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Advanced Air Mobility sector finds a home at NBAA-BACE

by Matt Thurber

Developments in the new advanced air mobility (AAM) sector are accelerating, aided by new sources of funding, raising the question of how traditional business aviation and AAM will fit together.

At NBAA-BACE, October 12-14 in Las Vegas, exhibitors will be seeking answers to these questions at the show's dedicated AAM & Emerging Technologies Zone. Despite the proliferation of AAM start-ups, just five eVTOL aircraft developers will be present, touting their varying designs.

Although Airbus appears to have shifted its future propulsion priorities to plans for hydrogen-powered airliners through its ZeroE program, it may also bring an eVTOL to market, possibly through its Airbus Helicopters division.

Last year, Boeing closed its Boeing NeXt advanced technology incubator, which had been the fulcrum for its work on eVTOL

aircraft. However, the company still is committed to the AAM sector and is a 50 percent shareholder in eVTOL developer Wisk, along with Kitty Hawk, which is exhibiting at the show.

XTI Aircraft has previously exhibited at NBAA shows and clearly views the business aviation sector as part of the target market for its hybrid-electric TriFan 600 VTOL aircraft. In June, the Colorado-based company announced a joint venture with Xeriant Aerospace through which it aims to bring the model to market by the end of 2024.

Jaunt Air Mobility is developing a family of VTOL aircraft and expects to start test flights with a full-scale prototype in 2023 and achieve production in 2026.

Samad Aerospace recently completed hover tests with the second subscale prototype of its hybrid-electric eStarling eVTOL aircraft.

Noticeable by their absence from the NBAA show are apparent eVTOL aircraft front runners (in terms of funding and progress with development work) such as Joby, Archer, Vertical Aerospace, Volocopter, and Lilium. ■



Read Our **SPECIAL FEATURE**

Bizav Cybersecurity

Business aviation remains vulnerable to cybersecurity threats, and airborne connectivity providers and other companies have developed ways to prevent security breaches.

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XTI Aircraft is one of five eVTOL companies exhibiting at this year's NBAA-BACE. Its \$6.5 million TriFan 600 hybrid-electric aircraft is designed to carry six to nine passengers on flights up to 750 miles in vertical takeoff mode or 1,380 miles when taking off horizontally.

Engines

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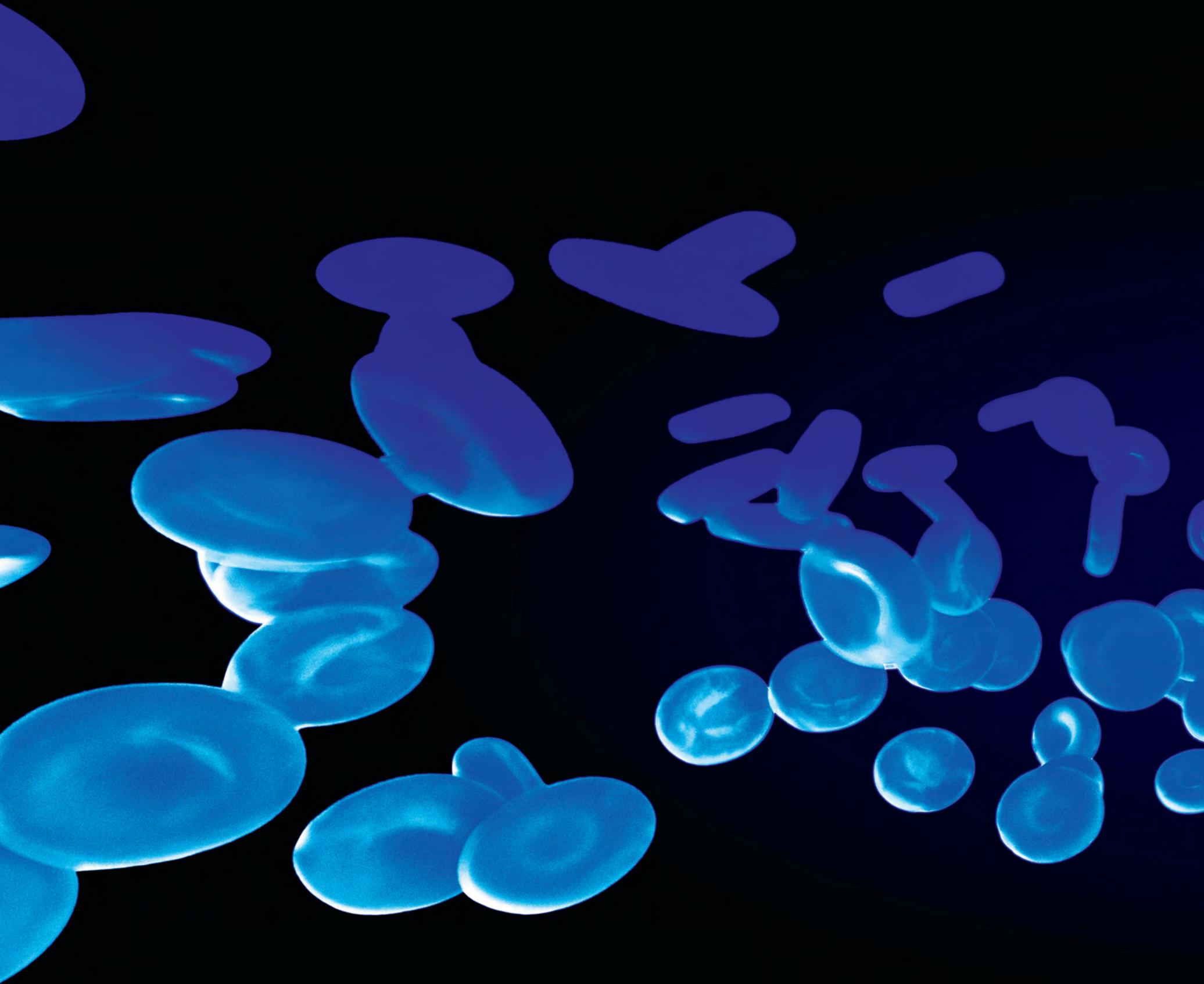
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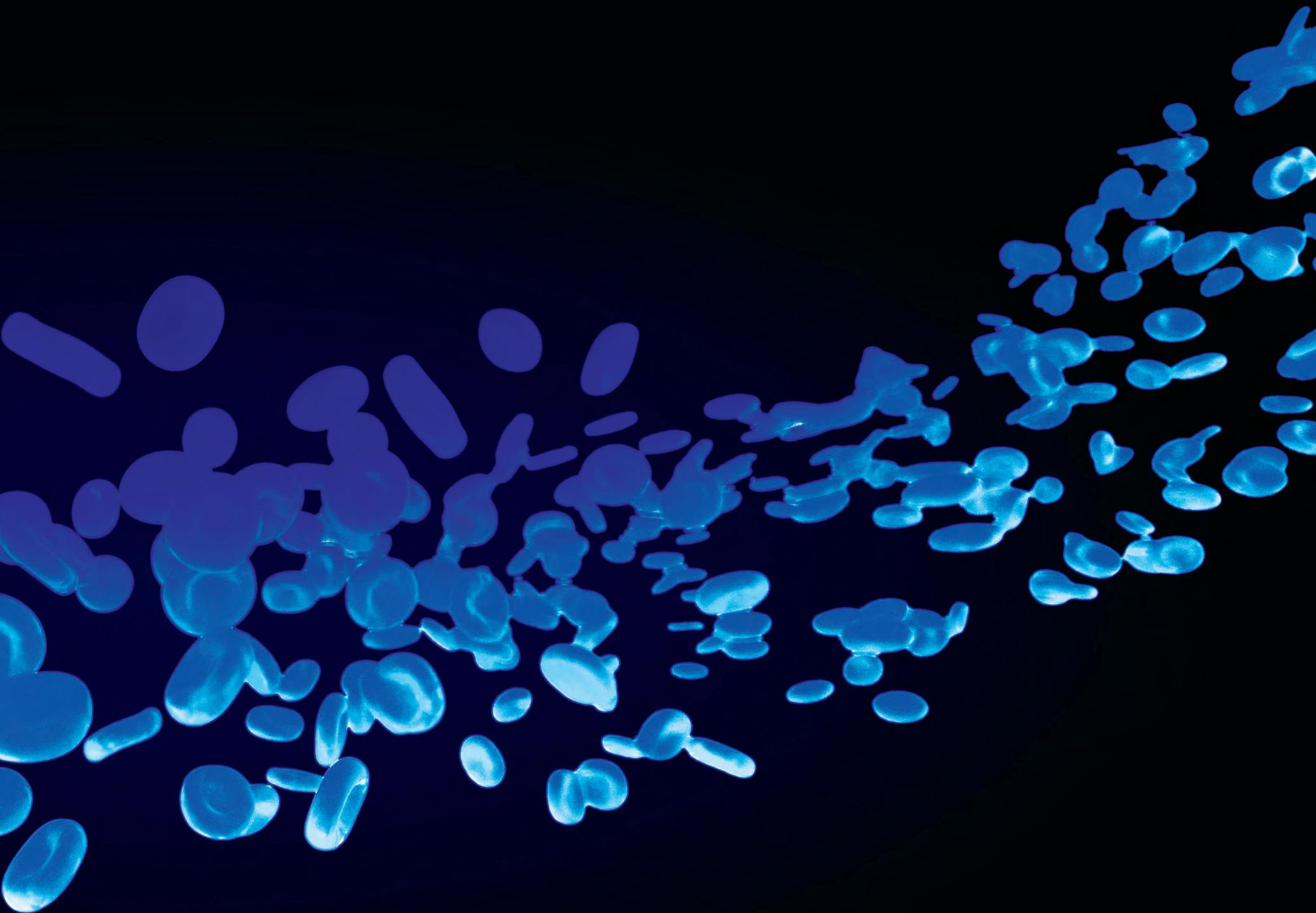
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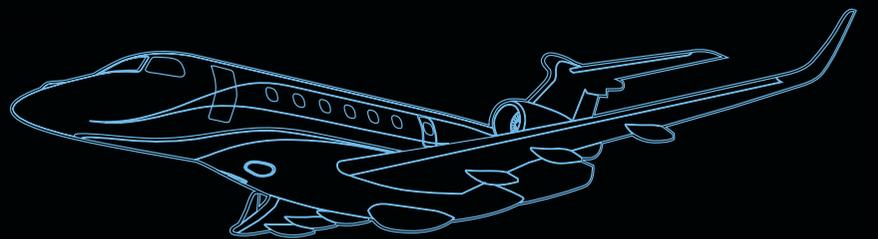


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As We Go To Press

JETNET FORECASTS 'ENDURING RECOVERY' FOR BIZAV

JetNet's 2021 iMarket Report predicts "an enduring business aircraft recovery," with deliveries of 8,529 new business jets worth \$245 billion over the next decade. The report forecasts 718 business jet deliveries this year, up 15 percent from 2020, and a 7 percent increase in 2022. Based in part on surveys with owners and operators, the forecast reflects the highest level of optimism since JetNet began measuring customer sentiment more than a decade ago, said JetNet iQ managing director Rolland Vincent. More than 80 percent of respondents reported they are likely to buy a new business jet in the next five years.

BOMBARDIER TRANSITIONING LEARJET PLANT

Bombardier is creating Wichita as a center of excellence for Learjet as it transitions its facilities and employees there from production to maintenance and support of the line of light and midsize jets. In February, the Canadian manufacturer announced it was ending Learjet production. With more than 2,000 still in service, Bombardier executives stressed that the company was not abandoning the brand, but instead expanding its support efforts. Bombardier is planning to hand over the final Learjet early next year, but the transition in Wichita is already underway with hangars being shifted to its support and other activities.

SEEKING AN FBO THAT HAS SAF? 4AIR'S GOT A MAP FOR THAT

Aviation sustainability solutions provider 4AIR has introduced the first interactive sustainable aviation fuel (SAF) map depicting the fuel's distribution for business aircraft operators. The map currently shows approximately 20 verified locations worldwide with supplies of SAF available for general aviation customers. It will be continually updated as announcements are made and verified. As the number of SAF distribution points increases, 4AIR can offer benefits to its private jet operator members by assisting with uplift documentation tracing and providing calculations for emissions reductions through programs such as CORSIA. According to 4AIR president Kennedy Ricci, "This map is the best single way for aviators to find this climate-beneficial fuel. And by making it easier to find SAF, we hope to promote its use and expand its availability."

ZENITHJET ADDS BIZ AIRCRAFT COST-MANAGEMENT PROGRAM

Business aircraft consulting firm ZenithJet has rolled out a cost-management program for business aircraft owners and operators. Dubbed Aviation CFO, the program helps reduce

aircraft operating costs by benchmarking against real-world data. ZenithJet uses data generated by sister company Elit'Avia, an aircraft management and charter provider, along with additional industry databases to provide "highly-reliable comparative data" on business aircraft services. Aviation CFO provides analysis of recurring expenses, including fuel, handling, parking, maintenance, hangarage, insurance, crew salaries, and other operational costs. It also offers an analysis of aircraft programs and warranties to ensure maximum coverage, as well as negotiation of aircraft maintenance proposals and final costs.

