have 5,000 sq ft more room than the current presidential transports. That will allow more space and improved capabilities for areas such as the two galleys, which will allow for the preparation of 2,000 meals from provisions loaded in the U.S., and the medical bay, which will be equipped with state-of-the-art equipment to allow for the highest level of care, including surgery on the president, first family, and those aboard. Even the communications suite will be enlarged to accommodate four operators, rather than the three currently on duty at all times.

The new cockpit will be fully digital and will include the latest military GPS units, an improved instrument landing system enabling it to land regardless of the weather, and defense system controls. The modernizations will allow the on-duty cockpit crew to be halved to just two flight officers.

One of the major parts of the conversion requires structural modification of the airframe to accommodate large boarding doors and attached air stairs front and aft. As the program describes, before any cutting into the airframe could take place, the entire aircraft (all 350,000 pounds of it—without the engines and interior) had to be supported by a specially-built hydraulic cradle, which precisely measured and relieved strain, to prevent any warping or twisting. Additionally, dozens of holes were cut in the aircraft skin to accommodate the installation of any top-secret defense and advanced communications systems.

Those enhanced communications systems will allow the chief executive to address the nation from the airborne Oval Office, which wasn't available on 9/11, former President George W. Bush recounted to the National Geographic team.

The cost of the VC-25B program is expected to total $5.3 billion, including two years' worth of flight testing prior to achieving operational status. ■

NATA, NBAA ask IRS to clarify broker and charter federal excise tax rules

NATA and NBAA are asking the Internal Revenue Service (IRS) to clarify federal excise tax (FET) collection responsibilities of charter brokers and operators, saying current regulations remain unclear and are causing confusion.

The IRS recently issued its long-awaited final rule that addressed when the air transportation tax applied in situations involving aircraft management fees. During that rulemaking, NATA and NBAA also had raised questions regarding the FET collection responsibilities of charters and brokers. However, the IRS, noting the broad implications of the issue, suggested a separate rulemaking.

The associations stressed their willingness to work with the IRS on the issue, calling it critical for their members. "There is currently little guidance to determine whether charter brokers are responsible for collecting FET," they told the IRS in a joint letter.

In addition, they expressed concerns about the requirement for the air carrier providing the initial leg of a trip to remain responsible for paying the tax if it is not collected otherwise. "This obligation on the air carrier's part to pay the tax if the party responsible for collecting it fails creates confusion and unfair liability exposure for the air carrier in instances where a broker is collecting payment from the passenger."

As a clarification, the associations suggested that if an air carrier documents that it informed the charter broker of the obligation to collect the FET, then the operator would not be liable for uncollected tax. In addition, they said the operator should have access to information from the IRS on whether the FET was paid by the broker or another party.

"We have developed a strong working relationship with the IRS and are eager to work on regulations or guidance to provide much-needed clarity on tax collection and remission roles when brokers are receiving payment for the transportation from passengers," said Jacque Rosser, NATA's senior advisor for regulatory affairs.

NBAA and NATA asked for a meeting to discuss possibilities for either a rulemaking or guidance. "We appreciate how the IRS engaged with industry on the most recent FET rulemaking and look forward to working collaboratively on issues related to liability and collection of the tax," said Scott O'Brien, NBAA's senior director of government affairs. **K.L.**

Building a strong safety culture via human factors

by Kimberly Perkins

G650 Captain Kimberly Perkins

Safety Culture may be one of the hottest, yet least understood topics in aviation safety.

Safety management systems (SMS) is a valued and established set of protocols and processes to enhance the safety of an organization. From SMS, the industry has learned that trust is the fundamental building block for a positive safety culture. But, how do we build trust?

Crew resource management (CRM) implores us to use effective communication and to use all available resources. But it doesn't tell us how to effectively communicate nor does it explain how to maximize our human connection. Many pilots are comfortable with the tactical style of communication; we train for that in the simulator. Yet that style of communication does little to foster human connection, empathy, or inclusion.

The protocols, audits, and checklists of SMS and CRM have provided teams with important tactics for upholding physical safety. However, these systems are left vulnerable because they fail to educate on the "human" aspect of human factors training.

Genuine human factors training would include elements of neurobiology, cognitive science, epistemology, emotional intelligence, and leadership strategy. Each one of these facets would provide insight into how humans think, respond, and interact. Ultimately, we would learn that all humans want to be seen, heard, and valued.

On Being Seen

Our brains receive 11 million bits of information per second. But, we can only process about 40 bits per second, which means 99 percent of the information we receive, we cannot process consciously. Our brain makes mental associations and forms prototypes as a way of processing data more quickly. These subtle cues and associations were important in our evolution. They helped our brains make quick decisions on whether someone was a friend or foe and helped trigger the fight-flight-freeze response.

The prototypes and mental associations we unconsciously create can influence how we view other people. These associations can influence how we think about others. Our mental models try to tell us how people should think or should act. But, we know that not everyone fits perfectly into our subconsciously created prototypes. So if we don't question our own bias, we may end up perpetuating antiquated models or outdated stereotypes.

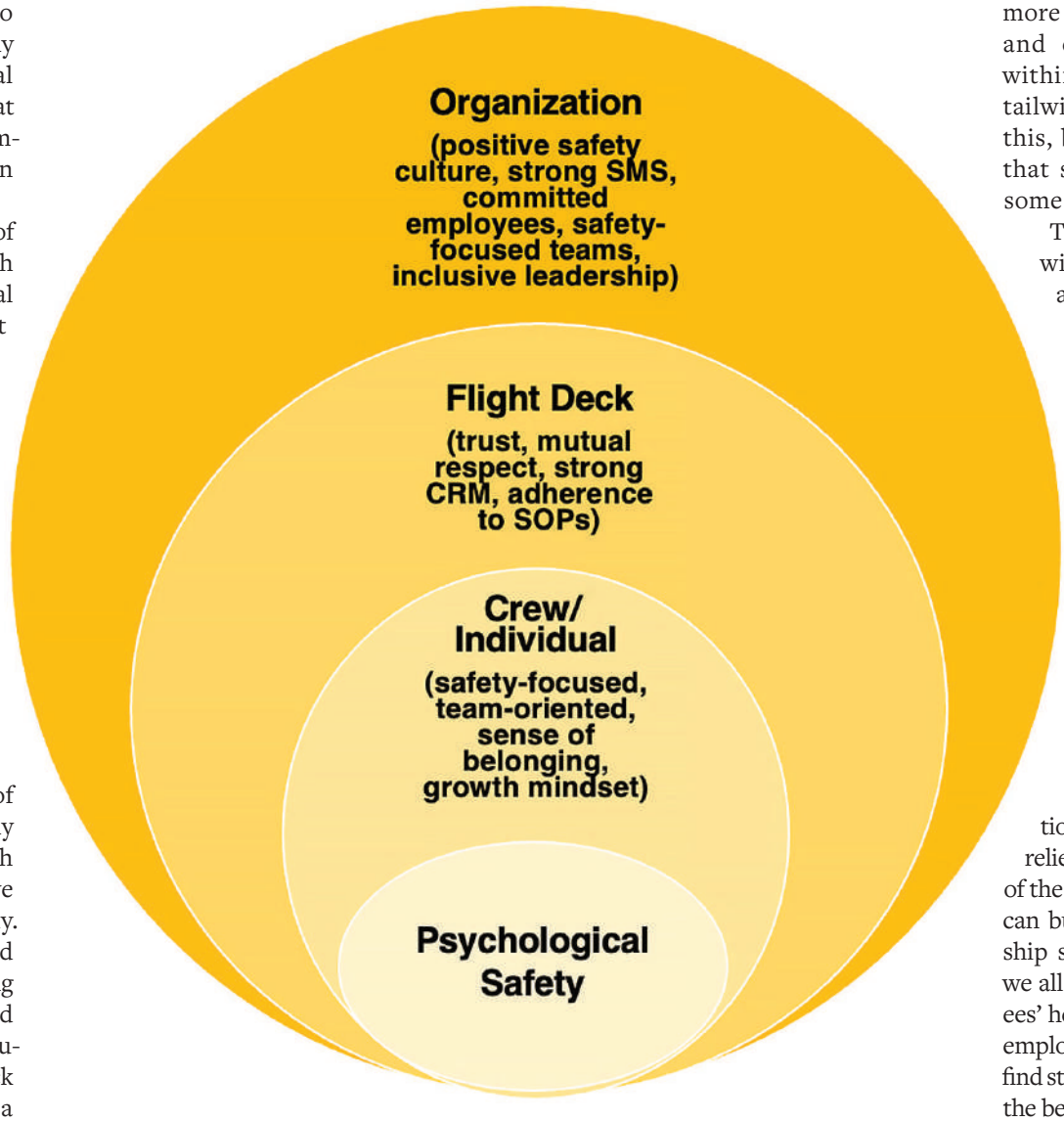
We want to feel seen. But the first step in seeing others is to admit we all have biases.

On Being Heard

When we feel safe to show up as our authentic best selves, we have a high level of psychological safety.

Psychological safety is defined as "being able to show and employ one's self without fear of negative consequences of self-image, status, or career." It means we feel comfortable speaking up with our original thoughts even when they fall outside of the groupthink model.

Psychological safety is fundamental to safety culture. When we don't feel safe to be ourselves or speak up, our brain shifts from critical thinking and logical processing to defense mode. When an individual senses danger (real or perceived, physical or emotional), our brain triggers the fight-flight-freeze response. When triggered, our cognitive functioning is impaired. Our attention shifts from pro-safety team behavior to one of defensive self-protection.



The incidents that go unreported, the disgruntled employee that overlooks protocols, the subtle noncompliance, and the costly employee burnout all lead to a reduction in safety and a deterioration of safety culture.

Conversely, psychological safety enhances safety culture because it allows people to ask tough questions and share their mistakes without fear of embarrassment or punitive repercussions. It creates a learning environment where employees feel engaged and free to express themselves. It is fueled by group trust and is paramount to healthy, high-functioning teams as it allows employees to feel heard.

On Being Valued

We hear a lot about inclusive leadership strategies. Forbes found that inclusive groups were more productive and made better decisions 87 percent of the time. The business case has already been made: inclusive leadership leads to more creativity, increased productivity, and a higher level of safety. We can create this environment by understanding an individual's unique experiences and looking at our differences as an asset.

Many people believe that aviation is a meritocracy, which means that everyone is on an equal playing field. In a meritocracy, the harder you work, the more successful you become. We all want to believe in that type of system because it sounds fair and it embodies the American spirit. Unfortunately, it's far too simplistic and negates recognizing the individual hurdles each person experiences.

Let's say two pilots start flight training at the same time. Pilot A is not financially burdened. This pilot can take extra classes to finish sooner, fly whenever the weather cooperates, and attend after-school networking events. Meanwhile, Pilot B works after school to pay for flight training, has limited time to fly, and misses those evening networking events.

Pilot B is fighting a relative headwind while Pilot A is enjoying a relative tailwind. Pilot A completes flight training more quickly, makes more connections, and can establish relatively ahead within the industry because of their tailwinds. There's nothing wrong with this, but it's important to understand that some people have tailwinds and some have headwinds.

These relative headwinds and tailwinds help create our uniqueness and authentic selves. Understanding these individual characteristics helps leaders create cohesive teams where people feel valued as individuals while also creating a sense of belonging in an inclusive group.

Safety Culture–A Collective Term

Culture is a collective term, meaning a singular individual cannot create it. Culture is observed through the social norms and behaviors of the individuals comprising a group.