INDUSTRY GROUP TO EXAMINE GROUND HANDLING SAFETY

NATA has launched the Ground Safety Alliance (GSA) as a collaborative, industry-led, data-gathering body that will work to raise the bar on aircraft ground-handling operations and reduce incidents. While injuries arising from these incidents are rare, "hangar rash," towing mishaps, and ground vehicle-aircraft collisions often result in costly aircraft damage. "Data is critical for aviation business success and has been used to improve safety in aircraft operations for years," said Michael France, NATA's managing director for safety and training. "The GSA will provide the foundation for ground-handling operators and other industry stakeholders to collaborate on the collection, analysis, and distribution of safety data and intelligence." The alliance will include FBOs, aircraft operators, safety consultants, and other parties.

LUXAVIATION AND SHELL PLAN JOINT INVESTMENT IN NEW FBOs

Luxaviation and Shell Aviation will jointly invest in new FBO locations, adding to their existing shared network of outlets through a new strategic alliance. However, the companies did not provide details as to where new FBOs might be established but indicated that the fuel group and the business aviation services provider expect to expand their combined operations and product portfolios globally.

CLAY LACY COMMITS TO ELECTRIC AIRCRAFT INFRASTRUCTURE

California-based FBO operator Clay Lacy Aviation has signed an agreement with Eviation Aircraft, developer of the all-electric Alice airplane, to provide electric charging stations at all of its locations. The partnership makes it one of the first service providers to declare it will install the equipment required to support the operation of electric aircraft. Clay Lacy, which also operates a fleet of charter aircraft, has FBOs at Van Nuys and John Wayne Orange County Airports in California, with another slated to open next year in Connecticut.

UK charter operators not happy over Brexit changes

by Charles Alcock

During a session on September 14 at the Air Charter Expo (ACE) conference at London Biggin Hill Airport, the UK charter industry lamented the country's departure from the European Union (EU). Under Brexit, UK operators have needed to obtain country-specific permits for charter flights into the EU since January.

"The permit system has been a nightmare, and January was the worst month of my career," David Lacy at UK-based charter operator RVL Group told ACE attendees. The situation has somewhat improved since then with some block permit arrangements now in place for countries such as France, Ireland, and Italy.

Third and Fourth Freedom rights to and from the EU. This is a major achievement for the regulator, which, following the end of the Brexit transition period on December 31, was the only country to offer this flexible arrangement. Renewal of the three-month permit on April 1 was conditional on a reciprocal arrangement being in place with the EU states.

"The UK was way ahead of the curve with these block permits; unfortunately, many EU countries were slow to replicate the arrangement," said Bernhard Fragner, founder and chief executive of Austrian charter company GlobeAir. "After a lot of pressure from 20 Austrian operators, our



Air Charter Association CEO Glenn Hogben welcomes attendees to this year's Air Charter Expo at London Biggin Hill Airport, which featured more than 60 exhibitors and some 20 aircraft.

"But for other countries it has been crazy," Lacy complained. "We've had to work with arrangements from a bilateral agreement going right back to 1956. Since January, we've only been able to fly one intra-European flight [for Covid-related logistics work]. We used to do flights like that all the time [pre-Brexit] and while it's now a bit better, we're by no means where we'd want to be."

Mark Bosly, chief air services negotiator with the UK Department of Transport (DfT), said charter companies cannot expect to operate as they were pre-Brexit. "The rules have changed; you are now regarded as a foreign operator within the EU."

He noted, however, that the UK government is "working hard" to help ease the operating burden through bilateral arrangements with each of the 27 EU member states. So far the DfT has secured a memorandum of understanding (MOU) with 15—including France, Germany, Belgium, and the Netherlands—to provide Fifth Freedom rights for cargo operations, said Bosly. He expects more MOUs to follow before year-end.

The UK Civil Aviation Authority (CAA) has also secured more than 200 block permits for UK non-scheduled passenger operators from the EU 27 that allow

civil aviation authority was persuaded to put a reciprocal arrangement in place for UK operators by the end of March."

Fragner said GlobeAir has conducted more than 1,600 flights to the UK since January "and we are now getting used to the new system."

Fragner's views were echoed by Leigh Westwood, director of operations for Luxaviation UK, but he pointed to the need for a much smoother and more streamlined permit process. "It can be difficult to get permissions at very short notice, with some states insisting on a lead time of days rather than hours," he said. Given the strongest selling points for business aviation are convenience and flexibility, Westwood argued, these situations are "very frustrating, forcing us to turn down business."

Westwood also noted that some states "interpret the rules differently and can be inflexible." He singled out Greece for criticism: "It is refusing access to its islands for UK-registered aircraft under Third and Fourth Freedoms, which is incredibly frustrating during the summer months."

Mosely acknowledged Westwood's concerns and said while there is "no silver bullet," the DfT, through regular contact with the EU member states, will "strive to address these concerns." ■

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Bombardier adds 3500 to Challenger family

by Kerry Lynch

On September 14, Bombardier unveiled a new look and branding for its venerable Challenger 300/350 family that brings it in line with the Global nomenclature, borrows from some of the high-end interior features from its flagship Global 7500, and adds new equipment, including an autothrottle.

Revealed during an event at its facilities in Montreal that featured a mockup in the bronze and gold livery used during the Global 5500/6500 launch, the Challenger 3500 builds on the 350 and eventually will replace it on the production line, the company said. Nearly 250 gathered for the rollout event that drew local and industry leaders, customers and the leadership and board of Bombardier, including chairman emeritus Laurent Beaudoin and chairman Pierre Beaudoin.

“We wanted to make sure we embedded a lot of the newer technology that people expect these days in their cars and their home—such as wireless charging,” said Laurence Casia, manager of industrial design and cabin innovation. “There’s a lot of amenities that are becoming expectation but are still rare in business aircraft. So, we’re introducing a lot of those features. And we really wanted to emphasize comfort, but not just for comfort sake, but also for productivity.”

This approach is particularly important for “concept” buyers—the non-fleet owners—and new buyers coming into the market, he said.

For comfort, Bombardier is bringing in its hallmark Nuage seats—first introduced in the Global 7500 and later into the Global 5500 and 6500—into the



Bombardier's Challenger 3500 will be available in the second half of 2022, bringing new features such as autothrottle, wireless charging, and sustainable materials to the Challenger line.

Bombardier president and CEO Éric Martel, who joined the current chairman in the formal launch ceremony, said the 3500 “features all the best-selling elements of the Challenger platform—impressive performance, consistent reliability, exceptional smooth ride—while elevating the cabin experience for our customers.”

To be available in the second half of 2022 and offered at the same \$26.7 million list price of the Challenger 350, the 3500 will introduce features such as voice-controlled cabin management features and wireless charging.

The 3500 will retain the engines, avionics, and performance of its predecessor super-midsize business jet. But the new Safe Flight autothrottle will ease control and pilot workload, said Mathieu St-Cyr, manager of sales engineering.

Bombardier took a holistic approach to the cabin considering comfort, the connected passenger, wellness, styling, and sustainability, the company said.

Challenger 3500 but designed them to fit a super-midsize cabin. The seats use a patented tilt link system to provide a deep recline position for additional comfort, as well as a “floating base” for ease of movement and tilted headrest.

Offered in a four double-club configuration or with an optional divan replacing two of the seats, the Challenger 3500 Nuages are contoured, taking away the “boxy” look found with traditional business jet seats and providing a feeling of wider aisles. The seats also were shaped to enable the passenger to curl their feet underneath, which Casia said is a more natural approach for customers to sit.

The divan is fitted with pull-out drawers at either end that can be used for storage of drinks and snacks. The drawers are positioned so the passenger can easily open without having to struggle to reach down.

Bombardier redesigned the forward galley, incorporating features such as a see-through wine cooler and crystal holder showcased as passengers board.

The workspace was altered to enable a large espresso machine along with an oven, that can be hidden behind a tri-fold door. In addition, new soft-close drawers with pulls make them easier to open.

The cabin management system incorporates new capabilities such as voice-activated controls for everything from lighting to sound and media that can play on 24-inch, 4K displays. Voice activation works through a CMS app on passengers’ personal devices. Meanwhile, the wireless charging pads are folded into side ledges adjacent to the forward-facing seats.

In addition, Bombardier is incorporating an approach to the sound system borrowed from the Global 7500 that includes controls that will enable a “sweet spot” sound experience that is optimized around where a passenger is seated.

On the wellness side, Bombardier is lowering the cabin altitude by 2,000 feet, to 4,850 feet, at FL410, marking a 31 percent improvement. This was accomplished through reviews of technical materials and testing but also a reinforcement of the bulkhead.

As for sustainability, Bombardier is marking its second full aircraft Environmental Product Declaration (EPD) with the Challenger 3500. It obtained its initial EPD for the Global 7500 in June 2020, marking a first in business aviation. Third-party verified to international ISO standards, the EPD discloses detailed environmental information about a product’s lifecycle, such as CO₂ emissions, noise, water consumption, and other key environmental impact indicators.

Flight testing on the newest Challenger 3500 cabin is carbon neutral through the use of sustainable aviation fuel and carbon offsets.

Bombardier further is offering an eco app for the Challenger 3500 developed by SITA to enable flight crews to optimize flight plans to reduce fuel burn. The app will use data from the aircraft’s health monitoring unit, which comes standard on the 3500.

Notably, Bombardier is also employing the use of more sustainable materials in the cabin finishings. This includes veneers from eucalyptus trees, which grow faster and require less water. Other examples are the use of “upcycled” wool and polyesters that are reclaimed from manufacturing processes. Still others are under evaluation such as the use of flax and hemp in materials.

At the same time, Bombardier folds in curves in the lines throughout the cabin as a nod to the Challenger winglet and incorporates the look and feel of high-end automobiles.

The 3500 will retain a number of the enhancements that Bombardier has made to the Challenger 350 since its introduction into the market in 2014. This includes double-layering of insulation for a quieter cabin, head-up display and enhanced vision on the flight deck, a performance package that enabled the aircraft to fly 1,500 nm farther out of short runways, and optional Ka-band connectivity. ■

News Briefs

Falcon Jet Group Formed

Dallas-based aviation entrepreneur Sean Lynch has founded the Falcon Jet Owners and Operators Association as a way for people flying Dassault business jets to exchange information and keep their aircraft in service longer. Lynch owns MRO-focused business aviation companies Engine Assurance Program and Marklyn Jet Spares and is also the president of the Love Field Pilots Association. “Our objective is to provide a way for members of the Falcon Jet community to talk to each other, both in person and online,” said Lynch. He added that the new organization plans to work in collaboration with Dassault Falcon and is not meant to be a replacement for factory technical or troubleshooting support.

New Fractional HondaJet Provider Launches in U.S.

Volato has launched a U.S. fractional share program featuring the HondaJet Elite S. The Atlanta-based company received its first aircraft in August and has already sold shares in it. An additional HondaJet is slated to join its fleet in December, and according to Phil Michaels, the company’s chief strategy officer Volato expects to receive the balance of its 10-airplane order by the end of 2022. Volato manages all aircraft maintenance, fees, and flight operations, while owners simply schedule flights through the company’s app. In addition to the five-year ownership packages ranging from a 1/16 share (\$350,000) up to a full aircraft, the company offers flights for as low as \$2,450 per hour, including fuel, and owners can earn up to \$1,250 per hour on flights used by non-owners.

King Air 260/360 Get EASA TC

Textron Aviation’s newest Beechcraft King Air variants, the 360/360ER and 260, have won EASA type certification. Both variants, which are already FAA approved, feature a Collins Aerospace Pro Line Fusion flight deck equipped with Innovative Solutions & Support’s ThrustSense autothrottle, a digital pressurization controller, and Collins’s MultiScan RTA-4112 weather radar. The 260 also includes newly designed seats created originally for the King Air 360 to provide greater passenger comfort on longer flights.

KKR Invests \$40 Million More in Jet Edge

KKR will invest an additional \$40 million in Jet Edge International to support the growth of the charter operator’s technology and infrastructure, aircraft fleet, and Reserve membership program. It follows a \$150 million credit facility from KKR to support the launch in June of the company’s AdvantagEdge charter management program, which recently added 27 aircraft. With the additional preferred equity investment, Jet Edge will continue its initiatives to optimize its scheduling system and make advancements in artificial intelligence-based programs to maximize fleet efficiency.



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Held at the Vnukovo-3 FBO in Moscow, this year's Russian Business Aviation Exhibition hosted a dozen aircraft, including a Falcon 8X and two Hawkers, with the largest a B757.

Moscow's RUBAE show forges on during pandemic

by Vladimir Karnozov

The 15th edition of the Russian Business Aviation Exhibition (RUBAE) opened at Moscow Vnukovo Airport on September 8, albeit with a smaller footprint than previous shows thanks to the pandemic. The three-day event was held at the Vnukovo-3 FBO after skipping last year due to the Covid-19 outbreak.

RUBAE 2021 saw the number of exhibiting companies with stands dropping below 40 and the number of aircraft to a dozen, showing a considerable reduction to pre-pandemic times. Still, organizer Russian United Business Aviation Association (RUBAA) decided to run the show to commemorate the Vnukovo Airport's 80th anniversary.

Participation of the Western manufacturers was a shadow of previous RUBAE shows, with only two foreign-registered aircraft on display—a Dassault Falcon 8X

and Pilatus PC-24. The latter was on display inside the only exhibition hall along with two turboprops—a Piaggio P.180 Avanti II (operated by Russia's State Air Traffic Management Corp.) and a Piper Meridian.

The largest aircraft on display was a Boeing 757-200 purchased earlier this year by Russia's Azur Air from the Four Seasons hotel network. Azur Air, which is controlled by Turkey's Koçkar family, intends to use this airplane configured for 72 business-class travelers on charters organized by tour operator Anex Tour Group, which serves Turkey, the UAE, and the Maldives.

Also on display was a VIP-configured Tupolev Tu-204-300 operated by Russia's Cosmonaut Training Centre's aviation arm—Cosmos Airlines—to carry astronauts and associated personnel. Other jets on display included a Cessna Citation-Jet, Hawker 700 and 800, and Beechcraft

Premier I, the latter being the only one of its kind in Russia and marked "for sale."

Gulfstream, the largest RUBAE exhibitor in the past, was not at the show—not unexpected since the company announced in June that it wasn't attending any trade shows in 2021. Meanwhile, Bombardier had a slimmed-down stand and brought no aircraft, though there was a privately-owned Challenger 350 on display. A tarmac space appeared to have been reserved for a Global 6500, but the aircraft did not arrive. Pilatus shared a stand with its local partner, Nesterov Aviation.

Rotorcraft were represented by a Mil Mi-8AMT and an Airbus EC130T2, the latter under the tent of Airbus Corporate Helicopters. Aircraft operators exhibiting included ABS Jets, Jet Express, Meridian, RusJet, Tulpar, UTAir-Helicopter Services, and Weltall-Avia.

Speaking at the show opening, RUBAA president Jaroslav Odintsev said that despite the pandemic and geopolitics, business aviation remains active and hopeful of better times ahead.

Key speakers explained that the pandemic has changed the habits and ways of Russian business travelers. While Europe remains the primary destination for Russian business jet flyers, previous top-list getaways UK and France have given way to the Baltic states, Greece, and Cyprus, according to RUBAA executive director Anna Serezhkina.

This finding was confirmed by EBAA COO Robert Baltus at RUBAE. According to statistics on aircraft operations out of Russia's three largest business aviation hubs—Moscow Vnukovo and Sheremetyevo airports, as well as Pulkovo in St. Petersburg—business jets recorded 16,000 flights to and from Europe in the first seven months of this year.

According to Baltus, Russia-Europe air traffic has stayed "comparatively well." This traffic hit its lowest point in April 2020 at about 500 flights, but has been on the rise this year and hit 3,500 flights in July.

While traffic levels are now about the same as they were in 2018 and 2019, destinations differ, reflecting the current Covid-19 situation and geopolitics. For example, Nice has been replaced by Riga as the most popular destination for Russian business jets. However, Baltus believes that the air connection between Russia and Western Europe might improve if state authorities introduce an internationally recognized so-called Covid passport for air travelers. ■



Attendees at RUBAE 2021 helped the Russian United Business Aviation Association celebrate the 80th anniversary of Moscow's Vnukovo Airport.



News Briefs

EASA, Transport Canada Okay IS&S Autothrottle

Transport Canada and EASA have granted certification to Innovative Solutions & Support (IS&S) for its ThrustSense Full Regime Autothrottle system for the King Air 200 and 300 series. With these approvals, more than 40 countries outside the U.S. have now certified the IS&S autothrottle system for King Airs. The IS&S autothrottle is also standard equipment on new-production Beechcraft King Air 260s and 360s. IS&S has delivered more than 70 shipsets of the ThrustSense autothrottle to date. In addition to the normal benefits of autothrottles, the King Air ThrustSense application can help prevent loss of control in Vmca situations.

MRO Insider Extends Quoting Platform Reach to FBOs

MRO Insider has expanded its quoting platform to include FBO services. With the latest update, operators, schedulers, and dispatchers can use MRO Insider to request fuel pricing, ground transportation, hangar rental, and other services such as detailing and disinfecting service quotes. The FBO service quoting ability follows other expansions of the platform, which was originally designed as a forum for maintenance services and still serves that function. The platform enables FBOs to provide quotes based on aircraft make, model, length of stay, and other factors. FBOs can customize their quote based on fuel cost, quantity, and other services requested to provide individual package deals, MRO Insider said.

FAA: Laser Strikes Increasing

The frequency of laser strikes is increasing, according to a newly released FAA interactive webpage detailing data from more than 57,800 reported incidents between 2010 to 2020. Despite greatly reduced flying hours in 2020 due to the pandemic, pilots reported 6,852 laser strikes last year versus 6,136 in 2019. In addition, the number of incidents reported last year was the highest annual total in a decade since the peak of 7,383 reported in 2016. The agency also revealed that there have been nearly 200 reports by flight crews of injuries resulting from laser strikes between 2010 and 2020. According to the data, about one of every four laser strikes occur below 3,000 feet agl.

Santa Clara Looks To Shutter Reid-Hillview Airport

Continuing the long-term battle over the future of Reid-Hillview Airport in San Jose, California, the Santa Clara County board of supervisors in California unanimously voted to take steps to shutter the airfield sooner than grant obligations currently permit and prohibit leaded aviation gasoline fueling there in the meantime. Grant obligations would require that the airport remain open until 2031, but Reid-Hillview has had a lack of support from local politicians for years.

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Embraer's 1,500th business jet delivery went to Haute Aviation, which plans to fly the Phenom 300E on charter missions from its headquarters at Saanen-Gstaad Airport in Switzerland.

Embraer delivers its 1,500th business jet

by Jerry Siebenmark

Embraer's handover this week of a Phenom 300E to Switzerland-based Haute Aviation marks its 1,500th business jet delivery, the Brazilian airframer announced today. This milestone was accomplished in just two decades, besting the industry average of 34 years, according to the OEM, which assembles its Phenom light jets at a facility in Melbourne, Florida.

In all, Embraer has more than 950 customers operating its business jets in more than 80 countries. Embraer's business jet unit has had an annual growth rate of 22 percent since the delivery of its first business jet in 2002. The company estimated that one in every four light and midsize business jet deliveries is an Embraer Phenom or Praetor.

Haute Aviation charters, brokers, and manages business jets and is based at

Saanen-Gstaad Airport. "For Haute Aviation, the new Phenom 300E is the best product on the market to complete the range of our fleet," said Haute head of marketing and communication Catherine Tamagni. "We believe the aircraft's two engines will suit our passengers who prefer not to fly in a single-engine aircraft, as this allows for uncompromised range and payload performance." ■

Airacer intros two AI-based charter apps

by James Wynbrandt

Online technology firm Airacer has introduced charter apps Airacer Pro, to provide one-stop shopping for traditional jet charter, and Airacer Air Taxi, for quick ride-hailing access to short-haul flights. Aimed at seasoned charter customers and charter brokers, as well as a "new generation" of business aviation consumers accustomed to online transactions, the portals provide all the information needed to quickly find available lift, select all travel details, and book and pay for the trip online seamlessly, said Airacer CEO Wen Wang.

Along with the expected selectable options (passenger count, cabin size, luggage, etc.), charter customers can select trips by Argus and/or Wyvern operator safety rating, ancillary ground services, or onboard services. Customers can also contact operators with suitable aircraft directly for quotes, review the contract, and book and pay for the flight through the apps. A scalable map of the U.S. that serves as Airacer Pro's interface shows the route and other trip data as customers fill in their flight details.

Airacer Pro is primarily for high-end jet charter customers, while Airacer Air Taxi is for last-minute short-haul flights aboard turboprop and piston aircraft and helicopters. Currently, Air Taxi doesn't

support the scheduling/price comparison shopping that the Pro app allows.

For operators, the apps can be incorporated atop Airacer's proprietary software as a service fleet-management and scheduling solution, which Wang said some are already using on a subscription basis. "We help our operators save a lot" with the software by improving efficiency and reducing administrative time and costs, according to Wang. "For these operators, it's easy to use the platforms," providing an additional, virtually automated revenue stream, she said. Operators do not see each other's quotes when responding to customer requests.

Three attributes distinguish the New York company's charter apps from those of competitors, Wang said, including the high quality of its lift database; the platforms' artificial intelligence (AI) and algorithms; and its ability to arrange the entire journey through one platform, complemented by 24/7 customer service from multilingual staff.

The company's database of lift is assembled from several sources, Wang said, and numbers more than 10,000 aircraft worldwide, with about 57 percent of the lift in the U.S. and the majority of the remainder in Europe, China, Latin America, the Middle East, and

Russia representing about 2 percent each.

Airacer's AI, meanwhile, will help the platforms recognize unique customer needs while also ensuring operators aren't bothered by excessive quote requests from individual customers. The apps are free to use for charter customers, who must register and provide all necessary documentation before using the system to book flights.

Wang formed the company in 2015 while majoring in mathematics at Carnegie Mellon University, a year after attending her first EAA AirVenture Oshkosh show in Wisconsin. Born in China and raised in New York City, she'd been inspired to learn to fly at the Wisconsin fly-in, but when she returned home and tried to learn online about flight training options, she found little comparative information or other tools to help make intelligent choices.

In the intervening years, while preparing for the release of its new retail charter apps, Airacer's website provided information and booking resources about air tours available for travelers in a variety of vacation capitals. With the two new apps now launched, "I'm pretty sure I'm going to have a little bit more time to continue my [flight] training," Wang said. ■

News Briefs

Gulfstream G700 Sets City-pair Speed Records

Gulfstream Aerospace's first production G700 recently set a trio of city-pair speed records. The fully outfitted G700 production test aircraft—S/N 006 and registered as N706GD—left Gulfstream's headquarters in Savannah, Georgia, on August 27 for Doha, covering a distance of 6,711 nm at an average speed of Mach 0.88 in 13 hours and 16 minutes. The aircraft then set another city-pair record from Doha to Paris, flying 2,953 nm in 6 hours and 15 minutes at an average speed of Mach 0.90. From Paris to Savannah on September 4, the jet cemented yet another record, making the transatlantic crossing in 7 hours and 59 minutes at Mach 0.90.

Illegal Charter Reports Spike

The number of reports received by the illegal-charter hotline has jumped 40 percent this year as more people have turned to private flying as a result of the pandemic, according to industry executives. This jump has caused concern that passengers are unaware of who is transporting them and to stress that this makes the need for education on illegal charter even more important. Thus, NATA has renewed its nationwide workshops to discuss the issue. Joining in this effort are FAA officials and key industry experts. Meanwhile, the FAA has stepped up enforcement actions. Since January 2020, it has announced some \$13 million in civil penalties.