The micro-culture of your organization or the macro-culture of the industry relies heavily on the psychological safety of the individuals that comprise it. Leaders can build trust by using inclusive leadership strategies. This includes admitting we all have biases, understanding employees' headwinds and tailwinds, and valuing employees for their uniqueness. We must find strength in our differences to maximize the benefits of inclusive leadership and create a genuine positive safety culture.

Safety culture is not a singular, check-the-box element. It is something to improve upon daily. The tone for the organization is set by leadership, but everyone plays a role. As an industry, we invest in new technologies and emergency and pilot training. We are always learning and always striving to do better. We can do this collectively by investing in aviation's most important asset—its human capital. It starts with a deep dive into more comprehensive human factors training. ■

Universal Avionics' InSight flight deck for the Hawker 800XP includes three EFI-1040 displays.

Hawker 800XP flies with Universal InSight flight deck

by Matt Thurber

Universal Avionics has added the Hawker 800XP to the airframe installations list for its InSight integrated flight deck. The STC for this InSight upgrade was done by Redimec, a Universal Avionics-authorized dealer based in Argentina; Redimec is making the STC available for purchase by other dealers for 800XP upgrades. While Argentina regulator DGAC approved the original STC, it can be converted to a U.S. STC, according to Robert Randall, Universal Avionics director of strategic business development.

The InSight flight deck for the Argentinian Hawker 800XP includes three EFI-1040 displays, dual UNS-1Fw SBAS FMSs with ADS-B Out, one Data Concentrator Unit II, dual touch EFIS control display units (ECDUs) and alphanumeric keyboards, one Reference Select Panel, a UniLink-801 Communications Management Unit (CMU) with a Latitude Technologies Iridium satcom for CPDLC, and a CVR-120 cockpit voice recorder. Synthetic vision system, electronic charts, advanced mapping, own-ship position (including on runway), and autotuning of radios are all features included in the InSight upgrade.

In this 800XP, the InSight flight deck integrates with the existing Collins autopilot and flight director, as well as radios. Radio tuning is done using the InSight Touch ECDU.

"Operators do not need to perform a complete 'rip and tear' of their cockpit to gain the best-in-class capabilities such as data communication and enhanced situational awareness," said Universal Avionics CEO Dror Yahav.

With the new FMSs, satcom, CMU, and CVR, the 800XP can take advantage of modern airspace capabilities, including Aeronautical Telecommunications Network Baseline 1 (ATN B1), ADS-B Out, CPDLC, Data Comm, FANS 1/A+, and LPV approaches. ■

FreeFlight Terrain Series radar altimeters mitigate effects of 5G interference

FreeFlight Systems has unveiled a new series of radar altimeters with "redesigned RF circuitry built to withstand 5G interference." The new Terrain Series RA 5500, RA 6500, and RA 7500 are optimized for heavy rotorcraft, turboprops, business jets, and military aircraft and will be available in October.

Radar altimeters are facing interference problems from 5G terrestrial broadband datalink systems, such as new 5G products. According to FreeFlight, "Decades ago, when the original specification was created for the radar altimetry, the radio frequency (RF) environment was protected." That is no longer the case with new products such as 5G.

In November, an RTCA Special Committee issued a report about the frequency spectrum assigned to 5G applications and warned they could interfere with aircraft radar altimeters. According to the report, the frequency spectrum from 3.7- to 3.98-GHz, which the Federal Communications Commission (FCC) has assigned to upcoming flexible 5G telecommunications applications, may "introduce harmful radio frequency (RF) interference to radar altimeters currently operating in the globally-allocated 4.2- to 4.4-GHz aeronautical band."

FreeFlight's new radar altimeters are designed to withstand 5G interference, including from 5G systems by Ligado that the FCC has approved.

The RA 6500 is designed for Part 29 heavy rotorcraft and features an Arinc 552 interface for integration with older analog indicators. It can also be paired with FreeFlight's RAD45 standalone indicator. For most installations, the new radar altimeters can connect to existing antennas.

Terrain Series radar altimeter specifications include a 25-Hz update rate, frequency-modulated continuous-wave at 4.3-GHz center frequency, altitude range of 20 to 2,500 feet, antenna response angles of up to ±20 deg pitch and ±30 deg roll, and a service ceiling of 55,000 feet. The RA 6500 has received FAA and EASA technical standard order approval and is design-assurance level B-rated, as well as meeting DO-160G environmental and DO-178C software standards.

"The design represents the forward-thinking, future proof technology that FreeFlight Systems is known for," said FreeFlight Systems president and CEO Tim Taylor. "The Terrain family is designed for robust operation in future environments and platforms while offering a simple retrofit path for replacement of older less capable altimeters in service today." **M.T.**

News Update

FreeFlight Gains Approval for Datalink ADS-B Transceivers

The FAA has granted approved model list-supplemental type certificate (AML-STC) approval for FreeFlight Systems' Datalink ADS-B system in more than 400 Part 23 aircraft models, including Beechcraft, Cessna, Cirrus, Piper, and other types. The company plans to obtain STCs for Part 25 aircraft early this year.

Weighing less than two pounds, the Datalink ADS-B transceivers have built-in Wi-Fi for sharing ADS-B In information with panel displays and portable devices. ADS-B In capabilities include receiving free Flight Information Services-Broadcast (FIS-B) weather and Traffic Information Services-Broadcast (TIS-B), as well as information for surveillance applications. The transceivers can interface with TCAS and TAS (traffic systems) and support Ethernet, RS-232, and Arinc 429 interfaces.

For larger aircraft and those operating outside the U.S., the new units are capable of diversity functionality, allowing for top- and bottom-mounted antennas that facilitate better reception, including Aireon space-based ADS-B in areas without ADS-B ground stations.

Honeywell, Curtiss-Wright Certify 25-hour Voice Recorder

EASA has granted technical standard order approval for a new 25-hour cockpit voice recorder (CVR) developed by Honeywell and Curtiss-Wright for air transport category aircraft weighing more than 59,500 pounds (27,000 kg). In addition to recording data, the CVR is also able to transmit data while airborne for flight and maintenance analysis and to speed up post-accident investigations.

The new Class 6 CVR—the Honeywell Connected Recorder-25—meets and exceeds EASA's new 25-hour CVR mandate for that class of aircraft. Equipped with a 90-day underwater locater beacon, the new CVR weighs less than 9.5 pounds, "substantially less than early-generation, rack-based, solid-state recorder alternatives," Honeywell said. It is also a form-fit replacement for Honeywell's HFR-5 CVRs and flight data recorders (FDRs).

King Air C90, E90 Approved for GFC 600 Autopilot

The FAA has approved an STC for installation of Garmin's GFC 600 autopilot in the Beechcraft King Air C90 and E90 models. The upgrade is available now from select Garmin dealers and it can integrate with Garmin G600 and touchscreen G600 TXi displays, the GI 275 flight instrument, and GTN navigators.

In addition to Garmin's Electronic Stability & Protection, the autopilot also offers the LVL button, which returns the airplane to straight-and-level flight. Brushless DC motors in the autopilot servos perform better and have lower maintenance requirements, Garmin said.

Flex is the new Custom Function Display

by Matt Thurber

Mid-Continent Instruments and Avionics has introduced the Flex MD23 Custom Function Display, a new series of forward-fit and retrofit displays that can be customized to fit hundreds of applications.

The Flex display is a blank slate on which avionics and systems engineers and designers can create almost any kind of instrumentation display and control output. According to Mid-Continent, Flex is "a custom display, controller, and data converter, all-in-one."

What is unique about Flex is that Mid-Continent has already obtained FAA certification for the hardware and the software that runs inside the instrument. All that remains is for the customer to work with Mid-Continent's experts on the design of what shows up on the MD23's display and how it interacts with the aircraft, and the result is a much quicker method of adding display functionality and system control into many aircraft types.

Flex comes in two basic hardware platforms, one with pitot-static inputs and one without. The display fits in a standard 2.25-inch instrument panel hole and features daylight-readable, high-definition graphics with a single push-and-turn control knob for the user interface. Hardware certification includes FAA Technical Standard Order (TSO) C113b, C2d, C10c, and C106, and RTCA environmental qualification DO-160G. The software is certified to DO-178C, Design Assurance Level A. Flex can receive and display Arinc 429, analog, discrete, frequency, temperature, and absolute and differential pressure data.

One way to understand what Flex offers is to consider an aircraft that is being upgraded with a lithium-ion battery, for example, the True Blue Power TB40, which requires an indicator in the flight deck. The aircraft could be older and without glass displays or the existing displays can't be modified by the original equipment manufacturer (OEM) to show the battery information without a significant amount of software redesign and certification work.

"We've run into situations where existing displays and systems—the design and control methodology—they can't be changed," said Todd Winter, Mid-Continent president and CEO. "Either the OEM says 'we can't change it,' or they say 'we might be interested but the people who provide our primary flight displays and engine instruments, if we go to them and ask for this, it's going to take forever and it's going to cost a fortune,' and that's understandable.

"That's not the exact reason why we developed this product but it's a good example of why it's needed," he explained. "This is a much more cost-effective way for somebody to add functionality that they feel is important or that is required to certify something new or slightly different on an airframe."

The point is not for Flex to be able to change from one instrument to another in an end user's instrument panel, explained v-p of engineering Brett Williams. Rather, an avionics or MRO shop or OEM can make Flex into whatever type of display and control device is needed, all in a compact and easily retrofittable package. Instead of designing an instrument to do one thing, for example, to be an attitude indicator, then going through all the trouble to certify that specific instrument, a Flex customer can design the instrument and all of its functionality and get it ready to install in a much shorter period of time. This is because the underlying hardware and software of Flex is already certified. All that needs to be approved is the final configuration and installation.

"Flex is a two-part solution: the base hardware and software are fixed, while the configuration and digital display are flexible," he explained. "Each unit is customized through unique Custom Instrument Definition (CID) settings, specific to the application."

The possible applications for Flex are almost endless, and customers could choose a Flex MD23 instrument to perform one function or combination of functions. It could be a radar altimeter display, for example, or cabin pressure indication and controller, an autopilot controller, fuel management display, airspeed or angle-of-attack indicator, air data computer, engine data indicator, or serve many other functions. A creative customer might want to design a clock combined with a density altitude indicator or a landing gear indicator optimized for amphibious operations.

"We've certified all the different possible data inputs," Williams said, "and we've proven the Flex operating system can handle and manipulate those. It doesn't matter what you throw at us as long as it uses the type of data that can be accepted. Then we can manipulate them any way we want. It has this inherent flexibility. We build on the base hardware and software certification."

Once a customer chooses a Flex solution, then it's up to the customer to specify what the display will look like and do. And this may require a supplemental type certificate (STC) for installation in an aircraft.

"The FAA has a multi-layer approval and certification process," Williams explained. "We've been able to certify the design. But to get installation, you'll need an STC or field approval. It's still a secondary layer of certification, to say it fits the intended use and is appropriate and applicable."

Mid-Continent will help customers with that step. "It's a partnership of certification," he said. "The design certification that we've achieved and local authority approval."

Mid-Continent CEO Winter explained that one of the reasons for developing Flex is that there are fewer suppliers making dedicated, specialized indicators. But there is demand for these types of products. "We have companies and operators that need a solution," he said. "We can't get old components, and it's just not economical to go another route. This is what we hope will be an ideal bridge between all those hundreds of thousands of indicators in the aftermarket but also specialty needs going forward for OEMs that need to display something."

"This is the ultimate gauge," said Williams, "with the ability to shortcut the long and expensive process of custom product development. That is the goal behind the genesis of Flex. We've found a way to get something into customers' hands in weeks or just a few months instead of years, and save them thousands, if not hundreds of thousands of dollars." ■

These are just some of the examples of the types of instruments that are possible with Mid-Continent's new Flex Custom Function Display, which fits in a 2.25-inch panel hole and can be adapted to fulfill many different use-cases.