Collins Aerospace Makes Play for FlightAware

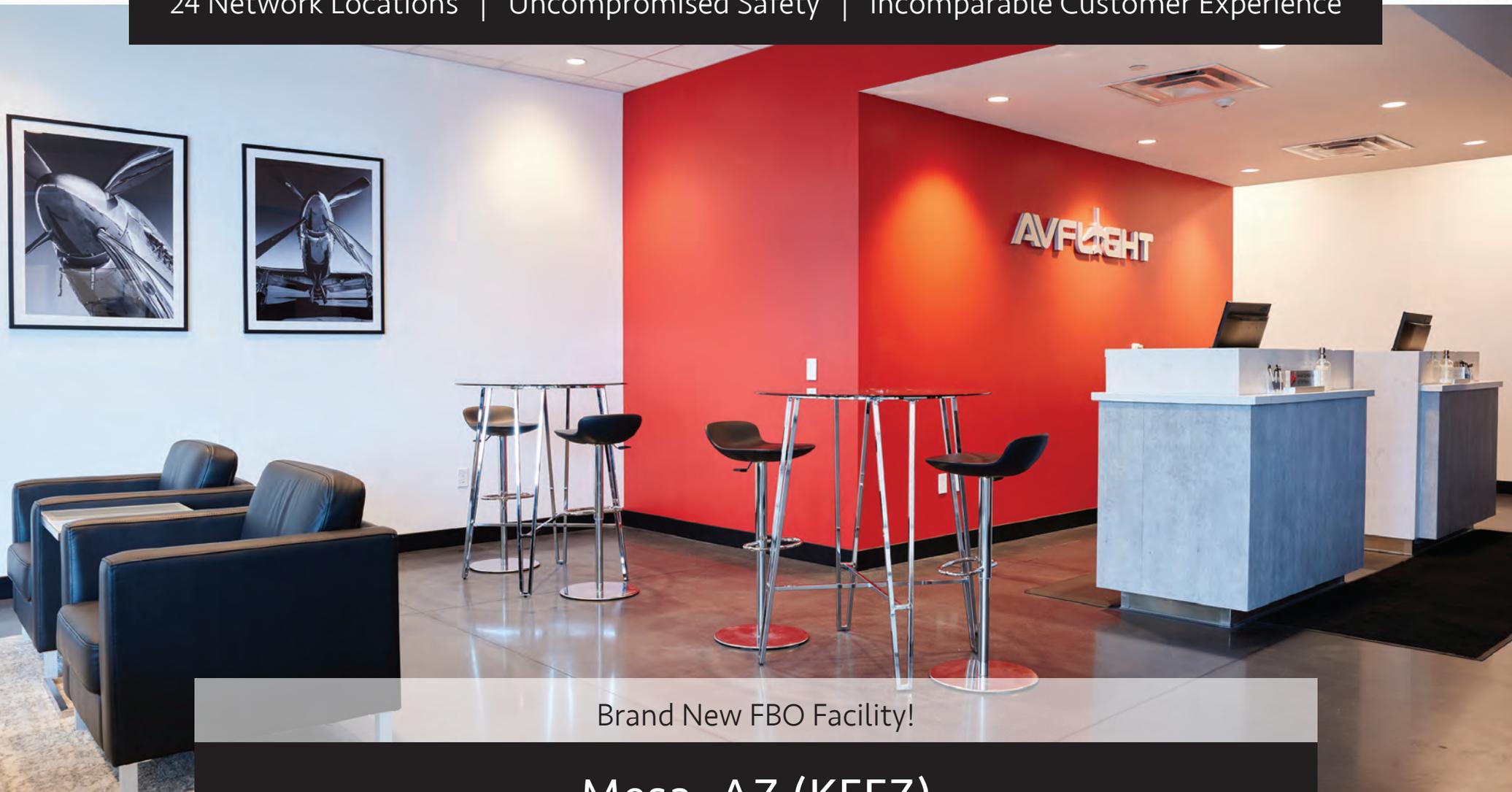
Raytheon Technologies subsidiary Collins Aerospace has signed a definitive agreement to acquire aircraft flight tracking, data, and analysis company FlightAware. Financial terms were not disclosed, and the deal is subject to regulatory approvals. Following closing, FlightAware will join Collins's information management services portfolio within the company's avionics business unit. According to Collins Aerospace avionics head Dave Nieuwsma, "FlightAware's flight tracking and data platform...has the potential to deliver new capabilities and innovations across our entire business."

Cowen Upgrades Textron on Bizjet, eVTOL Vigor

Analysts at Cowen have upgraded Textron to outperform based in part on Textron Aviation's strength in the business jet market and Bell's "underappreciated eVTOL play." Cowen's report notes that the percentage of preowned Textron Aviation business jets for sale has dropped by half since September 2020, to 4.2 percent of the in-service fleet. On the new-production side, an improving order mix with about 20 percent of bookings from first-time buyers and return of corporate buyers is also a positive development for the Wichita airframer, the report notes.

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Business jet shipments in the second quarter were up from 2020 but overall still down from 2019, according to GAMA's latest report.

GAMA: general aviation shipments improve across all categories

by Kerry Lynch

U.S. business and general aviation manufacturers continued to gain steam in the second quarter with total fixed-wing deliveries reaching 618 aircraft, up 123 units from the same year-ago period, and just eight units shy of the same quarter in 2019, according to the General Aviation Manufacturers Association (GAMA).

Releasing the second quarter billings and shipments, GAMA reported deliveries were up year-over-year across all categories. Both turboprops and piston deliveries exceeded 2019 totals, though business jet shipments were still down significantly from 2019.

Business jet shipments reached 151 units in the second quarter, up from the 130 handed over in second-quarter 2020 but down from 192 in the same three-month period in 2019. Turboprop shipments, meanwhile, jumped to 137 units in the most recent quarter, compared with 81 from a year earlier and 109 in 2019. Piston deliveries reached 330 in the quarter, up from 284 in 2020 and 325 in 2019.

For the first six months, total fixed-wing deliveries were up 16.8 percent year-over-year to 1,050 units. Business jet deliveries were up 8.2 percent to 264 units, and piston deliveries by 12.3 percent to 565 in the first six months. But turboprop deliveries have jumped by 45.4 percent to 221 units.

As a result, aircraft billings in the first half rose 9.4 percent, from \$7.9 billion in 2020 to \$8.6 billion. This is still down from \$9.9 billion in the first six months of 2019.

Similarly, the 341 first-half helicopter deliveries marked increases in both the piston and turbine categories for a 32.7 percent improvement. In the first six months, piston helicopter shipments increased 31.7 percent to 83, and turbine helicopters by 33 percent to 258. Helicopter billings jumped 37.7 percent from \$1 billion in the first half of last year to \$1.4 billion this year. This is down slightly from

the \$1.5 billion in the first half of 2019.

“Through the first six months of 2021, we can see that the industry continues to progress in its recovery efforts,” said GAMA president and CEO Pete Bunce. “While it is encouraging to see segments improve from 2020, we still trail when

compared to how the industry was faring before the onset of the pandemic.”

Interest and demand remain strong, he added, but the industry is working toward addressing supply chain issues and strengthening workforces while focusing on sustainability. ■



Aerion, now in liquidation, has accrued some \$100 million in claims, however, the value of the assets is less clear since they mostly involve intellectual property.

■ Aerion liquidation targeted by year-end

Development Specialists Inc. (DSI), which has been retained to wind down operations at Aerion through a liquidation process under Florida statutes, hopes to finalize sales of the former supersonic aircraft designer's assets by year-end. Unclear, however, is how much those assets will fetch since the majority of what is available to sell is intellectual property, said Joseph Luzinski, the assignee and a senior managing director of DSI.

Aerion, which had been designing the supersonic AS2 business jet, has about \$100 million in outstanding claims. GE Aviation—which would have produced the Affinity engine for the AS2—accounted for nearly \$32 million of that. But Aerion has claims from a range of aerospace companies—Spirit AeroSystems, which tightened its partnership with Aerion a year ago, is owed an estimated \$4.9 million and Boeing more than \$3.5

million, according to court documents.

While Aerion does have some fixed assets to sell such as computers, software, and wind tunnel models, there are no real estate assets as it was early in the development work to build its headquarters complex in Melbourne, Florida. But numerous patents are available. “There are no valuations for these types of assets there's no Kelley Blue Book or comps. There is no clear indication of what the assets are worth,” Luzinski said, adding the market will determine that.

Parties have already reached out as the news of the liquidation has spread, he said, noting he's received a call from private equity interests as well as a “large jet manufacturer.” DSI also has a list of aerospace and other companies that might have an interest, he said. “Hopefully this will generate a spirited sale process that will generate value,” he said. **K.L.**

News Briefs

Denali Achieves First Ground Runs of Catalyst Engine

The Beechcraft Denali prototype successfully completed initial runs of its new GE Aviation Catalyst engine in late August, moving the clean-sheet turboprop single closer to its first flight by year-end. Taking place at Textron Aviation's west campus at Wichita Eisenhower National Airport, the engine runs verified the functionality of the airplane's fuel system and engine, as well as avionics and electrical systems interfaces. Meanwhile, GE Aviation has completed more than 2,450 hours of Catalyst ground testing and at press time was preparing for the first flight on its Beechcraft King Air flying testbed. Two other flight-test Denalis are in development and three additional ground articles will be used for airframe static and fatigue testing, as well as cabin interior development testing. Denali certification is expected in 2023.

JSSI Parts & Leasing Targets Growth in EMEA

JSSI Parts & Leasing has named Ben Edwards as regional manager for Europe, the Middle East, and Africa in an effort to bolster its presence and aftermarket parts services in the region. Edwards was previously head of sales for UK-based aircraft parts supplier Allaero and before that, served as an engineer with the Royal Air Force. Before this move, the company was primarily focused on North America. With the addition of Edwards, JSSI Parts & Leasing president Benjamin Hockenbergh said the company “will not only be positioned to deliver enhanced support to our local parts customers in EMEA with strategically located inventory and expertise, but also to provide localized maintenance event assistance to our colleagues supporting JSSI's hourly cost maintenance clients.”

Tamarack Set to Grow Following Bankruptcy Exit

Tamarack Aerospace has exited Chapter 11 bankruptcy reorganization a little more than two years after it entered voluntary bankruptcy stemming from a two-month-long grounding in the U.S. of Cessna Citations equipped with its active winglets. After its Chapter 11 declaration, Tamarack received \$1.95 million in funding from a group of existing customers and vendors that supported its reorganization. While the grounding forced Tamarack to temporarily reduce its workforce, its continued operation allowed the company to return to growth and eventually double its workforce. It also expanded its facilities and operations and increased the number of active winglet installations to more than 140. Tamarack is looking to expand further by adding its active winglets to other aircraft types. “Now Tamarack is set to grow,” said Tamarack president Jacob Klingensmith.



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Bizav aircraft networks need more protection from cybersecurity breaches

by Dale Smith

To many observers, 2020 can be labeled as the “year the earth stood still.” But while the global population as a whole stayed home, that doesn’t mean we didn’t accomplish anything. Instead of doing business face-to-face, we switched our interactions to the internet.

From both a business or personal perspective, there’s almost nothing we collectively do today that doesn’t include interacting with a mobile app, website, or connected device of some sort. In fact, according to data firm Statista, the global internet population is now on the threshold of five billion people. It’s mindboggling that almost two-thirds of our world’s population has the capability to share all kinds of information with anyone instantly.

And that’s not counting the uncountable number of internet of things (IoT) machine connections there are today. The IoT has everything from smartwatches to cars to just about anything you can imagine sharing real-time information. Unfortunately, all that free-flowing information is just too tempting of a target for the rapidly growing business of data piracy. And like the internet itself, cybercrime is just going to keep expanding.

Welcome to the YOSC

Just how much of an issue is cybercrime for corporate and private aviation? Considering that the International Civil Aviation Organization (ICAO) designated 2020/2021 as the “Year of Security Culture” (YOSC), it’s a pretty pressing issue. In a statement, the coalition of aviation stakeholders and the ICAO Assembly called for a Cybersecurity Action Plan that, among other things, would work toward a common baseline for cybersecurity practices and make cybersecurity a part of aviation security and safety systems.

But what is cybersecurity in terms of business aviation? “Cybersecurity is the act of ensuring that data being transmitted from an aircraft to a prescribed network is protected at all times to prevent the unauthorized use of that data,” explained Chris Moore, president of business aviation at Satcom Direct. “It is often perceived as an abstract concept, but it incorporates physical security, data security, monitoring, risk management, education, roles, and responsibilities of departments that may not have converged before. For example, an IT department with an aviation department.”

Moore added that while many aircraft owners are familiar with cybersecurity for their offices and facilities, not many put their aircraft data security needs into that bubble. And that’s a mistake, he noted.

“In business aviation, there is often the assumption that if you are in an aircraft at altitude, that data is secure. However, without cybersecurity protocols in place, this is not the case,” he said. “The internet is visible to the aircraft data; then the aircraft data is visible to the internet.”

But business aircraft have been connecting to the global web for a long time. Why is cybersecurity becoming such a hot topic now? According to the experts, there are a number of reasons. One is that hackers are becoming much more sophisticated. They realize that with prosperous companies and individuals spending more time on their “private” aircraft, there’s that much more valuable information to be hijacked. Another is that the way we use the aircraft’s connectivity has changed, and that has opened the door to easier access.

“The ability to do live-streaming or a videoconference call from the aircraft opens up the connection for a much longer time, and that’s a potential security issue,” explained Britton Wanick, v-p of digital

solutions partnerships for SmartSky Networks. “We need to realize that the ultimate objective of a hacker is not going to change because they’re hacking an airplane. They want the same information they try to get on any other internet connection.”

And, depending on the goal, that information can be extremely tempting. Personal data, credit card numbers, and bank accounts are top on their list. But when a hacker is targeting a sophisticated business jet, they may well have bigger ambitions.

“It’s not a matter of if, but when an attack will occur,” Moore said. “We noted a sharp increase in attempted cyberattacks through the pandemic, particularly in ransomware attacks.”

It should be pointed out, however, that probably last on a hacker’s digital target list is to try and “hijack” the airplane’s controls via its internet connection. While the idea of controlling a business jet from a laptop makes for exciting, Clive Cussler-worthy fiction, industry experts say the likelihood of this ever happening is pretty much nil.

Rather, what the hackers want is either to collect data—corporate espionage, for example—or better yet, work their way into the company’s computer network with some kind of malware or ransomware.

“Overall, we look at what the hacker’s motivation is and who or what is behind that motivation,” explained Chris Bartlett president of CCX Technologies, which makes cybersecurity-focused cabin routers, components, and security plans that work in parallel with the aircraft’s connectivity provider. “There’s a wide spectrum of what that can be. In some cases, it’s just mischievous, and in others, it’s the opportunity to impact an organization’s business. I don’t know of an instance where it was a safety risk.”

“An attack can come from a variety of points: it can be a non-targeted attack like a malware virus. I think everyone is familiar with those,” he continued. “It could be a drive-by attack by a hacker who is just curious whether or not they can succeed. They just want to show how smart they are. These usually are no more than an annoyance.

“The most troublesome are the commercially motivated hacks like the recent attack on the U.S. oil pipeline. There was a massive ransom paid on that one,” Bartlett said. “There are so many motivations for attacks today. With all that’s riding on communications, I think you can see that aviation is in no way immune to the risk. Private airplanes are only private up to a point.”

Gone Phishing

No matter what they’re looking for or doing, the easiest way for a hacker to gain access to a company’s network via an aircraft’s connectivity is through passengers’ and crews’ personal devices. That’s why so many cybersecurity experts suggest carrying separate personal and business devices, something so many of us do not do.

“Rarely is an insertion accomplished by an individual hacker finding their way directly onto a network,” Wanick said. “It’s usually someone accessing a person’s personal device and planting something in there. The surface area in a large company is tremendous. The more users, the more entry points a hacker has.”

Of all the possible entry gates, the experts agree that phishing, pop-ups, fake emails, and the like are at the top of the list of ways for evildoers to gain entry into a device. That’s why it cannot be stressed enough that one should never open any unfamiliar email or document, which is easier said than done. Phishing scams are very sophisticated today and it’s getting harder all the time to tell the real from the fake.

“Methods used by the bad actors or malevolent hackers range from social engineering attacks to theft of passwords and credentials, to spam, malware, ransomware, and more,” Moore said. “Their methodology is becoming increasingly more sophisticated, to the point where some threats are thought to be derived from some state-sponsored institutions.”

In fact, some regions are becoming so notorious for cybercrime that Satcom Direct, in particular, has taken steps to proactively forewarn customers as to the threat potential. “Our existing cyber solutions suite offers a geofencing service,” Moore explained. “If an aircraft is about to enter airspace where cyber events are more frequent, our threat-monitoring service will advise the crew. They can then advise the passengers and/or close down the network while the aircraft travels through that airspace.”

Of course, it’s not only data that the bad actors are after today. There are plenty of instances of black hat corporate espionage goings-on inside of business jet cabins.

Justin Vera, senior installation sales representative for Duncan Aviation,

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TECHNOLOGY INNOVATION LEADS TO REPLICATING REALITY





Loss of control in-flight (LOC-I) is frequently cited as a major cause of aircraft accidents, with pilot error, including failure to maintain adequate airspeed, as the leading contributor to loss of control. But typically, the loss of control or failure to maintain airspeed is precipitated by another issue: perhaps a runaway trim on takeoff, an attempt to climb above weather leading to high-altitude stall, or ice blocking a pitot tube.

In the minds of many pilots and operations personnel, LOC-I only happens to low-time general aviation pilots; it would not happen to experienced, professional crews who meet Part 135, Part 121, or Part 91 Subpart K proficiency standards. The fact is, all three of the LOC-I examples listed above have happened at least once to proficient, professional crews: the runaway trim to a Part 135 crew in a Cessna Citation II that crashed into Lake Michigan in 2009; the climb above weather in a Bombardier Challenger 601 that likely entered a stall/spin scenario near 41,000 feet in 2019; and the ice in the pitot tube as a factor in the crash of Air France flight 447 in 2009.

Sometimes scenarios like these can be discussed or even practiced in flight, but this can lead to true in-flight emergencies. In the quest for making training “real,” several accidents have occurred when instructors modified the aircraft systems by pulling circuit

FLIGHTSAFETY CONTINUES TO PROVIDE THE MOST REALISTIC SIMULATOR TRAINING AVAILABLE FOR THE BUSINESS AND PRIVATE AVIATION MARKET.

breakers or intentionally shutting down one engine, ultimately turning simulated emergencies into real emergencies.

Safely preparing a crew for whatever odd-ball anomalies the aircraft or Mother Nature may bring is best done in a full flight simulator—the more realistic, the better. Through continuous improvement and technology innovation, FlightSafety continues to provide the most realistic simulator training available for the business and private aviation market.

REALITY STARTS WITH GROUND SCHOOL

To be prepared for anomalies and emergencies, crews need to know the aircraft systems, avionics, flying characteristics, and emergency procedures before they jump into the simulator. During ground school—which lasts from two days in recurrent training on a turboprop or light jet to 21 days in initial training on a heavy jet or airliner—FlightSafety brings as much realism into the classroom as possible using desktop simulators, graphical flight-deck simulators, avionics procedure trainers, and debriefing tools.

“We use several different instructional devices for getting students ready for the simulator or the actual airplane,” said Kelly Reich, senior v-p, strategic operations. “For example, our MATRIX integrated training system basically replicates the Level D simulator logic and software in a desktop training format, allowing the instructor to set up scenarios to show how various systems work. Often these will have OEM parts integrated to reinforce the tactile feel of the airplane.”

Always on the cutting edge of technology, FlightSafety is also beginning to use virtual reality simulation to provide aircraft preflight walkaround training when the actual aircraft is not available.

“We’ve launched a new program where we’re developing 3D virtual reality walkarounds for use in initial pilot training courses,” said Brian Moore, FlightSafety’s senior v-p of operations. “You can actually walk around the aircraft, look at open panels, open the aircraft door, climb up the stairs, and walk through the airplane, just as if it were there. You can check the system operation—is the oxygen full, all the fittings connected, all the static wicks there—everything you would check in

a preflight walkaround can be done in the virtual reality simulator.”

FlightSafety is deploying the use of VR walkarounds across its course offerings and is also using VR in various maintenance courses for both familiarization and procedure training.

Clients enrolled in pilot recurrent courses who want to minimize the time spent away from home base may choose to take the ground school portion online through FlightSafety’s LiveLearning platform. Likewise, maintenance clients also have the option to take courses via LiveLearning. eLearning courses are also available for select subjects. Both types of courses are accessed through online portals, but LiveLearning incorporates instructor-led training given at a specific date and time while eLearning modules are self-paced and can be taken at any time.

“We started offering LiveLearning for most of our pilot recurrent courses during the pandemic, so students could do the ground school from their home or office, and then come into the Learning Center for their sim sessions,” said Reich. “We’ve found there are some clients that just love the LiveLearning option because it means fewer days away from home. On the other hand, we also have clients that prefer the comradery of meeting other pilots in the classroom and being able to share their stories. That’s an important part of learning as well.”

SIMULATOR TRAINING SO REAL IT HURTS (IN A GOOD WAY)

With more than 70 years in the simulator training business, FlightSafety has championed the safety and key learning aspects of providing realistic training on the ground, working with aircraft manufacturers to make both the tactile feel and aerodynamic response of the simulator as real as possible, and working with the FAA, EASA and other government authorities to certify the training received as credit toward requirements and ratings.

One of the areas that the FAA reviews when certifying a simulator for flight credit is the fidelity of the flight experience. FlightSafety

Meet FlightSafety Executives



Brad Thress, President and CEO

Brad joined FlightSafety International as president and CEO in February 2020. He was previously with Textron Aviation where he held several leadership roles within many business areas including engineering, flight operations and customer service. Brad earned a Bachelor of Engineering degree from the University of Tennessee and an MBA from Baker University.



D. Richard Meikle, Executive Vice President, Safety and Regulatory Compliance

Richard joined FlightSafety International as executive vice president, safety and regulatory compliance in March 2020 after 25 years at NetJets Aviation. Richard flew in corporate, regional airline and fractional aircraft ownership operations and is type-rated in a wide variety of business and commercial aircraft. He holds a U.S. airline transport pilot license, and an Australian commercial pilot certificate with instrument and multi-engine instructor ratings. Richard earned a Master of Science degree from Embry-Riddle Aeronautical University with a minor in safety program management and serves as an adjunct associate professor for the university.



Brian Moore, Senior Vice President, Operations

A FlightSafety team member since 1990, Brian has served in various leadership capacities including as manager of the company’s Wichita East Learning Center, Executive Director of Operations. As SVP of Operations, Brian provides guidance and support for FlightSafety’s global Learning Center network and the delivery of training programs. He also interacts with customers and aviation regulatory agencies worldwide and oversees the entry of flight simulators and other advanced training devices into service. With an airline transport pilot certificate and multi-engine instructor rating, Brian’s experience includes more than 3,000 flight hours and 6,000 hours of ground school and simulator instruction. Brian is also a two-time graduate from Embry-Riddle Aeronautical University culminating in the Master of Business Administration in Aviation degree.



Kelly Reich, Senior Vice President, Strategic Operations

Kelly joined FlightSafety in October 2020 after more than 25 years in leadership roles at airframe manufacturers. Most recently he served as Vice President of Customer Service at Honda Aircraft Company. As SVP for Strategic Operations at FlightSafety, Kelly plays a key role in leading the company’s customer experience and courseware segments, including advanced and specialty enrichment training and future training methodologies. A native of Wichita, Kelly holds a Bachelor of Business Administration degree from Wichita State University and a Masters of Total Quality Management from Friends University.

uses industry-leading technology to design and manufacture its FAA-certified Level D full flight simulators with electric six-degrees-of-freedom motion bases, ultra-high resolution glass visuals, and flight decks that perfectly replicate the look and feel of the aircraft.

“When you fly a FlightSafety simulator, you strap into the same seat as the OEM uses, the switches and annunciators are all in the same places and the avionics are functioning, off-the-shelf units from the avionics manufacturer, not just procedure trainers,” said Moore. “When we build a type-specific simulator it provides that realism when you’re manipulating the switch or a lever, creating that fully immersive and realistic environment.”

FlightSafety’s massive flight simulators measuring up to 25 feet tall and 18 feet wide (depending on the model) may seem a bit daunting when you first encounter one. Entering from either a secured airstair or second-floor access ramp, you can look down at the floor below and wonder how the skinny tubular motion base is going to provide any kind of flight fidelity for the bulbous simulator perched on top. In fact, the lightweight materials of the simulator, the majority of required computing equipment residing outside of the simulator housing and the powerful yet efficient mechanisms inside the motion base allow the electric motion base to provide a faithful replication of motion in immediate response to crew and programming inputs.

The electric motion and control loading motion base also produce less heat, lower levels of ambient noise and provide a safer environment due to the elimination of the risks often associated with hydraulic fluids. This also increases the simulator’s overall availability and the ease of maintenance.

“Our simulators generally have an up-time of more than 99 percent,” said Moore. “We have a small army of technicians at the Learning Centers who keep the simulators flying. We do a tremendous amount of preventive maintenance to make sure the devices hit our exceedingly high dispatch reliability. And if something does happen to bring a simulator offline, our technicians are usually able to get it back



“WHEN YOU FLY A FLIGHTSAFETY SIMULATOR, YOU STRAP INTO THE SAME SEAT AS THE OEM USES”

up and running within a few minutes in most cases. It may require a little shuffling of the schedule, but rarely does it have any major impact on completing a training course.”

Continuously improving its simulators in Learning Centers around the world, FlightSafety introduced its VITAL 1150 visual system in 2019. An upgrade from the VITAL 1100 system released in 2013, the VITAL 1150 projects ultra-high 4K resolution graphics onto an integrated CrewView wrap-around glass display for stunningly crisp visuals and greater image fidelity. Fields of view up to 360 x 135-degrees and high 120 Hz frame rate provide realistic imagery for all flight maneuvers

including comprehensive airport lighting systems, dynamic and enhanced shadowing for detailed topography and ocean effects, time of day modes including dawn and dusk, and five levels of precipitation intensity.

The weather modes are so realistic you may be concerned about getting wet when you step outside the simulator. A MultiVis Weather Sim generates up to 64,000 atmospheric layers and uses a physics-based weather model including atmospheric scattering to provide realistic wind, turbulence and precipitation effects. The system can generate visual clouds with lightning and rain shafts and show correlated radar profiles on the appropriate cockpit displays.



Mist, driving rain, blowing snow and even dust storms can be initiated, complete with the associated enhanced halo and blooming effects around light points.

Flying over water? The VITAL 1150 system displays 3D water and ocean swells with whitecaps including 13 sea states, two swell states and ocean wave and spray effects.

As spectacular as the visual system is, it only reinforces the sense of realism provided by the fidelity of the flight deck layout and aerodynamic response to pilot and system inputs.

“Our relationships with the aircraft manufacturers allow us to use OEM data to ensure that the simulator looks like the airplane, flies like the airplane, the systems function like the airplane and it’s as realistic as being in the airplane,” said Moore.

For new aircraft models, FlightSafety typically builds the simulator at the same time that the OEM is building the prototype airplane. The company works so closely with the OEM that the aircraft manufacturer often uses the FlightSafety simulator to train flight test crews or develop flight test procedures, and FlightSafety instructors in turn often fly with OEM pilots in the actual aircraft so they become knowledgeable about any nuances or changes between models.