TSO granted for uAvionix tailBeaconX ADS-B Out transponder

The uAvionix tailBeaconX 1090 MHz ADS-B Out transponder has received FAA technical standard order (TSO) authorization. Approved model list STCs for installations are expected in the first quarter, covering a large number of aircraft models, the company said.

The tailBeaconX offers a unique advantage compared with typical light aircraft ADS-B Out transponders because its dipole antenna works with ground- and space-based ADS-B stations, including Aireon's network built into Iridium's new Next satellite constellation. Unless it is a diversity antenna installation (top and bottom fuselage-mounted), light aircraft ADS-B antennas are usually mounted on the fuselage belly for best reception with ground-based ADS-B stations. The tailBeaconX is also much simpler to install as it replaces tail-mounted position lights.

Included in the tailBeaconX are ADS-B Out, SBAS GPS receiver, and rear LED position light, and it meets TSOs that apply to each of those technologies.

"Combining an LED rear position light replacement, a 1090 MHz Mode S [extended squitter] ADS-B OUT transponder, SBAS GPS position source, and a dipole antenna into a single package was a major feat for our team, resulting in major cost reduction to our customers," said uAvionix COO Ryan Braun. "Weighing only 140 grams, taking no critical panel space, while incorporating its own antennas, the path to ADS-B compliance is significantly simplified for a large group of aircraft."

The preorder price is $2,499. The uAvionix AV-30-C multi-mode instrument can control the tailBeaconX and replaces attitude indicators and directional gyros but also displays angle-of-attack, air data, g meter, bus voltage, and GPS navigation. **M.T**

UPS's Airbus A300s currently use flight management computers with only 200 kb of data.

UPS 'futureproofs' A300s with Primus Epic upgrade

by Gregory Polek

UPS expects to extend the service life on its Airbus A300s by at least another 20 years with a project to upgrade their flight decks with Honeywell Primus Epic avionics. Speaking with reporters on a February 8 videoconference, UPS Aircraft Maintenance director of engineering Ed Walton said the upgrade to UPS's 52 A300s will also allow for further operational flexibility, giving pilots more ready access to airports, for example.

"That's the real challenge with the growing databases," explained Walton. "As the airports continue creating more departures and arrivals [and] your database doesn't include [them], you get pretty much kicked out the queue and you have to hold until the airport has time to deal with you. So by doing this, we futureproofed this airplane."

Honeywell calls the "really serious upgrade" to the flight decks a first-of-its-kind endeavor for the A300s, all of which UPS took new from Airbus from between 2000 and 2006.

"We did know when we purchased them that they had an older-generation flight deck that we would have to address at some point," explained Walton. "So we began looking at different options around 2010 and in 2017 we kicked the project off in earnest."

Walton said a desire to address any obsolescence issue until at least 2035 drove the decision to pursue a project of such size. Airbus received EASA approval to perform the upgrades toward the end of last year and since then the team received FAA approval, he added.

Walton further explained that the limitations of the A300's flight management computer (FMC) perhaps most influenced the decision to launch the project. "[The FMC] only had about 200 kilobytes of storage capacity, and that worked okay for the first decade," said Walton. "Even though we only fly the airplane in North America, we were pretty much having to be very stingy with the navigation database that we put into the airplane [and] had to eliminate a lot of airports. Eventually, we had to start splitting the country up into different segments. And so an airplane that would fly, let's say from Newark to Louisville, would pretty much need to go back to the Northeast to be able to fly with the same database. If we needed that airplane to go to Denver, then there's a 45-minute upload to another database."

Another benefit of the new system centers on safety and situational awareness for pilots through the addition of vertical guidance, for example. The new avionics also features predictive wind shear—what Walton called a big enhancement—and TCAS integrated into the displays. "This really brings us into the modern realm in terms of what pilots expect on a new-type aircraft," noted Walton. The new system also uses a central maintenance computer, allowing for the download of status in flight and allowing mechanics the ability to react more quickly.

UPS has entered final negotiations with two MROs, which Walton wouldn't name until the contracts get signed, to perform the upgrades. Plans call for work at the first MRO to start in May and the second in June, he added, in time to complete all 52 airplanes by UPS's peak season near the end of 2022. Walton said he expects roughly a three-week downtime to perform the modification on each airplane.

"We've just been through this similar modification on our 757s, and we're completing a similar modification of our 767s," he added. "That will be done by May. So it's a process we're very familiar with and we're very comfortable we'll hit our timelines." ■

Sriwijaya crash report points to engine thrust imbalance

A preliminary report issued early last month by Indonesia's National Transportation Safety Committee (KNKT) into the January 9 crash of a Sriwijaya Air Boeing 737-500 indicates the airplane experienced an imbalance between the left and right thrust levers as it climbed past 8,150 feet, a minute and 28 seconds before the start of its fateful dive.

After taking off from Runway 25R, the pilots asked for a heading change to 075 degrees to allow them to avoid weather. After air traffic control cleared the change, the airplane began a right turn. ATC then told the pilots to stop climbing at 11,000 feet due to conflicting departure traffic from Runway 25L.

At about 10,600 feet, the aircraft started turning left. About five seconds after the 737 reached its highest altitude of 10,900 feet, the airplane's autopilot system disengaged at a recorded heading of 016 degrees and a pitch angle of 4.5 degrees nose up. The aircraft then continued to roll left to more than 45 degrees as the thrust lever position of the left engine continued decreasing while the right engine thrust lever remained static and the airplane pitched more than 10 degrees downward. The FDR data also recorded the left engine N1 decreasing while the right engine N1 remained unchanged. ATC lost radar contact with the airplane 43 seconds after the FDR recorded the airplane's 10,900-foot altitude. All 56 passengers and six crewmembers died in the crash.

More than a month after the accident, authorities still haden't recovered the cockpit voice recorder.

The preliminary report did not list any suspected contributory factors, and infrared satellite images showed "no significant development of clouds" in the aircraft's flight path.

However, on January 20 Sriwijaya Air's chief pilot issued a notice to pilots to follow operating experience guidance, review training aids, ensure awareness of aircraft position, attitude, and aircraft systems in every phase of flight.

Eight days later Sriwijaya Air's standards, quality, and training division included upset recovery training as part of the training syllabus in the next Line Oriented Flight Training (LOFT) pilot proficiency check (PPC).

In the preliminary report, the KNKT characterized safety actions by the airline and the Directorate General of Civil Aviation (DGCA) as "relevant to improve safety," but that other safety issues remained. Namely, it said the investigation could not find guidance from the DGCA to operators or training organizations on upset prevention training, but only upset recovery training. As a result, the KNKT recommended that the DCGA include guidance for an upset prevention and recovery training (UPRT) program in the Civil Aviation Safety Regulations (CASR). **G.P.**

News Update

Airbus January Deliveries Slip by a Third

Airbus reported on February 5 that it delivered 21 airplanes to 15 customers during the traditionally slow month of January, compared with 31 airplanes during the same month a year earlier. Deliveries last month consisted of three A220s, 12 A320neos, four A320ceos, and a single A350.

This drop falls roughly in line with the one-third decline in deliveries all of last year, when the company said it met targets set in an "adaptation plan" instituted soon after the onset of the Covid crisis. The company also reported no orders for commercial airplanes last month, compared with net orders for 274 aircraft in January 2020.

Singapore Air Prepares To Fly First Boeing 737

Singapore Airlines will fly the first Boeing 737-800NG absorbed from the integration of its SilkAir regional unit on its inaugural mission on March 4 on a route to Phuket, Thailand, SIA Group said on February 4. The company noted the date as it reported a $142 million net loss in its fiscal third-quarter 2021 earnings release. SIA announced its intention to integrate SilkAir with the mainline airline in 2018 ahead of a three-year "transformation plan" designed to ensure the group emerges "stronger and fitter" from the Covid-19 crisis.

Operating a fleet of 185 passenger and cargo jets, SIA now flies only 64 of the airplanes due to Covid-related market suppression. It uses all seven of its freighters and has deployed 24 of its passenger jets on cargo-only services.

New schedules show that the group's total passenger capacity will reach 25 percent of pre-Covid levels at the end of April when it expects to serve some 45 percent of the points to which it flew before the crisis.

Pratt 'Flips' Frontier to GTF

Frontier Airlines' order for Pratt & Whitney PW1100G engines to power 134 Airbus A320neo-family jets represents a "flip" in suppliers not only from CFM International's CFM56s in the airline's classic A320s but from the Leap-1As that power its current complement of A320neos. Scheduled for first delivery next year, the Pratt GTF engines will power 49 A320neos, 67 A321neos, and 18 A321XLRs. Frontier signed the airplane order in November 2017 but hadn't committed to an engine choice at the time. The airline now flies 104 A320-family jets and plans to retire four A319s this year.

One of four airlines in the Indigo Partners portfolio, Frontier joins Volaris in Mexico, JetSmart in Chile, and Wizz Air in Hungary as a Pratt & Whitney customer. Together, the four Indigo Partners' affiliate airlines have committed to 539 GTF-powered aircraft.

Airbus ‘decouples’ Hamburg’s A321XLR production

by Gregory Polek

Airbus plans to begin major assembly of the A321XLR this year.

Airbus has begun parts production for the first A321XLR narrowbody across its sites and wider supply chain, including a new so-called pilot line in Hamburg, Germany, where the company plans to “decouple” major component assembly for the rear fuselage and new rear center fuel tank from the rest of the A320 line. The company said that the pilot line will allow a gradual production acceleration of the A321XLR airliner’s new rear fuselage starting next year “to attain maturity without impacting Hamburg’s existing single-aisle production operations.” Airbus expects major component assembly of the first forward fuselage, center and rear fuselage sections, and wings to start this year as it prepares for service entry in 2023.

While all major sections of the A321XLR contain what Airbus calls significant design changes versus the current A321neo/A321LR baseline aircraft, the center, and aft fuselage present the biggest differences due largely to the new rear-center fuel tank and associated fuel management systems.

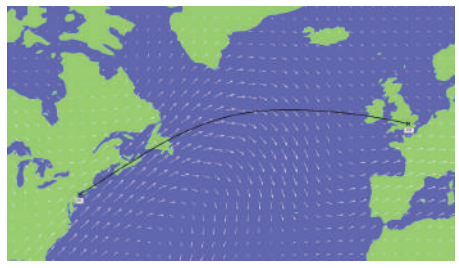
Airbus started the subassembly of the center wing box in mid-November 2020 at its plant in Nantes in France. Once built, the component will go to Hamburg, where Airbus will integrate it with the aft fuselage section.

Meanwhile, Premium Aerotec Group in Augsburg Germany has neared completion of the final parts for the rear center tank and has begun preparing for the rear center tank’s assembly. At Premium Aerotec’s other sites in Nordenham and Varel, various large center and aft fuselage components already have entered production.

Stelia Aerospace has begun parts production for the aircraft’s nose and forward fuselage section. Upon completion, they will go to Airbus’s facilities in St. Nazaire, France, for assembly.

Separately, Airbus’s UK wing plant in Broughton—where the team’s particular focus centers on the A321XLR’s new flap configuration—has begun associated tooling trials for the new ‘movables’ in conjunction with partners Spirit AeroSystems in Malaysia (inboard flap) and FACC in Austria (outboard flap). The wing’s fixed components, such as spars and stringers, continue to take shape in Broughton and in the associated supply chain. Likewise, production has begun for the landing gear components (Safran, Collins, and Triumph); fuel and inerting systems (Collins, Parker Aerospace); and the engine pylons (at Airbus’s dedicated production plant in St. Eloi near Toulouse). ■

SatNav promises greener flying over North Atlantic


An optimized-for-wind route from JFK to Heathrow will result in fuel savings and CO_2 reduction of as much as 2.5 percent.