“Often when we’re working directly with an OEM, they’re helping us write the training material, providing overview and oversight of it to make sure that it’s in alignment with their material,” said Moore. “It’s not uncommon for our training material to even be ahead of the aircraft material on a new program, meaning that sometimes parts of the maintenance manual and POH [pilot’s operating handbook] may be written off our materials. We work very closely with the OEMs to make sure that the content that we’re putting into our curriculum is accurate for each aircraft model.”

FlightSafety encourages its instructor corps to maintain currency and to fly in the aircraft models they teach in whenever possible. The company’s 1,800 instructors are generally experienced pilots from airline, military or corporate aviation backgrounds who become type-rated in the aircraft they teach and have opportunities to fly on OEM projects, and as contract pilots. The instructors often transfer these experiences to the classroom and course materials.

“We’ve got a group of really experienced pilots as a part of our instructor corps, and we capitalize on that wealth of experience,” said Moore. “When they’re qualifying into a new aircraft, they go through a robust training process to make sure that their knowledge level on that aircraft is where it needs to be to meet client training expectations. We use the instructors who are out flying as subject matter experts to make sure that the material that we’re writing and producing is in alignment with how that airplane actually gets flown and operated in the field.”

The fact that many OEM pilots take recurrent training at FlightSafety also helps keep the curriculum materials fresh and accurate.

“OEM pilots come through our training programs and consistently provide feedback, which we use to continually improve our products Moore said. “We also use them to help qualify the simulator, when we’re getting qualification on a new device for a new program, they’ll come over and fly. And they’ll say, ‘yeah, this feels just like the airplane,’ or ‘you need to tweak X or Y’ to make sure that both the simulator and the courseware are as real as possible.”

With more than 300 simulators at 31 locations around the world, if the new model is an upgrade of an existing aircraft—such as a Cessna Citation CJ3+ to a CJ4—FlightSafety may modify an existing simulator if more than one sim already exists. This allows more flexibility and availability for customers, especially if the new model features an avionics change or option; customers who haven’t upgraded to the new avionics can use the legacy sim while customers with the new avionics suite can use the new sim.

Differences training can also be used to help fill the gap when third-party avionics upgrades are available for aircraft but a FlightSafety simulator for that upgrade isn’t available. For example, if you have a Citation CJ2 with a Collins avionics suite, and the only device that FlightSafety has available to fit your schedule is a Garmin-equipped CJ2+, then FlightSafety will give you training in the CJ2+ simulator and additional training on a Collins kiosk to make sure that you understand the avionics differences.

FlightSafety’s FS1000 simulators includes an advanced instructor station equipped with an intuitive interface, scalable graphics and large displays with touchscreen controls. This is where it gets real as the instructor can throw everything except the kitchen sink at you during your simulated flight: weather, systems failures, inoperable instruments, ATC requests and even animals on the runway.

“And that’s where our instructors really provide value,” said Richard Meikle, FlightSafety executive v-p of safety and regulatory

compliance. “The simulator’s ability to be paused while the instructor and students discuss the situation, and then to be reset at a certain location, altitude, speed, and aircraft configuration, if needed, is one of the simulator’s greatest advantages. The instructors also hear the “water cooler” talk during breaks and can address those concerns or scenarios in the training environment.”

While aircraft system knowledge and operational procedures are important, the scenarios are also designed to help crews with aeronautical decision making and crew resource management.

“Training is far more than manipulative skill practice,” said Meikle, “It’s really about decision making, since rarely are the most difficult decisions answered through a checklist. Often there’s ambiguity in the situation. And that’s where being able to present the ambiguous scenario in the simulator is so effective, allowing the crew to ‘build their own adventure’ by deciding what path to take, since every decision drives them down a slightly different path.”

For example, Meikle asserts that very high-altitude operation training, such as taking a jet to its maximum altitude for the first time, is best done in the simulator. Several fatal accidents have occurred in business jets and even airliners by otherwise proficient crews taking aircraft to their extremes only to stall the aircraft, flame out the engines and mishandle the restarts. Besides being able to replicate these conditions in the simulator, FlightSafety also offers upset prevention and recovery training (UPRT), being the first simulator training provider to receive FAA qualification for UPRT aerodynamic modeling. In addition, a partnership with Mojave, California-based Flight Research, Inc., can provide expanded in-aircraft UPRT to further increase preparedness with unusual attitude and flight conditions.

“We see the two types of upset training dovetail nicely with each other because there are some things you just can’t do in the aircraft safely,” said Meikle, “And there are other things that the simulator doesn’t replicate as well, such as working through



PILOTS CAN TAKE ADVANTAGE OF THE MORE THAN 600 WORLDWIDE AIRPORTS IN THE FLIGHTSAFETY DATABASE

g-forces and staring out the window at a lot of ground. Staring at a lot of actual ground in an aircraft is a whole lot different than the same view in the sim.”

TAKING CONTROL OF YOUR TRAINING

One way pilots can become more prepared for anomalies is to take an active role in their own training. While being sent to simulator training every year in the case of most Part 91 pilots and every six months for Part 121 and 135 pilots can seem repetitive, Moore encourages pilots to ask for modifications and customization of courses to better prepare them for challenges ahead.

“We have a reasonable amount of flexibility in the normal training cadence to work modifications into the normal lesson plan,” Moore said. “Is there something in the avionics that you’re uncomfortable with? Something procedurally or systems-wise that you’d like to focus on? While there are some regulatory requirements we need to complete during each training session, there is still a lot of opportunity for customization and personalization for the pilots. They just need to communicate what they want to work on with us.”

FlightSafety also works with corporate flight departments on training initiatives for their crews. Companies that collect and use flight operational quality assurance (FOQA) data can share this data with FlightSafety on an anonymous basis (individual pilots deidentified) to identify specific areas or procedures that need closer attention across all crews.

“We can produce various scenarios that are subtly different, but fundamentally the same in terms of the learning point that we’re trying to achieve,” said FlightSafety president and CEO Brad Thress, “such as the precision delivery, avoiding loss of control, night vision goggles for helicopter operators, or operations to black holes [unlit airfields]. And we can vary the scenarios enough that if you have a team of ten pilots going through training in succession, even if the first crew talks, the following crews won’t have ‘the answers to the test’ before they get here.”

FlightSafety has also begun to use aggregated industry FOQA data to identify areas of focus called Spotlights. These Spotlights do not add or detract from training time but are incorporated as part of the curriculum to enhance a level of safety.

“We identify safety issues impacting the aviation community and spotlight them in the training,” said Meikle. “For example, runway overruns are a significant driver of accidents and incidents in the industry, but there’s a very simple countermeasure to the problem: deliver the airplane to the runway threshold at the right speed and altitude and control your touchdown point. We’re not adding anything

new to the curriculum, but just emphasizing—or spotlighting—that precision delivery on every landing for the purpose of reducing runway overruns and enhancing safety.”

Taking advantage of the more than 600 worldwide airports in the FlightSafety database, pilots can also ask to practice specific approaches or departures or fly certain city pairs. Often they are likely to find high-fidelity visuals of the desired airports already built. Aspen (KASE), for example, with its tricky DME, RNAV and Roaring Fork visual approaches, is one of the most requested airports in the FlightSafety database.

“I’ve flown into Aspen many times and I can tell you that our visuals are very accurately represented all the way down to the most exotic fire station on the planet,” said Thress. “It’s an amazing level of detail that we can achieve, and the clarity and resolution of the graphics makes you feel like you’re right there.”

Even if visuals for the requested airport haven’t been generated in the FlightSafety database, the instructor can still set up the airport for use in training, although procedures practiced there may not count for various regulatory requirements. With enough need and notice, though, customers can request FlightSafety build visuals for often-used airports.

“Maybe a particular company or aircraft owner wants to go into a dark, unlit region because that’s where their private airport is located,” said Thress. “We can build the visuals for that private airport so the pilots can practice takeoffs and landings there as part of the curriculum.”

Some FlightSafety clients can also book simulator usage outside of a structured course. This ad-hoc service might be used for certain currency requirements, to familiarize oneself with a foreign airport for an upcoming mission or to brush up on little-used avionics procedures.

“We have a full-service contract option where those clients can come by anytime they want,” said Meikle. “So if they haven’t done a night landing in 90 days and want to swing by to get night current, no problem. If they are in between their usual training intervals and they’ve got a big trip planned to somewhere like Reykjavik, which is a rather short runway in Iceland, they can come in and shoot a few landings with blowing snow

and a half-mile visibility just to see what it could be like. Anything they want to do, we can do it either on or off schedule.”

Pilots can also take control of their training and expand their expertise through the FlightSafety Master Aviator program. With specialized curriculums available for both fixed-wing and helicopter pilots, the Master Aviator program requires pilots to complete one initial or recurrent training every eight months plus a specified number of core and elective courses depending on the aircraft type. The program typically requires a two-year commitment to complete the blend of onsite core courses, such as Advanced Rejected Takeoff Go/No Go and Advanced Energy Management, plus eLearning courses such as Runway Safety and RVSM.

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shared a story of a customer who was traveling internationally and somehow someone put malware on his phone to break into the aircraft's network. "Apparently, someone wanted to be able to listen in on what was being discussed on the airplane," Vera said. "Luckily, the system's service provider spotted the intrusion and was able to shut it down."

"Operators need to employ on the aircraft the same security protocols they do for their terrestrial networks," Wanick added. "Monitor, protect, and loss prevention, they all should be available on the aircraft's network."

Also not to be overlooked is the need to maintain vigilance with regards to the aircraft's security when away from home. Many wrongdoers are quite happy with planting an electronic device directly in the aircraft's cabin. "When it comes to physical security, remember that most business aircraft don't have locks on their cabin doors. That makes them vulnerable for intrusion," Bartlett said. "Operators need to be aware of this situation and take steps to protect the aircraft. It's still part of a cybersecurity plan."

Not Our Problem...Yet

When it comes to cybersecurity measures, way too many business and private aircraft owner/operators are still in denial, according to industry experts.

"We have had dialogs with so many different flight departments, and in most cases, they are more worried about whether the Apple TV or Roku TV will work than whether or not the network will get hacked," Bartlett said. "It's just a matter of priorities for the passengers."

That lack of urgency is evident when talking to MROs and avionics shops. When it comes time to upgrade or install a new connectivity system, cybersecurity is usually the last thing to come up in planning.

"The subject of cybersecurity is still rare. Customers do ask about it, but not as often as you would think," Vera said. "We do have larger flight departments that have their corporate IT folks get engaged from the beginning of the installation. And there are others that do nothing at all."

"Right now, when it comes to putting connectivity equipment on an airplane from the customer, to the manufacturer, service provider, and the system's installer, anything that any of them can do is regulated by the FAA or EASA," he added. "Everything is regulated except cybersecurity. There are currently no regulations regarding keeping that connection secure. In the eyes of the regulators, this is all 'non-essential equipment.'"

"That's probably one reason why cybersecurity is not on a DOM's mind today," Vera continued. "They are focused on the things they need to be doing and what the regulations require to keep the airplane airworthy."

Dwayne Chandler, director of avionics sales for Stevens Aerospace and Defense Systems, agreed that while cybersecurity

isn't currently anywhere near the top of many of the MRO's customers' "must-have" lists, it is coming up more in discussions. "We tell customers if they are under the assumption that no one else can get onto their aircraft's network, they are incorrect," he said.

"It's just another network until you protect it," Chandler added. "The various connectivity providers have put a lot of effort into doing just that. Many of the large satellite service providers like Viasat and Satcom Direct also provide connectivity for the U.S. military and governments. They have very good security measures in place, and most are available to their other customers."

"For us as an installation agency, our job is to configure the equipment per the manufacturers' specifications and FAA regulations," Chandler continued. "There is nothing we can do to design or implement any further cybersecurity steps that the system doesn't already have."

Protecting in-flight data requires an understanding of the dynamic nature of the cybersecurity landscape and neces-



The Satcom Direct Network Operations Center in Florida keeps watch on customer networks.

sitates visibility into flight operations. This needs to be coupled with the right technologies, policies, procedures, and controls to implement solid security management systems, so operators need to discuss all these elements with their connectivity provider to reduce risk.

The in-flight connectivity system must be paired with a robust, secure ground infrastructure that can support secure connectivity solutions. Companies like CCX also add physical protection in the form of products installed on the aircraft.

"Our base-level offering goes beyond intrusion-detection systems to include intrusion prevention," said Moore. "This means we don't just let you know that a security event is happening, we take immediate steps to stop it and track down the root cause. Satcom Direct offers operators a sophisticated threat-monitoring and risk-mitigation service applied to the data traffic flowing to and from the aircraft."

Moore stressed that Satcom Direct's data monitoring doesn't actually look at the digital content itself but instead looks for unique patterns in the networks and applications in use. "If we spot abnormalities,

we can take remedial action to protect the network," he said. "Our team of certified experts can recognize and prevent attacks by proactively examining the data and shutting down any activity that seems unusual and notifying the crew in real-time."

Everyone's Responsibility

Cybersecurity is a highly complex business. Like everything in aviation, no two situations are the same, which makes creating and implementing a security plan challenging for the typical chief pilot or DOM.

Aircraft owner/operators need to work with their connectivity providers to explore all the options available to keep data safe, Moore said. There is no one size fits all, and it is important that the operator trusts the connectivity provider to tailor the security system according to their needs.

The good news is that it's possible to take some simple steps to start to assemble a workable cybersecurity protocol. It may not be something many chief pilots and DOMs are familiar or comfortable with, but the fact is, ready or not, chances are these types of decisions are going to fall on their shoulders.

Unfortunately, there's often a fine line between having a healthy, secure network and a happy boss. Take encryption, for example—there is a belief that encrypting a network connection slows down the onboard Wi-Fi experience, and the boss won't like that.

"You need to have an open discussion with the principal and all those involved about consequences of any cybersecurity protocol or process before you implement it," Bartlett said. "Yes, an open network is faster, but it's very vulnerable to attack. Can the principal afford that?"

"I tell our new customers that while the service providers absorb the largest portion of the security issue, it's really everyone's responsibility," Duncan's Vera said. "When they get a new connection installation, my first bit of advice is to consider the network wide-open like Wi-Fi in a coffee shop until you take steps to make it otherwise."

While it can take time and possibly new equipment to achieve the level of security that's right for a particular aircraft and flight operation, the data pirates aren't going to wait while everyone gets their digital ducks in a row.

Cybersecurity is new territory for the majority of business jet operators. For further help, a useful source is the NBAA connectivity subcommittee, which provides an array of insights to help answer cybersecurity questions.

While even identifying and planning a cybersecurity program is a major challenge, there are steps that operators can take today to help make personal devices, and subsequently the aircraft's network, just that much harder to break into:

- » Install the latest version of the service provider's preferred online security suite.
- » Secure passwords. Use more than one password and do not share them.
- » Update passwords often and remember that length matters. Experts say the more complex a password, the better.
- » While strong passwords are good, always take extra precautions when emailing sensitive information. Make sure these types of files are encrypted before pushing "reply."
- » Always take a second look at an email that is asking you to reply to verify some personal or account information. When in doubt, don't.
- » If you must use a Wi-Fi hotspot, be sure to only use secure sites or, better yet, use a virtual private network (VPN).
- » Use a multi-factor authentication protocol to provide extra layers of security. Set it up with authentication apps, SMS verification, or biometrics.
- » When doing online transactions, look for secure sites. They will typically have a closed padlock icon in the status bar.
- » Use one credit card for all of your online shopping needs.
- » Keep all apps and operating systems updated with the latest versions to ensure that you have the latest security patches and updates. Make sure to turn on auto-updates for your apps. ■



by Sheryl Barden

Sheryl Barden, CAM, is the president and CEO of Aviation Personnel International, the longest-running recruiting and HR consulting firm exclusively serving the needs of business aviation. A thought leader on all things related to business aviation professionals, Barden serves on NBAA's board of directors and is chair of the NBAA advisory council.

'Build It and They Will Come'

How can we build our talent pipeline in business aviation? For starters, we need to rethink the long-held belief that every corporate pilot must have 3,000+ hours total time. We also need to find ways to appeal to younger pilots—before they head to the airlines.

One way to accomplish this is for Part 91 flight departments to take a cue from the airlines and develop an ab initio training program. That means that your organization brings in a low-time pilot with little to no experience. And, in turn, your team gives him or her training and mentoring to ensure they become competent, proficient captains over time.

You can liken the process to “Build it and they will come.”

Proof Positive Ab Initio Training Works

Ab initio programs have been around for years. In fact, Jeff Daniels, who's now an aviation director for Zimmer Biomet, is the perfect case study for the practice.

In 1989, Daniels got his start as an SIC pilot at the Mobil flight department. Back then, they had a large contingent of former military aviators. And it was because of their deep bench strength that the department head was able to create a robust ab initio program.

“At the ripe age of 21,” Daniels recalls, “I was in the right seat with only 1,100 hours of total time, 40 hours of multi, and zero turbine time.”

For his first 60 hours, Daniels flew with a dedicated training captain. Within two short years, he earned his ATP and type-rating in a Cessna Citation. And just a few months later, he became the youngest (at the time) to fly the Gulfstream IV as a first officer.

Working with Insurance Underwriters

You may wonder how doable it is to hire a low-time pilot. After all, many aviation leaders say it's impossible, putting the blame on insurance underwriters.

To learn more about the underwriting process, I spoke with Kyle White, an Aviation Practice Leader from Marsh McLennan. Kyle, who's also an ATP and has flown with Daniels, explained how certain departments can bring on a low-time pilot. It's thanks to an insurance authorization in the pilot warranty—informally referred to as “chief pilot approval.”

For example, Daniels's current department underwriter gives him the ability to hire any SIC that he deems qualified to fly. This “hiring authority” is good, so long as

the copilot undergoes simulator training every 12 months.

“It's also about your department's loss history and relationship with the underwriting company,” Daniels noted. “Along with that, it's their knowledge of your current training programs, safety culture, and audits.”

Daniels's underwriter knows about his team's commitment to IS-BAO and other auditing programs. So at insurance renewal time, Daniels sits down to provide pilot summaries.

“If I have 10 pilots operating Gulfstreams and Challengers, and there's one with 5,000 hours and nine with 500 hours, they're going to look to me like I'm an idiot, right?” he said. “But if I have nine pilots with 5,000-plus hours and one with 500 hours, they don't even say a thing about it. They trust me.”

I'm grateful to both White and Daniels for debunking the idea that it's impossible to get insurance in a Part 91 operation with a low-time pilot.

Keys to Success

Considering an ab initio training program? Following are keys to your success:

» Build a business case

Obviously, your senior leadership team needs to be on board with hiring a lower-time pilot. But, as with all major decisions, you'll build the business case, outlining the long-term vision for the organization. You'll explain that by hiring a junior pilot with commensurate compensation, you're developing a “first officer.” And you'll share how this hire will impact your succession plan, as well as your onboarding and training programs.

» Understand the pro and cons

When you hire someone with years of flight experience, they can be set in their ways. High-time pilots might have to “unlearn” a few of them from previous employers. With a low-time pilot, you can train them to meet the cultural and technical needs of your organization.

Ab initio training offers you a unique opportunity to bring someone on board whom you otherwise wouldn't be able to add. What's more, it might be a refreshing change to hire someone who isn't the same age and experience level as the rest of the team.

» Get consensus

Of course, not all flight departments are capable of mentoring a young aviator. But it's an option for larger flight departments,

especially those with deep bench strength and a safety culture that values mentorship. To be successful, there needs to be a buy-in from everyone on the team, as it's a group effort.

» Establish expectations

All new hires, especially Gen-Z and Millennials, appreciate clear communication. That's why it's important to set expectations in the interview process. And then repeat them often—in the offer letter, during the onboarding process, and in one-on-one meetings. Additionally, set expectations with your team and flight training partners.

In turn, the pilot-in-training must understand that s/he will be in a junior role for several years. But that you'll support their growth every step of the way. They'll need to know that they'll likely need to meet with a mentor on a weekly basis.

» Hire for attitude, train for skill

Kyle White, my new friend in insurance, recalls some great advice he received from Bill Kahle, one of his long-time mentors. And that's to “hire for attitude and train to proficiency.”

According to White, “A hiring manager can't look at a piece of paper and say, ‘This person is going to be a good copilot or a good captain.’ Hiring the right person isn't based on a certain number of flight hours. It's about the culture of the environment and the attitude toward safety and training.”

Hiring a Pilot vs. an Aviator

When it comes to the issue of a “thin” logbook, Kahle placed more importance

on an individual's personality, character traits, and values. That said, as a former aviation department leader, Kahle also considered the quality of his/her flight experience. He told me: “A best-in-class safety culture and investment in simulator-based training can overcome the perceptions (and reality) of the ‘low time’ issue.”

And when it comes to recruiting, Daniels seeks out those candidates who are “pilots” versus “aviators.” He describes a pilot as someone who meets the minimum qualifications to get their license. Whereas an aviator meets those qualifications, as well as understands the why and the how, not just the what.

“When recruiting ab-initio candidates, it's key to find the right person,” Daniels explained. “It goes back to what Bill Kahle said, and it depends upon the person's passion. I can buy skills, but I can't buy attitude, and I can't buy passion.”

As I've mentioned previously, those of us in the business aviation industry need to consider recruiting talent for the long term. That means it's time to adopt “fluid hiring practices.” And it's time to challenge our mindset as well as our minimum requirements for entry.

To build our talent pipeline so that they'll come, we need to rethink how and when we bring new people into the industry. One way is to recruit pilots who are less experienced, but nonetheless passionate and willing to learn. ■

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

RedTail Flight Academy opens at Stewart Airport

On September 10, the RedTail Flight Academy at New York's Stewart International Airport celebrated the start of training of seven minority youth from underserved communities in the academy's Part 141 pilot training program. Charter provider Wheels Up is providing two internships every year to its graduates and, during a promotional period, donating \$1,000 from new Core membership signups to the academy.

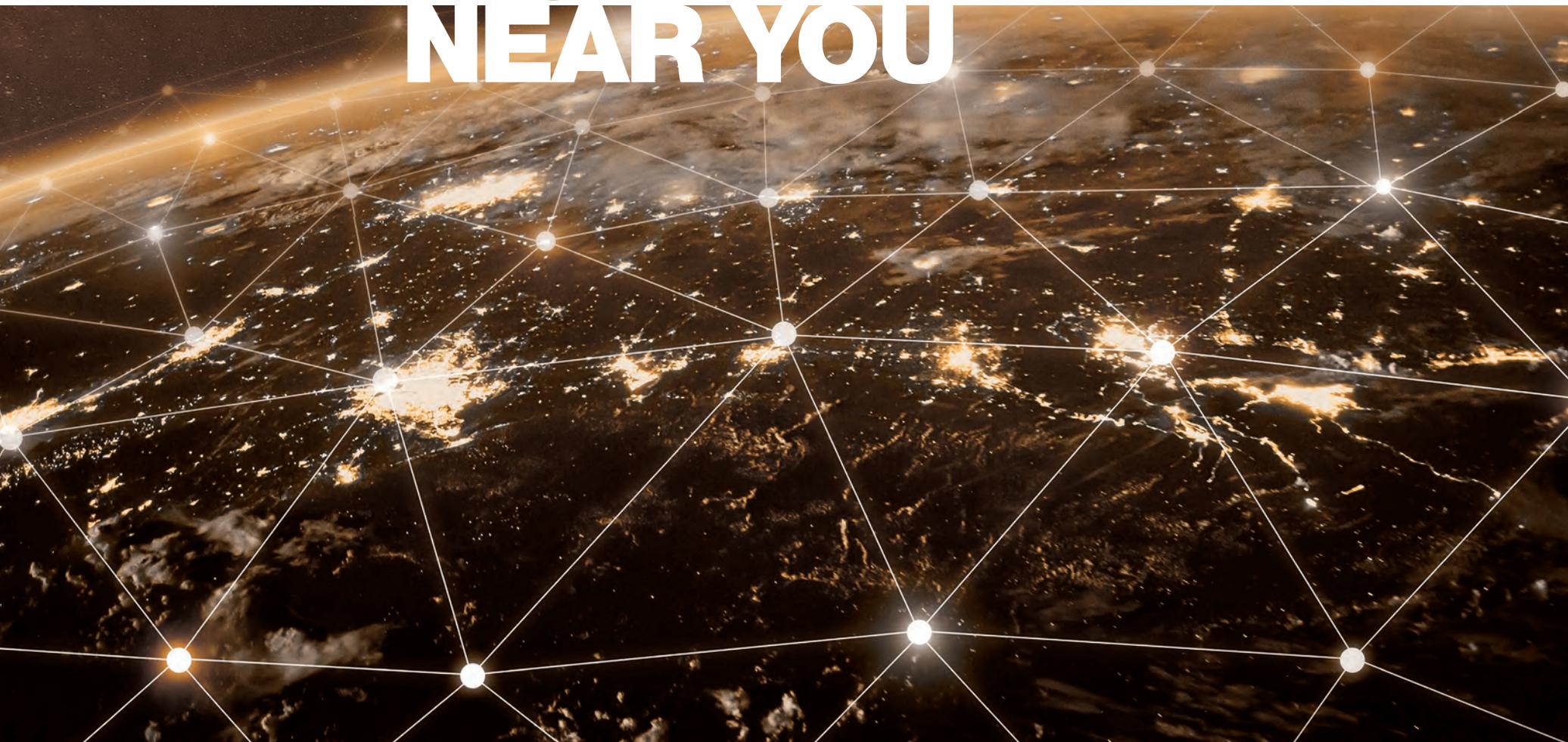
The academy honors the legacy of the Tuskegee Airmen, and Lt. Col. Enoch Woodhouse, one of the Tuskegee Airmen, was on hand to welcome the inaugural cadets during the celebration. The program is launching with three female and four male students and hopes to grow the percentage of minority pilots to 4 percent during the next 10 years, from the current 2.5 percent (in military and commercial aviation).