The advent of full satellite-based navigation over the North Atlantic will allow airlines to fly tracks between Europe and North America far more efficiently than those now organized by UK NATS and Nav Canada, resulting in considerable fuel savings and a dramatic reduction in CO_2 emissions, according to a new research paper appearing in the scientific journal Environmental Research Letters.

The paper’s lead author, Cathie Wells of the UK’s University of Reading, explained to **AIN** that air navigation service providers organize today’s routes primarily to ensure safe operation and, to a lesser extent, take advantage of winds. Airlines request their preferred tracks in the hours before a flight and the ANSPs create a daily track system that reflects the airlines’ wishes as closely as possible.

Wells’s analysis shows how organizing routes optimized for winds and, by extension, the distance flown by aircraft relative to the surrounding air leads to more fuel efficiency and helps airlines meet coming ICAO targets of 2 percent annual reduction in CO_2 emissions.

Recent research has centered on limiting energy output, rather than time. Other strands of route optimization have considered turbulence avoidance and balancing the reduction of climate effects with time of flight. Wells’s paper identifies fuel and emissions savings for transatlantic traffic by calculating the excess air distance flown along the current organized track system (OTS) relative to the minimum air distance route and, therefore, focuses solely on CO_2 reduction. While other cost considerations come into play when deciding on scheduling and flight paths, Wells submits those will become less important once global authorities institute disincentives to emitting carbon.

“I think the most important thing is going to be that you’re going to cut fuel to the minimum and thus cut carbon emissions to the minimum, and I don’t think any airlines are going to argue with that,” said Wells. “At the moment they’re not being fined for the amounts of carbon they’re emitting; there’s a new Corsia [Carbon Offsetting and Reduction Scheme for International Aviation] system that’s coming out where they can do carbon offsetting, but it is very likely that it will not be long before pollution fines start to appear. So they’re going to be all too happy to save money on both fuel and whatever fines come into being.”

According to the study’s findings, the use of wind-optimized tracks would reduce North Atlantic flight times considerably, even compared with today’s most efficient ATM tracks, said Wells.

The study concludes that using time optimization could result in a 0.7 percent to 16.4 percent reduction in air distance through each daily wind field, depending on flight direction and chosen ATM track. Considering the 3,833,701 seats provided between New York and London in 2019 and the amount of CO_2 an economy class return flight between those two cities generates according to ICAO calculations, the use of air-distance-optimized routing results in a 1.7 percent annual reduction in CO_2 for westbound flights and a 2.5 percent reduction for passengers flying east. That amounts to a total savings of 6.7 million kg of CO_2 over a 91-day period. **G.P.**

Qantas sees dawn of Project Sunrise breaking in 2024

Qantas will revisit plans to offer ultra-long-haul flights from the east coast of Australia to markets such as London and New York by the end of this year with an eye toward launching the flights in 2024, airline CEO Alan Joyce revealed last month. Known as Project Sunrise, the plan originally called for a launch in early 2023 of flights between Sydney and London with Airbus A350-1000s. The airline had just gotten ready to place an order for the aircraft before the Covid crisis took hold last spring.

In late 2019 Qantas chose the A350-1000 over the proposed Boeing 777-8X for the missions and indicated it would likely need 12 airplanes. Plans called for Airbus to add another fuel tank and slightly increase the A350-1000’s maximum takeoff weight to give it the required range.

The airline performed three test flights between Sydney and New York/London using a Boeing 787, collecting nearly 60 hours of “Sunrise flying” experience and thousands of data points on crew and passenger well-being.

“We were taking it unbelievably seriously,” said Joyce. “We were literally weeks away from ordering the aircraft. We had done the deal with Airbus, the aircraft was capable of doing it…and we had done a deal with our pilots; 86 percent voted in favor of a new enterprise agreement. So we were planning to order the aircraft and introduce it in 2023.”

Tense negotiations between Qantas and the union representing its pilots, AIPA, centered on so-called productivity and efficiency gains, including the ability to use the same pilots across the A350 Sunrise fleet and the airline’s existing Airbus A330s, in return for 3 percent annual pay increases and promotion opportunities.

“The economics before Covid-19 were very strong,” said Joyce. “Perth-London was the most profitable route on our international network and had the highest customer satisfaction in our network, believe it or not, on the longest route.”

Joyce noted the special position in which Qantas sits for making the economies of scale work for such long-haul flying. “It is a unique opportunity for Qantas because Australia is so far away from everywhere,” said Joyce. “We could apply a fleet with a significant [number] of aircraft that makes it economic, whereas if you’re a BA or a Lufthansa, probably the only place you need the aircraft for is Australia.” **G.P.**

NTSB investigator Carol Horgan examines wreckage during the NTSB's investigation of the crash of the Sikorsky S76B helicopter that killed Kobe Bryant near Calabasas, California.

NTSB: Kobe Bryant's pilot disregarded training

by Mark Huber

Celebrity allure met aviation safety culture and the pilot threw his training out the window. So concluded the National Transportation Safety Board (NTSB) in issuing its long-awaited probable cause finding in the January 26, 2020 crash of a Sikorsky S-76B that killed retired basketball legend Kobe Bryant and eight others near Calabasas, California.

The NTSB found that pilot Ara Zobayan conducted the flight significantly counter to his training likely in an effort to please his celebrity passenger and deliver him to his final destination, even as weather progressively deteriorated during the Part 135 VFR flight. Zobayan, an 8,500-hour IFR-rated pilot and instrument flight instructor, had logged just 75 hours of instrument time and all but 68 hours of that was simulated, the NTSB found. And although the S-76 was equipped with an autopilot, Zobayan did not use it as he attempted to climb through a cloud layer as terrain and ceiling began to converge.

The NTSB concluded that "the probable cause of this accident was the pilot's decision to continue flight under visual flight rules into instrument meteorological conditions (IMC), which resulted in the pilot's spatial orientation and loss of control. Contributing to the accident was the pilot's likely self-induced pressure and the pilot's plan continuation bias, which adversely affected the pilot's decision-making, and Island Express Helicopter Inc.'s inadequate review and oversight of the safety management processes."

In reaching its decision, the NTSB made a number of findings and recommendations, including air traffic control procedures did not contribute to the accident or affect survivability; an internal company risk assessment concluded that the flight was within the company's low-risk category, but, based on scoring, the pilot should have sought input from his director of operations for an alternative flight plan; losing outside visual reference was likely complete by the time the flight began to enter its final left turn prior to impact; flying at excessive airspeed (140 knots) into deteriorating weather conditions was inconsistent with the pilot's adverse weather training and reduced the time available for him to choose an alternative course of action to avoid entering IMC; and continuing the flight into deteriorating weather conditions was likely influenced by a self-induced pressure to fulfill the client's travel needs, the pilot's lack of an alternative plan, and the plan continuation bias, which strengthened as the flight neared the destination.

Recommendations from the NTSB include using appropriate simulation devices and scenario-based pilot training; improve the ability to assess weather and make appropriate decisions; evaluate spatial disorientation simulation technologies for use in training pilots to recognize the onset of spatial disorientation and successfully mitigate it; and establish a pilot data monitoring program for operators that conduct single-pilot operations and have little opportunity to directly observe pilots and the operational environment.

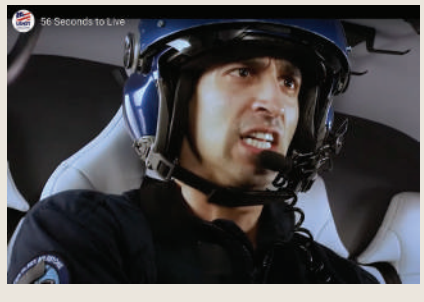
The NTSB also made a series of new safety recommendations and restated some older ones such as using simulators and scenario-based training to enhance pilot decision making with regard to inadvertent entry into IMC (IIMC) and spatial disorientation; mandating flight recorder installation in all turbine helicopters; and mandating flight data monitoring and SMS for all Part 135 operators.

"There are 1,940 Part 135 certificate holders," said Board member Thomas Chapman. "Of those, only 17 have an FAA-accepted voluntary safety management system and another 158 operators whose safety management systems are in various stages of development and have applied for acceptance under the voluntary program. So the level of participation on a voluntary basis on Part 135 operators is thin."

Board member Jennifer Homendy noted that the NTSB has long proposed some of these recommendations. "We've recommended flight data monitoring for 12 years and recommended SMS for 12 years—and recommended recorders going back 22 years." ■

USHST video: 'Fifty-six seconds to live'

A new safety video from the U.S. Helicopter Safety Team (USHST), entitled *56 Seconds To Live*, was released days after the NTSB released the probable cause of the helicopter crash that killed Kobe Bryant and eight others in January 2020. According to the NTSB, this crash resulted after the pilot inadvertently entered instrument meteorological conditions (IMC) and experienced spatial disorientation.



"U.S. accident statistics reveal that a helicopter pilot operating under visual flight rules who unintentionally continues flight into IMC will very likely lose control of their aircraft and be dead within an average of 56 seconds," according to Nick Mayhew, USHST industry co-chair. "We must join industry stakeholders to do everything we can to reverse this alarming and unacceptable trend."

The 56-second time period is based on a USHST study of 221 fatal helicopter accidents that occurred from 2009 to 2019, and the video offers a graphic depiction of how those 56 seconds feel to a desperate helicopter pilot. Unintentional IMC was one of the top causes in 38 of the accidents.

Concurrent with the video release, the USHST announced a *56 Seconds to Live* course, available April 15 on the USHST website. Pilots will be able to complete the free course, which emphasizes critical aeronautical decision-making moments and qualifies for FAA Safety Team (FAAST) credit. **M.H.**

News Update

Offshore Wind Needs $1 Billion Worth Of Helicopters

A new report predicts that the helicopter fleet servicing the offshore wind market will increase by at least 100 aircraft valued at $1 billion between now and 2030. Air & Sea Analytics said the demand will be driven by some 467 new wind projects expected to generate 267 gigawatts (GW) of electric power, a substantial increase over the 33 GW currently produced by offshore wind. The consultancy said mainly light medium and medium helicopters—such as the Airbus H135, H145, and H160, as well as the Leonardo AW169—will be flown to service completed offshore wind turbines but that larger helicopters such as the H175 and Sikorsky S-92 will be needed during construction.

Directional's OneSky Buying Sikorsky's AAG

Kenn Ricci's Directional Aviation Group unit OneSky Flight is acquiring helicopter charter operator Associated Aircraft Group (AAG) from Lockheed Martin's Sikorsky unit, the companies have confirmed. AAG operates 10 Sikorsky S-76 medium-twin helicopters based in the New York City area. The company was founded in 1989, purchased by Sikorsky in 1999, and used to launch the OEM's fractional share program. AAG offers customers a variety of programs including charter, shares, airport transfer, and the "Excalibur Card," which is sold in 10-hour increments.

FAA Weather Cams Coming To Hawaii

Long-awaited FAA aviation weather cameras could soon be up and running in Hawaii. In November, the agency began engineering surveys required for the installation of the first 10 of 23 planned camera systems there. Hawaii's mountainous terrain, rapidly-changing weather conditions, and vexing microclimates often render traditional weather forecasts and reporting of little value. The deficiencies have long been cited as factors in aviation accidents there involving inadvertent entry into instrument meteorological conditions and the resulting loss of control, as well as controlled flight into terrain.

Erickson: Wildfires Are Worse

A senior executive of Erickson characterized 2020 wildfires as "extreme" and warned that future fires are only going to get worse. "We are seeing more fires, higher maximum temperatures, amazing change in humidity, increase in droughts, and increase in wind speeds," said Erick Nodland, Erickson v-p aviation center of excellence. "These longer fire seasons are stressing out companies' abilities to provide aircraft, maintenance, and pilots. The downtimes that we used to have are gone because different parts of the world want more and more firefighting assets."

HAI safety programs help reduce operational risks

by Mark Huber

In the wake of the recently issued high-profile NTSB probable cause report on the helicopter crash that killed Kobe Bryant, the Helicopter Association International (HAI) issued a comprehensive list of programs it produces or supports as part of its "360-degree" approach to safety.

"Most accidents are caused not by aircraft issues, but by people making mistakes, not following procedures, making poor decisions. We can lower the industry accident rate significantly by addressing these human factors," said HAI president and CEO James Viola. "HAI continues to promote a 360-degree approach to reducing accidents, one that addresses culture, processes, and training and the appropriate use of technology to reduce aviation risk. We have the tools to reduce accidents to zero—let's use them."

James Viola, HAI president and CEO

HAI safety programs and tools include HAI Accreditation Program of Safety (HAI-APS), Land & Live, and HAI Aviation Reporting Program (HARP). It has also teamed with the FAA on Maintenance Malfunction Information Report (MMIR) and Rotorcraft Aviation Safety Information Analysis and Sharing (R-ASIAS) programs.

HAI-APS helps operators improve their safety culture, as well as identify the hazards and mitigate the risks inherent in their helicopter mission profiles. Participating operators are required to implement a safety management system (SMS), as well as adopt practices recommended for their specific mission.

Land & Live encourages the use of precautionary landings by helicopter pilots when flight conditions begin to deteriorate for any reason. This program educates pilots about their ability and responsibility to ensure flight safety and provides techniques for making a safe off-site landing. Operators learn how they can support their pilots in good aeronautical decision-making and can proactively pledge to support their decision to "land and live."

HARP, meanwhile, is a free aviation safety reporting portal that promptly directs users to the most appropriate reporting source for accidents, drone events, near–midair collisions, laser events, wildlife strikes, or other aviation hazards. The portal is used to generate data for agencies and organizations that oversee aviation safety.

The MMIR simplifies the process of submitting numerous FAA and warranty claim forms related to potential maintenance safety issues. Since its development in the 1980s, 476 operators and 766 individual users have submitted 136,800 reports through the application. HAI is working with the FAA to assess industry gaps and upgrade the tool to properly address current and future safety issues.

R-ASIAS takes de-identified data voluntarily contributed by operators that is then shared with researchers for additional insights on operational safety.

HAI and other industry partners have also designed a number of safety tools. This includes the customizable Flight and Maintenance Risk Assessment Tool (FRAT) developed with NGFT Solutions that is used by 609 operators and 857 individuals to mitigate risk. To date, users have submitted 29,687 reports through the application. The tool is currently being expanded into an expansive suite of free, customizable safety tools optimized for mobile and offline use.

Also developed in partnership is the Aviation Safety Action Program (ASAP) for rotorcraft operators slated for rollout in March. HAI worked with the Air Charter Safety Foundation to develop the ASAP, which is targeted at small operators and provides third-party support for the reporting of aviation hazards and events.

In addition, HAI offers a number of outreach and education programs. The Spotlight on Safety (SOS) campaign, which provides third-party support for the reporting of aviation hazards and events, falls under this segment.

Likewise, the HAI Safety Awards recognize helicopter operators, pilots, and maintenance professionals who demonstrate a commitment to safety while successfully sustaining accident- and violation-free operations during the preceding calendar year. HAI also annually recognizes industry professionals with the Salute to Excellence Safety Award for their outstanding contributions in the promotion of safety and safety awareness.

HAI also organizes a program of 50-plus free safety education sessions during its annual Heli-Expo conference under its Rotor Safety Challenge. Many of these sessions are approved for FAA Wings and AMT continuing education credits.

Further, the association's UPAC Safety Guide for Operators focuses on best practices for power-line construction, utility patrol and inspection, and related maintenance operations. It also provides guidance to utilities in selecting qualified contractors for these highly technical operations. ■

NTSB chief pushes for more helicopter IFR

During the February 9th hearing into the fatal loss-of-control helicopter crash that killed Kobe Bryant and eight others last year, NTSB chairman Robert Sumwalt characterized the accident pilot's decision to continue the VFR flight into instrument meteorological conditions (IMC) as "SLOJ" or "sudden lack of judgment." During the hearing, Sumwalt stressed the need for passenger-carrying Part 135 operators to develop and maintain IFR proficiency and for wider use of scenario-based training. **AIN** spoke to Sumwalt after the hearing and posed questions concerning Part 135 helicopter operations and safety. It should be noted that the pilot in this accident held a helicopter flight instructor-instrument certificate and was qualified to fly in IMC.

NTSB chairman Robert Sumwalt.

Why do you think some pilots who fly VFR into IMC have such a problem getting on the instruments and avoiding loss of control?

Helicopters are inherently unstable. If you let go of something, that helicopter is going somewhere, and maybe not where you want it. But we see this in both fixed-wing and helicopter accidents. You are better off with a well-trained, proficient IFR pilot who is flying legally in an instrument route system that can accommodate them as opposed to staying down low or punching into the clouds [VFR]. Which would you rather have? Somebody who is scud-running in a hilly area—or anywhere—or would you rather have someone who is competent, qualified, and certified to be flying IFR, where they are receiving the radar separation they need and have the terrain clearances that are in accordance with the TERPS [terminal instrument procedures]. We've seen so many accidents where people are trying to remain VFR and then get into inadvertent IMC.

Then should all Part 135 helicopter operators be required to have IFR-rated pilots?

We did recommend that all helicopter air ambulance operators have IFR-rated pilots, and that was incorporated in the 2014 FAA rule. But I don't believe that all helicopter pilots should have an instrument rating. If you are strictly doing things like logging or law enforcement, it is not needed. But my personal opinion is that when you start carrying passengers for hire such as on-demand charters, I do think it would increase the safety margin. The problem arises when you are flying VMC and get trapped into going IMC. The 2014 rule requires Part 135 helicopter operators to demonstrate competence in recovering from IIMC [inadvertent entry into IMC]. But that did not help in this particular crash. It never hurts anybody to have strong instrument skills. It's never a bad thing.

Along those same lines, should all Part 135 helicopter operators be required to fly with autopilots?

I don't think so. We recommended it for single-pilot air ambulance operations and I can extrapolate that to the world of Part 135 when you are carrying passengers for hire.

Given the difficulties inherent with operating low-level IFR in congested airspace and the frequency of the marine layer and its impact on helicopter VFR operations in the Los Angeles area, would the NTSB support installing weather cameras in the Los Angeles basin similar to Alaska and Colorado?

We've not specifically called for weather cams in the L.A. basin; however, we do know that they have been effective and well-received in the state of Alaska. We have called for the FAA to evaluate a low-altitude IFR route structure and once they've evaluated it to implement it. We issued those recommendations coming out of our helicopter air ambulance recommendation package in 2009. We closed those out as "unacceptable" because the FAA didn't respond.

During the hearing, you talked a lot about safety management systems. Is it realistic to expect widespread SMS adoption before the FAA promulgates a final rule on this?

I don't think that people should wait for the FAA mandate to proceed with this. The operator in this accident had an SMS but we found that it was not as robust as it could have or should have been. The president of the company said he wasn't very involved in it. Safety culture has to start with the senior leadership of the organization. If it doesn't start there, it may not start at all. **M.H.**

Atlantic Aviation has added more than 1,000 sq ft to its FBO terminal at Las Vegas McCarran International Airport, part of a $22.5 million renovation and construction project.

Atlantic Aviation Wraps Up Vegas FBO Renovation

Atlantic Aviation has completed a major renovation at its Las Vegas McCarran International Airport FBO. The $22.5 million project spanned 18 months and included the addition of a 25,000-sq-ft hangar capable of sheltering the latest flagship business jets with 5,150 sq ft of adjoining office and shop space.

That brings the facility, one of two FBOs at the gambling destination gateway, to 152,200 sq ft of hangar space. In addition, the company built a 3,700-sq-ft designated charter terminal. That building served as a temporary terminal for nearly a year while construction took place at the two-story primary terminal, which was enlarged, bringing it to a total of 31,500 sq ft with the newly-added space. Once the work was completed, the FBO relocated back into its regular facility, which includes amenities such as conference rooms, pilot lounges with shower facilities, Wi-Fi throughout the entire facility, concierge, and an on-site deli. Meanwhile, the charter terminal is now being rented to a tenant.

"Completion of this project provides our stakeholders with premier facilities that match our uncompromising commitment to customer service, making Atlantic Las Vegas one of the best FBOs in the United States," said Jay Hamby, the company's senior v-p of operations for the Midwest region.

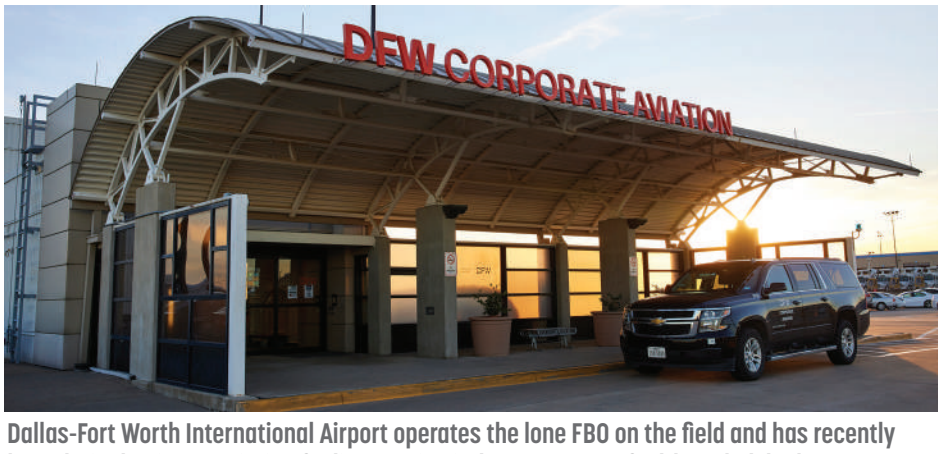
DFW FBO Joins Avfuel Network

DFW Corporate Aviation, the airport board-operated sole FBO at Dallas-Fort Worth International Airport (DFW), is the newest member of the Avfuel network. The airport took over the business aviation fueling operation last September after fielding complaints that the incumbent into-plane fueling service provider was not responsive enough to unscheduled operators, leading some major private aircraft operators to warn crews about long waits for fueling.

As a result, the FBO acquired a pair of 5,000-gallon tanker trucks and trained its staff to handle the fueling for the private aviation traffic, which in pre-Covid days would equate to 50 flights a day, according to airport manager of corporate aviation Stephen Courtois. He said on-demand fueling requests are now responded to "immediately." Now operating as a full-service FBO, "We're able to fill an important need for the corporate aviation community at one of the nation's largest airports," Courtois added.

Located in a former regional airline terminal on the northeast corner of the field, the FBO features a pilot lounge, snooze room, business center, 10-seat conference room, refreshment bar, and passenger lobby. On-field U.S. Customs is available, along with rental cars and shuttle service.

The location, which is staffed daily from 5 a.m. until midnight, has no aircraft shelter. However, Courtois told **AIN** that airport officials are thinking about building hangars to enhance its private aviation business.



Dallas-Fort Worth International Airport operates the lone FBO on the field and has recently brought its business aviation fueling service in-house as an Avfuel-branded dealer.

Carver Adds Third Iowa FBO

Carver Aero, which operates a pair of FBOs in Iowa, will make that a trio with the acquisition of Advanced Air, the lone service provider at Council Bluffs Municipal Airport. In addition to the 7,800-sq-ft FBO terminal, the purchase includes Advanced Air's flight school as well as its aircraft charter, maintenance, and avionics operations, according to Lisa LaMantia, the company's former owner who will join the Carver team and continue to manage the facility.

"Carver plans to expand that service, which will result in better-paying careers including [for] flight instructors, charter pilots, maintenance crews, and avionics technicians," she said.

The company, which was approved by the airport authority, is now in negotiations on a new long-term lease, according to authority executive director Andy Biller. "Carver plans to make our airport a magnet for our community and for a new breed of customers, as well as a nationally-known place for a stop-over and to refuel," he said.

Carver has gained experience as a sole-source service provider, operating the lone FBOs at Davenport and Muscatine Municipal Airports.

Carver Aero is growing a chain of Iowa FBOs with the acquisition of Advanced Air at Council Bluffs Municipal Airport. That marks its third location in the Hawkeye State.

New GA Customs Facility Debuts at Cincinnati Airport

Cincinnati/Northern Kentucky International Airport (CVG) has improved Pg-Touchingbases_v5.indd its arrivals processes for international general aviation flights with the opening of a new U.S. Customs and Border Protection (CBP) facility.

Located in the Wheels Up Jet Center, the lone FBO on the field, the $1.2 million, dedicated general aviation facility was paid for by the airport. Adjacent to the terminal, the facility is operated by CBP officers and is staffed daily from 8 a.m. until 10 p.m., with after-hours service as-available.

"This new facility provides updated technology and a secure location for our officers to simultaneously complete our anti-terrorism mission and give the public better access to these necessary services," said Richard Gillespie, Cincinnati's port director. "With this modernized general aviation facility, we will enhance public safety while continuing to support legitimate trade and travel."

Gillespie told **AIN** that before the opening of the new facility, GA clearance was performed in an ad hoc basis at the airport with some flights being rerouted to other entry ports. The new CBP facility will now standardize the procedures, he said.

"This was an important project for CVG as it expands the U.S. Customs clearance capabilities at our airport, benefiting private jet travelers and making CVG even more efficient and accessible," added airport CEO Candace McGraw.

Jetex To Manage Falcon Aviation FBO in Dubai

Global aviation services provider Jetex has signed an agreement to manage the Falcon Aviation FBO and hangar at Dubai Al Maktoum International Airport.

Considered one of the world's largest private aviation terminals with more than 32,000 sq ft of passenger lounge space, it offers a dedicated crew facility equipped with a lounge, resting area, workstation, and shower facilities, refreshment bar and coffee lounge, conference rooms, prayer rooms, duty-free shops, on-site immigration and customs service, newly-added en-suite bedrooms, and a kids club. The location is also one of the first in the region to offer helicopter charters, linking Dubai and Abu Dhabi in 30 minutes.

Jetex will also manage the facility's climate-controlled Code-F hangar, one of the largest in the Middle East, as well as administer its more than three acres of ramp space. Dubai-based Jetex already occupies 16,146 sq ft of space in the airport's VIP terminal, with an additional 12 acres of dedicated ramp parking space.

"I'm pleased to sign the management agreement with Falcon Aviation, which will cement our position as a one-stop solution in the world of private aviation," said Jetex founder and CEO Adel Mardini, adding the company's customers will benefit from the enhanced passenger facilities in the terminal. ■

Gulfstream Aerospace will increase maintenance and completions capability at its Appleton, Wisconsin service center with a 180,000-sq-ft expansion.

Gulfstream To Expand Appleton Completions

Gulfstream Aerospace is expanding and renovating its completions facility in Appleton, Wisconsin, as part of a larger effort to modernize its facilities and enhance customer support.

The Savannah, Georgia-based airframer will add more than 13,000 sq ft to its completions hangar at Appleton International Airport, bringing the facility to 126,500 sq ft. Along with the expansion, Gulfstream expects to add 200 new jobs.

Gulfstream expects the project to be completed in the third quarter. This follows a previous expansion of the Appleton MRO facility just two years ago.

F/List Acquires ACC Columbia's Bizjet Seat Division

Aircraft interiors specialist F/List has acquired ACC Columbia's upholstery operations in Erfurt, Germany, enabling ACC to focus on business jet MRO services while expanding F/List's capacity and strengthening its service network in the Europe, Middle East, and Africa region. In addition to the acquisition, F/List will partner with ACC for cabin refurbishments.

Part 147 AMT School Rule Sees Significant Changes

Revamped Part 147 regulations governing aviation maintenance technical schools in the U.S. will update language and standards that are more than 50 years old, while aligning schools' curriculum with mechanic Airman Certification Standards, freeing them from FAA curriculum approvals. Those and other changes to Part 147 were the topics of an hour-long webinar hosted by Helicopter Association International

Under the new final rule, publishing of which is called for by March 27, the regulator will now assess a program's quality based on student test performance and, in the case of nationally accredited schools, will defer oversight of all educational elements to the Department of Education. It also will more easily allow schools to provide off-site training, including online, as well as establish competency-based programs that don't have any seat time or credit hour requirements.

Bombardier Partners with StandardAero

Bombardier reached an agreement with MRO provider StandardAero to bring expanded engine and APU services for Challenger and Learjet customers at its London Biggin Hill and Berlin facilities. Under the agreement, StandardAero will have dedicated technicians available at both locations providing capabilities from engine borescope inspection to on-condition engine disassembly and repair, along with troubleshooting and repair of recorded engine squawks.

The agreement enables the facilities to provide a full range of services encompassing engine, airframe, and APU work, Bombardier said. It will offer all-inclusive pricing options for these services, the company added.

MecanAir Adds Full Mx Credentials for Daher Aircraft

Switzerland's MecanAir, already an authorized Kodiak service center, has been awarded similar credentials for the TBM series turboprops by Daher. Tarbes, France-based Daher, which also owns Kodiak, said the addition of the TBM to MecanAir's factory maintenance authorizations underscores its integration of the two turboprop product lines.

MecanAir is based at Ecuvillens Airport near Fribourg, with maintenance workshops at the Swiss airports of Yverdon-les-Bains and Grenchenand. The EASA Part 145 MRO provider specializes in maintenance and repair of aircraft weighing less than 12,500 pounds, as well as overhaul of turboprop engines and accessories.

DC Aviation Expands Bizjet Wheel Mx Capabilities

DC Aviation has expanded the wheel shop at its Stuttgart, Germany airport maintenance center by 828 sq ft (77 sq m) and added new equipment in a move that will allow it to repair and maintain main and nose gear wheels of larger business jets.

Included in the expansion was the addition of two bead breakers to detach the rubber from rims of various sizes, a rim washing machine, a sand-blasting cabin, and a hydraulic lift.

Textron To Offer ACA System in Larger Jets, King Airs

Textron Aviation will offer Aviation Clean Air's (ACA) cabin ionization system as a retrofit to the Cessna Citation Latitude, Sovereign, and Excel/XLS/XLS+, as well as 300-series Beechcraft King Airs. The Wichita airframer will install the system at its service centers and plans further development to retrofit the system in its other aircraft models.

API Names Volare Aviation Authorized Winglet Installer

Oxford, UK-based Volare Aviation completed its first retrofit of Aviation Partners blended winglets on a Hawker 800XPi and was appointed an authorized installation provider for the Hawker 800 series in Europe.

Duncan Expands Honeywell Legacy Platform Capabilities

Duncan Aviation has entered into an agreement with Honeywell Aerospace in which the MRO provider manages the sales, exchange, and repair services for specified Honeywell avionics content, flight controls, electronic flight control instruments, air data, and attitude heading reference units on legacy platforms found on business jets, turboprops, and rotorcraft. It builds on Duncan's credentials as a Honeywell-authorized service center and channel partner, adding more than 2,000 part numbers on nearly 100 airplanes and rotorcraft.

A Kodiak 100 and a TBM 930 in front of the MecanAir facility at Ecuvillens airport in Switzerland.

Modern Aviation Wilmington Adds Avionics Support

North Carolina-based Modern Aviation Wilmington has added avionics repair and installation to its Part 145 repair station operations, which the company said fully rounds out its four decades of maintenance capabilities at Wilmington International Airport.

Also, Modern Aviation has been tapped as a Garmin avionics dealership and added an Airtext dealership.

ExecuJet Haite Marks Milestone Legacy 650 Inspection

ExecuJet Haite Aviation Services China has marked a milestone by completing the first 96-month inspection of an Embraer Legacy 650 in China. The inspection, which lasted eight weeks and encompassed 3,000 man-hours of labor, was completed on time and with limited effect from Covid-19 logistical challenges, the Embraer-authorized service center announced.


ExecuJet Haite's 96-month inspection of an Embraer Legacy 650 lasted eight weeks.

Included in the inspection was the removal of the aircraft's interior for an examination of the super-midsize jet's structure, as well as detachment of the forward and ventral fuel tanks, wing leading edges, flaps, landing gear, and flight controls.

JetSupport Makes Tracks Outside the Netherlands

JetSupport Amsterdam has opened a maintenance facility at Oberpfaffenhofen Airport in southern Germany that will carry full EASA and FAA line station approvals. Calling it a new chapter in the 19-year-old company's history, the facility represents JetSupport's first expansion outside of The Netherlands. Oberpfaffenhofen puts JetSupport close to customers in Munich, as well as the rest of Europe. ■

by David Jack Kenny

PRELIMINARY REPORTS

Pilot of Crashed Citation Lacked Type Rating

CESSNA 560 CITATION V, JAN. 9, 2021, 14 MILES SOUTHEAST OF PINE GROVE, OREGON

The pilot of a Citation V that crashed into the Mutton Mountains on the Warm Springs Indian Reservation did not hold a type rating for the airplane, though he was rated for the Learjet and Grumman G-111 Albatross. Historical flight data and statements from acquaintances suggest that the accident took place on his first solo flight in the Citation. He was killed after the airplane spiraled down in a one-mile radius right turn from FL310 to the accident site at an elevation of 3,600 feet, a descent that took eight minutes. The owner of a training facility in Arizona told investigators that while the private pilot had taken a Cessna 560 transition course in late 2020, he "had not performed to a level sufficient to be issued a type rating or single-pilot exemption."

The accident occurred 30 minutes into an IFR flight from Troutdale, Oregon, to Boise, Idaho. Prior to takeoff, the pilot initially failed to read back his taxi clearance; after the handoff to Portland Approach, the pilot acknowledged clearance to climb to 15,000 feet but missed multiple calls from both Portland Approach and Troutdale Tower assigning a heading change. He then missed the next radio call and turned 15 degrees too far left when cleared to his next waypoint, putting him on a direct track towards Mt. Hood at an altitude of 12,000 feet.

After a handoff, Seattle Center issued a low-altitude warning and a clearance to climb to FL230. The pilot initially read the next frequency back incorrectly. After making contact, he was cleared to FL370. Climbing through FL270, the airplane began drifting right. The pilot did not respond when advised that he was now 30 degrees right of course. The Citation continued to climb until it reached FL310, when it began its eight-minute right spiral downward. Weather did not initially appear to have been a factor.

Five Killed in South African Air Ambulance Accident

BELL 430, JAN. 21, 2021, BERGVILLE, KWAZULU-NATAL, SOUTH AFRICA

Two doctors, a transplant nurse, and a flight paramedic were killed when their helicopter crashed en route to pick up a critically ill patient for transport from Hillcrest to Johannesburg's Netcare Millpark Hospital. The pilot was also killed when the ship went down in an open field, igniting grass fires that the local fire department extinguished. News photographs from the scene show the helicopter's tail boom separated from its fuselage, but do not make clear whether that occurred before or after collision with the ground.

FINAL REPORTS

Otter Breakup Caused by Fatigue Fracture

DE HAVILLAND DHC-3 OTTER, OCT. 26, 2019, LITTLE GRAND RAPIDS, MANITOBA, CANADA

A fatigue fracture in the right lift strut's outboard upper lug plate led to an overload fracture of the inner lug plate, causing the strut to detach from the right wing and the wing to separate from the airframe. The pilot and two passengers were killed when the floatplane broke apart on approach to a water landing on Family Lake. Metallurgic analysis found that the fracture originated on the inboard side of the lug's bolt bore hole and propagated outwards. Both its location and the typical lack of visual evidence of fatigue cracking would have made this difficult or impossible to detect during the standard visual inspections mandated by the current holder of the airplane's type certificate, Viking Air. The TSB's report noted that "Non-destructive testing methods, such as the use of eddy current, or dye penetrant inspection, could detect these cracks," but were not mandated by the inspection procedures in effect at the time.

The 1957-model airplane had accumulated 16,474 flight hours. Its last 100-hour inspection had been completed 77 hours prior to the accident. The right-wing strut assembly had been replaced in 1998 with a new unit manufactured in 1954 but never previously installed. It had a service life of 20,000 hours, of which 8,747 hours remained.

In response to the accident, Transport Canada issued AD CF-2020-20, making compliance with the inspection procedures of Viking Air Alert SB V3/0011 mandatory for all DHC-3 lift strut assemblies with more than 2,500 hours time in service.

Air Force Crew Shut Down Wrong Engine

BOMBARDIER GLOBAL EXPRESS (USAF E-11A), JAN. 27, 2020, BAGRAM, AFGHANISTAN

A U.S. Air Force Accident Investigation Board (AIB) concluded that the crew of the E-11A that crashed in Bagram Province mistakenly shut down the airplane's right engine in response to the failure of the left engine. The twin-engine jet, a military variant of the Global Express, was operating as a Battlefield Airborne Communications Node, relaying voice, images, and data between other air and ground forces. The flight also served as the copilot's third Mission Qualification Training sortie.

During a climb from FL420 to FL430 while in orbit just west of Kabul, a blade broke free from the left engine's N1 first-stage fan and was ingested, causing catastrophic damage contained within the cowling. The engine's FADEC computer immediately shut it down. The cockpit voice recorder captured a loud bang and then stopped functioning due to severe vibrations logged by the flight data recorder. Ten seconds later, the crew retarded both throttles halfway, advanced and then retarded the left, and advanced the left again while pulling the right back to idle. Nine seconds after that, the right engine's run switch was turned off. The flight data recording ended 17 seconds later, about 45 seconds before the crew alerting system's red "DUAL ENGINE OUT" warning is believed to have illuminated.

The AIB report notes that the airplane was about 17 nm from Kabul International Airport, 28 nm from Forward Operating Base Shank, and 38 nm from Bagram Air-Field, putting all three within gliding distance. However, in their initial mayday call its crew stated that they were "proceeding direct" to their base at Kandahar Airfield some 230 nm southwest. It's assumed that they attempted several restarts while descending on that heading but were unsuccessful. Thirteen minutes after the failure, they announced their intention to land at FOB Sharana, but they came up 21 nm short, touching down in an open field crossed by three-to-six-foot berms and ditches. The airplane was destroyed and both pilots killed when it struck a berm.

The mission commander was a current E-11A instructor and evaluator pilot. His 4,763.9 hours of military flight experience included 1,053.3 in that model, 504.2 of which were as an instructor. The copilot had logged all of his 27.6 hours of E-11A time within the preceding 30 days, receiving his basic qualification 10 days before the accident. His 1,343.5 military flight hours included 755.1 as a T-6 instructor.

"Ambiguous" Temporary Lighting Faulted in Undershoot

BEECHCRAFT 200, JULY 9, 2020, CAIRNS, AUSTRALIA

The crew of a Royal Flying Doctor Service (RFDS) King Air 200 mistook the reflection of the safety car's headlights from traffic cones marking the works limit line of the Runway 15 construction zone for that runway's displaced threshold, leading them to touch down short of the actual threshold. The King Air's right wheel struck and broke a unidirectional runway end light marking the temporary departure end of Runway 33, which as required was masked to make it invisible to traffic arriving from the north. Damage was limited to scuff marks on the tire.

The threshold of Runway 15 had been displaced 6,089 feet for ongoing repaving and grooving work, leaving 4,265 feet available. The runway was generally closed at night during construction but available to the RFDS by prior arrangement. After departure on the homeward segment of a three-leg patient transport flight, the pilot advised air traffic control of their expected arrival in Cairns around 0013 local time. Cairns Tower subsequently radioed the duty airport safety officer (ASO). After checking the runway, taxiway, and displaced threshold lights, the ASO drove to the holding point on Taxiway B3, angling his car's headlights about 45 degrees from runway orientation to the traffic cones, which were fitted with retroreflective bands the ASO described as lighting up "incredibly brightly...[with] a bright white light extending across the runway." The pilots aimed to touch down two runway edge lights beyond what they took to be the threshold, and the ASO saw them land about 200 feet too short.

Closed-circuit footage showed that the runway edge lights were extinguished prior to the displaced threshold, suggesting that the pilots were referencing taxiway edge lighting instead. After the incident, the airport replaced the cones with non-reflective equivalents, barred directing vehicle headlights at the active runway during aircraft operations, and disabled all airfield lighting short of the displaced threshold.

Wrong Engine Shutdown Triggers Helicopter Fatal

AIRBUS BK117 C2 HELICOPTER, SEPT. 8, 2017, HERTFORD, NORTH CAROLINA

The NTSB has concluded that the fatal Sept. 8, 2017 crash of an Airbus BK117 C2 air ambulance occurred after the pilot shut down the No. 1 engine after the No. 2 engine began to fail. The board added, "The complete loss of engine power likely occurred at an altitude and/or airspeed that was too low for the pilot to execute a successful emergency autorotative landing."

Operated by Air Methods, N146DU crashed near Hertford, North Carolina, at 11:20 a.m. local time en route to the Duke University Medical Center, killing all aboard including the pilot, both flight nurses, and the patient.

The NTSB investigation found that "neither engine exhibited damage consistent with rotation at time of impact." An NTSB review of maintenance records found that oil tests on the No. 2 engine in the nine months before the accident revealed that the "metallic contaminants" detected in it, while within manufacturer specifications, were at levels that were "considerably higher" than the No. 1 engine and that "The oil test evaluation procedures did not include steps to monitor trends of contaminant concentration levels over time. If the engine manufacturer's procedures had included appropriate trend monitoring criteria, the impending bearing failure in the No. 2 engine might have been detected and mitigated." ■

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Jetex movements up 150% in second half of 2020

by Peter Shaw-Smith

Dubai-based international FBO operator Jetex saw business grow 150 percent at its business aircraft terminal at Dubai South in the second half of 2020 and hopes to launch three new facilities in the Asia-Pacific region in the next 18 months. "Business is growing; due to COVID, people [are looking] to private aviation," Jetex founder and CEO Adel Mardini told **AIN**. "It's a solution. Private aviation used to be an accessory. Now, it's a necessity."

Mardini said on some days, Jetex has had 80 to 90 daily movements with an average of five passengers per aircraft. On January 10, for example, Jetex handled 85 flights. "Usually, we do 25 to 30," he said. "I expect in December 2021 to have more than 1,200 flights, which is good business."

In September, he hypothesized to **AIN** that three out of 10 flights taken by Middle East-based first-class airline passengers were migrating to business jets, but claimed this trend was growing. "Sometimes, five out of 10 trips will be on business jets," he said. "It depends. When people fly private, especially for the first time, they [continue]. I don't see them going back to commercial."

The exception to that is the effects of the UAE-Israel peace deal, which led to a sudden upsurge in commercial traffic. "We have had a few Israelis pass through the Dubai FBO," he said. "After the launch of commercial flights, we don't see them anymore." Mardini added that there are 50 commercial flights a week between Israel and the UAE.

Besides Jetex, Dubai's FBOs include Jet Aviation, DC Aviation Al Futtaim, and ExecuJet. Falcon Aviation handed over management of its VIP Terminal FBO to Jetex, which has a new designation and function, he said.

"Falcon's FBO is now managed by us as a crew lounge. We signed an agreement in November to manage their facility. The FBO and the hangar at Dubai South will be under our management. We now [operate] three lounges: our two, plus Falcon's. We are now managing 75 percent of the entire VIP facility. In Dubai South, we have 34,000 square feet of lounges, making it the biggest such facility in the world."

This year, Mardini is looking to expand Jetex's Asia-Pacific footprint, a region where he said he was negotiating for three new facilities. Jetex opened a new FBO in Singapore in October, after signing a deal with Bombardier Aerospace Services Singapore.

The Singapore FBO—Jetex's 33rd—is another marquee site to add to its FBOs in Paris, Dubai, and Marrakech. "It's the first flagship in Seletar Airport. Business jets there...did almost 10,000 flights in 2019," he said.

Under Jetex's partnership agreement with Bombardier at Seletar, Jetex will handle any aircraft coming to Bombardier's MRO or Singapore in general. "My target is 30 percent market share this year, and I'm sure I will get it," Mardini said. "I have very solid communications with all the operators. Once the market opens, they will shift to us."

The timing of its FBO at Seletar is ideal, he noted, with organizers of the World Economic Forum moving the event this year from Zurich to Singapore. "This is the first time in Davos's lifetime that the event will take place outside Switzerland," Mardini explained. "We hope to handle [a third] of the movements at the event."

In other developments at Jetex, the company's proprietary Global Trip Management (GTM) software is now fully operational. Mardini said Jetex had many clients and more than 400 aircraft on call. Some 80 percent of its business is charter, although it also has major owner-operator clients in smaller numbers.

"I will have a solid [GTM] system by the end of this year," he said. "It will be a solution for any operational inquiry. As a Global Jet, Jet Aviation, VistaJet, or NetJets salesperson, once you book a flight, you log it in our system. I want these companies to outsource their operations to us, to depend on us." He added that VistaJet is exclusive to Jetex in all locations where his company has FBOs. "We have a good relationship with VistaJet, and mutual support is strong." ■

by Gordon Gilbert

Within 6 Months

March 31, 2021

EASA: Sim, Training Updates

Application of new rules updating flight simulators and training requirements has been postponed to March 31, 2021 because the Covid-19 pandemic led to significant delays in the update process. Enacted in December 2019, the requirements were originally scheduled to apply starting August 20. The new mandate addresses approach-to-stalls; upset prevention and recovery; engine and airframe icing effects; and developing and deploying an instructor operating station feedback tool.

March 31, 2021

EASA: Maintenance Licenses

This proposal from EASA aims to facilitate the maintenance license type-rating endorsement for certain legacy aircraft, enhance the efficiency of on-the-job training, and update the basic knowledge syllabus. In addition, the proposal provides a solution for maintenance licenses with regard to new products without adding a new license type. Comments are due March 31, 2021.

May 31, 2021

EASA: Ditching Survivability

Improving the ability of occupants to survive a water impact from a helicopter ditching is the subject of a NPA from EASA. The NPA would revise type certification standards for both small (Part CS-27) and large (Part CS-29) rotorcraft by requiring several design improvements. In addition, this NPA also proposes enhancements to certification specifications for new ditching and emergency flotation provisions. Comments are due May 31, 2021.

June 2, 2021

U.S.: Aircraft Fuel Truck/ Farm Fire Standards

The National Fire Prevention Association (NFPA) has proposed the installation of automatic shutdown systems on aviation fuel trucks and fuel farms. The NFPA standards, typically adopted as requirements by regulatory agencies, would apply to in-service trucks and fuel farms, as well as for new equipment. In-service equipment would need to be retrofitted by June 2, 2021.

Within 12 Months

Nov. 4, 2021

Runway Surface Format

In response to the Covid-19 pandemic, ICAO has delayed for one year the applicability date of the new global reporting format (GRF) for assessing runway conditions to Nov. 4, 2021.

Dec. 2, 2021

Australia: Flight Operations

Ten new flight operations regulations consolidate the operating and flight rules, as well as certification and management requirements. The rules apply to all pilots and operators in Australia and will commence on Dec. 2, 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.

Beyond 12 Months

Sept. 16, 2022 and Sept. 16, 2023 **NEW**

FAA: UAM Remote ID

New FAR Part 89 requires that after Sept. 16, 2022, no unmanned aircraft can be produced without FAA-approved remote identification capability. After Sept. 16, 2023, no unmanned aircraft can be operated unless it is equipped with remote ID capability as described in Part 89 or is transmitting ADS-B Out under Part 91. A person operating an unmanned aircraft without remote identification must always operate within visual line of sight and in an approved FAA-recognized identification area.

Dec. 31, 2022

New Zealand: ADS-B Out

Covid-19 pandemic implications have prompted New Zealand to extend its ADS-B out compliance date for one year from the previous deadline of Dec. 31, 2021. The ADS-B provisions, already mandatory for aircraft flying above 24,500 feet, will apply in the rest of New Zealand's controlled airspace by Dec. 31, 2022.

Jan. 1, 2023 and Jan. 1, 2028

U.S.: Aircraft CO2 Standards

The first U.S. standards for CO_2 aircraft emissions have been enacted by the EPA and initially apply to large subsonic jets, including business jets, that weigh more than 132,277 pounds mtow for which the application for a new type certificate is made on or after Jan. 11, 2021. The standards apply to all other new jet design applications made on or after Jan, 1, 2023 and to new deliveries of in-production large jets starting Jan. 1, 2028. Jets with an mtow under 12,566 pounds, turboprops below 19,000 pounds mtow, and piston-engine airplanes are exempt.

For the most current compliance status, see: https://www.ainonline.com/aviation-news/compliance-countdown

by Kerry Lynch

DR. SUSAN NORTHRUP

ALEXANDRIA COLINDRES

BEN NICHOLSON

TOM KELLER

LAURA HELTEBRAN

The Biden Administration selected **A. Bradley Mims**, who had been president of the Conference of Minority Transportation Officials, to serve as FAA deputy administrator. Mims has a 40-year background in transportation, serving at the FAA and the Department of Transportation during the Clinton Administration and holding roles with the Mid-Atlantic Laborers' Employers Cooperation and Education Trust, Parsons Brinckerhoff, and Booz/Allen/Hamilton.

The *FAA* appointed **Dr. Susan Northrup** as the federal air surgeon. A private pilot and retired U.S. Air Force colonel, she previously has served as acting deputy federal air surgeon and senior regional flight surgeon and also has held leadership roles on the American Board of Preventive Medicine, the U.S. delegation to NATO's aeromedical working group, the American Society of Aerospace Medicine Specialists, and the Civil Aviation Medical Association.

The Registry of Aruba named **Alexandria Colindres** CEO. She succeeds the company founder and her father **Jorge Colindres**, who remains executive chairman and CEO of the Aruba Registry's parent, Aviation Registry Group of Companies. Alexandria Colindres has served with the registry for eight years, beginning in public relations and most recently as COO.

Mike Skow, who is CEO of *Omni Aircraft Sales*, *Omni Air Transport*, and *Omni Aircraft Maintenance*, has become a partner in the business. Skow has served with the Omni group of companies for 14 years, beginning as a first officer.

Boom Supersonic brought **Kathy Savitt** on board as president and chief commercial officer and **Joe Massaquoi** as chief financial officer. Savitt, a founder of change management consultancy Perch Partners and Alaska Airlines board member, has served as a Boom adviser. Massaquoi formerly was CFO of Initium Aerospace. Boom further added three board members: **Ray Johnson**, also a Boom adviser and former senior v-p and chief technology officer for Lockheed Martin; **Michael Marks**, a founding managing partner of WRVI Capital and co-founder of construction technology company Katerra; and **Jacqueline Reses**, former head of Square Capital and chief development officer at Yahoo.

Gary Spulak retired from his role of president of *Embraer Aircraft Holding* in North America after a 37-year career with the Brazilian airframer. Spulak, however, will remain on the board of Embraer Aircraft Holding, Eve Urban Air Mobility Solutions, and the Embraer Foundation, and will serve as a senior advisor.

Spartronics named **Annette Cusworth** senior v-p and CFO. Cusworth has more than 30 years of financial experience, previously with electronics manufacturing services company Creation Technologies.

Mandy Richards was appointed CFO of *Epic Fuels* and *Signature Select*. Richards has served with Epic affiliate Signature Flight Support since 2012 and most recently as senior director of business process management.

CAE named **Ben Nicholson** v-p of Washington operations. Nicholson, who has 21 years of experience, previously was v-p of global government relations for Honeywell International and also has served as v-p of government affairs for L3 Technologies.

Tom Keller was promoted to chief technology officer for *King Schools*. Keller joined King Schools in 2005 to run the internal technology department and has taken on software development, software quality assurance, and technical support roles.

Laura Heltebran joined *Wheels Up* as chief legal officer, responsible for legal, corporate governance, privacy, IP, compliance, and risk. Heltebran previously was senior v-p and deputy general counsel at Hilton Worldwide and before that had senior v-p roles at Hewlett Packard, Enterprise, and Xerox.

The Air Charter Association added two board members–**Derek Thomson** and **Emily Williams**. Thomson is commercial director and accountable manager for Air Charter Scotland Europe. Williams co-founded the private aviation consultancy IW Aviation.

JetHQ appointed **Sanjeev Choudhary** as v-p of sales for Asia. Choudhary brings 15 years of aviation sales experience to his new role, most recently as president of business development for Arrow Aircraft in New Delhi.

Kyle Schultz joined *Ross Aviation* as v-p of operations. Schultz previously was president and CEO of MLS Courier and also has served as president at Network Global Logistics. In addition, **Marilyn Vela** a 30-year industry veteran, most recently regional sales manager for Signature Flight Support, was named as Ross's director of network sales.

Mente Group named **Jamie Buff** director of technical services. Buff has held roles with Cessna Aircraft and Wachovia Bank Flight Operations in addition to serving with the U.S. Air Force.

Honeywell Aerospace promoted **Laura Pogue** to senior account manager of Boeing aircraft defense programs. Pogue joined Honeywell Aerospace in 2019 in strategic operations and planning, and before that launched an online educational technology company.

Tina Barnes was promoted to national client account leader for *CAE*. Barnes joined CAE in 2001 as a sales representative. In addition, **Tom Cushman** was named regional sales manager for the Central region and **Tina McCarthy** regional sales manager for the Northeast region.

Matthieu Rosanvallon joined *Freestream* as director of sales and acquisitions. Rosanvallon formerly was sales director for the Mid-Atlantic for Guardian Jet and also has served with the commercial real-estate firm Coalition.

Elliott Aviation promoted **Roger Woolums** to engineering manager. Woolums joined Elliott Aviation in 1998 after working in the U.S. Navy as an avionics technician.

GlobalParts named **Jamie Breth** Part 145 manager of its Aero Services repair station. Breth, a U.S. Air Force veteran, joined GlobalParts in October 2017 after serving with Wescon Controls and spending 16 years in various roles with Bombardier Aerospace.

PHI Americas appointed **James Maner** as chief pilot. Maner also has served as chief pilot and director of training for Bristow.

West Star Aviation promoted **Todd Rasch** to quality/accountable manager in East Alton, Illinois. Rasch, who spent eight years as chief inspector at West Star, has more than 35 years of aviation experience, beginning with the U.S. Air Force as a jet engine mechanic and also including with Midcoast and Avmats.

MySky hired **Erica Da Veiga** as a sales manager within the European team. Da Veiga brings more than a decade of private aviation experience, including as a founding partner of Vertis Aviation as well as head of charter sales at Comlux Aviation and partner and managing director at Glaronia Aviation.

Duncan Aviation appointed **Troy Nail** airframe service sales manager for its Lincoln, Nebraska, and Provo, Utah, facilities. Nail, who served in the U.S. Army, joined Duncan in 2001 and most recently was an airframe service sales representative with Bombardier. ■

FINAL FLIGHT

Earle Plain Martin III, a charter operator who became a champion of the Mitsubishi MU-2 turboprop twin, passed away on December 31 after battling Covid-19. He was 65.

Dubbed by a colleague as "Mr. Mitsubishi," Martin had devoted a significant amount of time to speak publicly about the attributes of the MU-2 after it came under criticism and urged fellow operators to take industry-wide product surveys, leading to Mitsubishi earning top ratings. He also highlighted safety and training throughout these campaigns, according to obituary information from the Houston Chronicle.

Born in Houston on Aug. 14, 1955, Martin attended Vanderbilt University and then received a law degree from the University of Texas. He initially joined the firm of Vinson & Elkins. However, his love of flying led him to become a charter pilot and launch Personal Air Charter.

Martin teamed up with another charter business owner and eventually joined that operation, Mid-Coast Air Charter. In 1996, he acquired that business and along with it, its MU-2. That launched his decades-long advocacy for the aircraft.

Cresful William "Cress" Horne, Jr., who founded U.S. Helicopters as a college student and turned it into a nationwide company supporting the film, television, and a range of other industries, died on December 18 at the age of 61 in Marvin, North Carolina.

Horne established U.S. Helicopters in 1979 while still a student at Wingate University, according to his obituary information. The company began in a barn in Marshville, North Carolina, originally flying crop dusting missions and supporting aerial surveys of land and timber. U.S. Helicopters evolved into providing helicopter services for film and TV news, along with aerial surveys. In addition, it ventured into charter, maintenance, sales, and a range of other support activities.

Horne became a noted aerial director, pilot, and technical director of films with credits including *The Fugitive, Nell,* and *The Gingerbread Man*, among many others. Horne ultimately returned to the Carolinas to expand U.S. Helicopters.

Lindell "Fred" Shrum, a long-time pilot and aviation business leader, passed away at the age of 75. Born in Dixon, Illinois, Shrum spent most of his life in the Washington, D.C. area. A Vietnam veteran, he served in the U.S. Navy on the aircraft carriers Yorktown and Bonne Homme Richard. Following his service, he became a pilot, flying Learjet and Fokker aircraft. He also owned a number of aviation services companies, including East Coast Airways, North American Aircraft, North American Jet Sales, and Crown Aviation, according to his obituary information. ■

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DAN SCHWINN
FOUNDER AND CEO
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DIRECTOR, BUSINESS AVIATION
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WHAT THE AUDIENCE WILL LEARN:

- The many challenges of flight deck obsolescence in legacy business jets
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