The all-volunteer academy was founded by the New York-based Tuskegee Airmen chapter. The training program aims to graduate the cadets in 10 months with a multi-engine commercial pilot license and instrument rating.

“We're thrilled to finally be able to welcome students to the RedTail Flight Academy to help diversify the aviation industry and perpetuate the values of leadership, courage, and perseverance of the original airmen,” said Glen Fraser, director of Lee A. Archer Jr. Red Tail Youth Flying Program. “The opportunity for our graduates to gain firsthand experience through internships at such a great company ensures they continue to learn aviation skills from industry leaders.”

“We're honored to be the first Part 135 provider to partner with the RedTail Flight Academy to help support the next generation of aviation talent,” said Wheels Up COO Thomas Bergeson. “By offering two internships every year to academy graduates, we're committing to diversifying our employee base and offering positions to underserved communities.” M.T.

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Williams International

AIN Product Support Survey

Readers rate turbine engine manufacturers on their product support efforts during the past year.

by Jerry Siebenmark

Williams International was the sole OEM to hold the first place slot in the turbofan segment in this year's AIN Engine Product Support Survey after sharing it with Pratt & Whitney and Rolls-Royce last year. Williams recorded an Overall Average of 8.8 (out of a possible 10), up from 8.2 last year. Meanwhile three engine manufacturers, GE Aviation, Pratt & Whitney, and Rolls-Royce, tied for second,

each with Overall Average ratings of 8.5. Honeywell followed with an Overall Average of 8.2. All five OEMs in the turbofan segment saw their Overall Average scores increase this year by between 0.6 and 0.2.

In this year's survey, Honeywell finished first with an Overall Average of 9.0 in the turboprop segment, up from 8.1 in the 2020 survey. Pratt & Whitney had an Overall

Average of 8.5, which was up from 8.0.

And in the turboshaft segment, Pratt & Whitney finished at the top with an Overall Average of 8.7, which was up from 8.0 last year. Safran Helicopter Engines followed with an 8.0 Overall Average, a score that was unchanged from 2020. Rolls-Royce came in third with an Overall Average of 7.6. The UK-based OEM was not rated in the turboshaft segment last year.

Survey Rules and Methodology

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

NEW SURVEY TOOL

This year, the survey was conducted via a newly designed questionnaire, developed in partnership with Rolland Vincent Associates, a Texas-based consultancy focused on aviation market research, strategy, and forecasting. The redesigned survey was created to provide improved ease of use and to encourage more participants to complete the entire survey.

The new survey tool:

- » Included Spanish and Portuguese versions for the first time.
- » Asked respondents to evaluate one full aircraft at a time including airframe, engines, and avionics.
- » Included clearer language and imagery around the individual categories and the evaluation scale.

METHODOLOGY

AIN emailed qualified readers a link to the password-protected survey website. The survey website was open from May 3 to June 11. Respondents were also asked to rate, on a scale from 1 to 10, the quality of service they received during the previous 12 months in the following categories:

- » Factory Owned Service Centers—Cost estimate vs. actual, scheduling process, on-time service, service experience
- » Authorized Service Centers—same as above
- » Cost per Hour Programs—Value for price paid, completeness of coverage, response time, quality of service, communication effectiveness, transferability of coverage, perception of residual value effect
- » Parts Availability—In stock vs. backlog, reasonable shipping time, parts available
- » Cost of Parts—Value for price paid when outside of warranty or cost-per-hour program
- » AOG Response—OEM speed of response, accuracy, cost, communication
- » Warranty Fulfillment—Ease of paperwork, extent of coverage
- » Technical Manuals—Ease of use, formats available, digital access, timely updating
- » Technical Reps—Response time, knowledge, effectiveness
- » Overall Engine Reliability—Satisfaction with reliability over last 12 months for this aircraft model

THE RESULTS

In total the survey collected 858 engine platform evaluations. Rolland Vincent Associates reviewed the data to ensure accurate and valid responses. They also compiled the final survey results in close coordination with AIN. In consultation with Rolland Vincent Associates we decided to separate turboprop and turboshaft engines in the tabulated results.

RESULTS ANALYSIS

In analyzing the results of this survey vs. prior years, this year's scores were generally higher. Our thoughts on this are:

- » Higher scores reflect the OEMs' continuous improvement and focus on the customer experience.
- » Certain segments of business aviation did fly considerably less from May 2020-May 2021. Fewer cycles may have led to fewer scheduled and unscheduled maintenance events.
- » The new survey tool certainly could have played a part in scores tending to be higher. The switch from a drop-down to radio buttons reduced the chance of a mistaken score.
- » This year's strong results could establish a new benchmark of excellence for OEMs as flight activity rebounds globally.

The 2021 AIN Product Support Survey results for aircraft appeared in the August issue while flight deck avionics, cabin electronics and connectivity were featured last month.

Williams International

The Results

In addition to receiving the top Overall Average among engine OEMs in this year's survey, Williams International received top marks from AIN readers for Cost per Hour Programs (8.5), Cost of Parts (7.9), AOG Response (8.8), Warranty Fulfillment (9.3), and Technical Manuals (8.6).

Williams's FJ44 also led the turbofan category with an Overall Average of 8.8. AIN readers also liked Williams's turbofan Cost per Hour Programs (8.5), Parts Availability (8.8), Cost of Parts (7.9), AOG Response (8.8), Warranty Fulfillment (9.3), and Technical Manuals (8.6).

The Improvements

Williams International's installed base of turbofan engines continues to grow at what senior v-p of product support Steve Shettler told AIN is an "increasing pace." Its fleet of FJ44 and FJ33 engines is approaching 6,700 and 16 million hours of flight time, he said.

In the past year, the Pontiac, Michigan-based OEM has focused on educating customers about the responsibilities

of assuring proper maintenance on their engines through qualified personnel by promoting its TAP Blue hourly engine maintenance program. Not only does TAP Blue allow customers to budget for maintenance events, it also ensures that work is done through approved centers with trained technicians, he said. Shettler added that 90 percent of Williams customers enroll their engines in TAP Blue upon delivery of their new aircraft. What's more, nearly all of its legacy hourly maintenance program enrollees have upgraded to TAP Blue.

The company's product support enhancements over the past year have included an updated payment system on its website to work with current browsers and mobile devices, which also enables Williams to accept all major credit cards. "This foundation will allow for future enhancements such as eWallet, stored payment profiles, and others that will allow for a faster checkout process on our customer portal," Shettler said.

In addition, Williams is implementing a new system for its technical publications, which will utilize the S100D format and, according to Shettler, "provide numerous enhanced features." "These new manuals should simplify access to information that technicians need to maintain our engines," he said.

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| Category & Overall Average Ratings for Engine OEMs | Overall Average 2021 | Overall Average 2020 | Rating Change from 2020 to 2021 | Factory Owned Service Centers | Authorized Service Centers | Cost per Hour Programs | Parts Availability | Cost of Parts | AOG Response | Warranty Fulfillment | Technical Manuals | Technical Reps | Overall Engine Reliability |
|--|----------------------|----------------------|---------------------------------|-------------------------------|----------------------------|------------------------|--------------------|---------------|--------------|----------------------|-------------------|----------------|----------------------------|
| Turbofan Engines | | | | | | | | | | | | | |
| Williams International | 8.8 | 8.2 | 0.6 | 8.8 | 8.8 | 8.5 | 8.8 | 7.9 | 8.8 | 9.3 | 8.6 | 8.8 | 9.3 |
| Pratt & Whitney | 8.5 | 8.2 | 0.3 | 8.6 | 8.9 | 8.0 | 8.5 | 7.6 | 8.5 | 8.9 | 8.5 | 8.6 | 9.2 |
| GE Aviation | 8.5 | 7.9 | 0.6 | 8.9 | 8.6 | 7.9 | 9.0 | 7.5 | 8.3 | 9.0 | 8.3 | 8.0 | 9.4 |
| Rolls-Royce | 8.5 | 8.2 | 0.3 | 8.6 | 8.6 | 7.6 | 8.5 | 6.9 | 8.7 | 8.9 | 8.2 | 8.9 | 9.6 |
| Honeywell | 8.2 | 8.0 | 0.2 | 8.7 | 8.8 | 7.6 | 8.1 | 7.1 | 7.9 | 8.6 | 7.7 | 8.3 | 9.0 |
| Turboprop Engines | | | | | | | | | | | | | |
| Honeywell | 9.0 | 8.1 | 0.9 | 9.8 | 9.6 | * | 8.8 | 7.0 | 9.0 | * | 9.1 | 9.5 | 9.8 |
| Pratt & Whitney | 8.5 | 8.0** | 0.5 | 8.6 | 8.7 | 8.1 | 8.5 | 6.9 | 8.3 | 8.8 | 8.3 | 8.7 | 9.4 |
| Turboshaft Engines | | | | | | | | | | | | | |
| Pratt & Whitney | 8.7 | 8.0** | 0.7 | 8.8 | 8.8 | 8.3 | 8.8 | 7.9 | 8.9 | 8.9 | 8.6 | 8.7 | 9.0 |
| Safran Helicopter Engines | 8.0 | 8.0 | - | 7.5 | 8.2 | 7.7 | 7.6 | 6.7 | 7.8 | * | 8.2 | 8.1 | 9.3 |
| Rolls-Royce | 7.6 | NA | NA | * | 7.9 | 7.2 | 7.1 | 6.1 | 7.0 | * | 7.9 | 8.7 | 8.7 |

Ties listed alphabetically; * Not reportable due to sample size; ** 2020 Overall Average includes both Turboprop & Turboshaft



GE Aviation

The Results

Besides its second-place Overall Average tie with Pratt & Whitney and Rolls-Royce in the turbofan category of engine OEMs, GE Aviation was singled out for its Factory Owned Service Centers (8.9) and Parts Availability (9.0).

Its CF34 engines also tied Rolls-Royce's BR700-series and Pratt & Whitney's PW500-series engines for third in the turbofan category of aircraft engines with an Overall Average of 8.5, up from 7.9 in the prior year's survey. The CF34 received high marks for Parts Availability (8.8).

The Improvements

Navigating the Covid-19 pandemic while improving support was the biggest challenge in the past 12 months for GE Aviation's business jet services operation, which supports the CF34 engine that powers the Bombardier Challenger 600-series and the Global 7500's Passport engine. "We really dug deep during the pandemic to make sure that not only did we not lower that customer service level but in fact increased it and were able to expand our offerings to make sure that we're providing that top level of customer service," GE Aviation business operations executive Tony Culic told **AIN**. "So, we're really trying to enhance and strengthen our services infrastructure." For example, the company did not cut its mobile repair teams nor its field service engineers during the pandemic, he said. During that time, GE Aviation completed more than 100 customer service events/touchpoints since the pandemic began. "For us, maintaining that level of service, making sure that availability is high in facilitating that, is a primary objective," he added.

More recently the company added another field service engineer, bringing its total to 17, and increased mobile service team members to 18 from 12. "We're

› continues on page 24

Pratt & Whitney

The Results

Among engine OEMs, Pratt & Whitney (P&W) was recognized for its Authorized Service Centers (8.9) in addition to its second-place tie with Rolls-Royce and GE Aviation. And among turboshaft OEMs, it was singled out for its Factory Owned Service Centers (8.8), Authorized Service Centers (8.8), Cost per Hour Programs (8.3), Parts Availability (8.8), Cost of Parts (7.9), AOG Response (8.9), Warranty Fulfillment (8.9), Technical Manuals (8.6), Technical Reps (8.7), and Overall Engine Reliability (9.0).

Its PW300 series engines tied Rolls-Royce's AE3007 and Tay engines for second place in the turbofan category with an Overall Average of 8.6, up from 8.2. The engine series received high marks for Authorized Service Centers (8.9) and AOG Response (8.8). Continuing in that category, the Canadian OEM's PW500 series engines finished at third with an 8.5 Overall Average, tying Rolls-Royce's BR700-series engines and GE Aviation's CF34 engine. The company's PW600-series

› continues on next page

WAIT FOR THE ALL-©CLEAR

BEFORE FLYING

Dear Aviation Professional,

Having a cold makes anyone function at a lesser level. For pilots, getting a little sick can be more than a minor inconvenience. Illness alone can cause flight impairment, but so can medicines taken to feel better. Nearly 30% of U.S. pilots killed in aviation accidents had potentially impairing medications in their systems. Even for over the counter (OTC) drugs the general public considers safe, the aviation profession owes a higher duty of care. It's vital to have experienced any medication in safe circumstances to check for side effects before flying with it, and to know exactly what's going into our bodies. A common decongestant, for instance, may have an active ingredient that puts it on the FAA's No-Go list.

Medication standards for flight crews are understandably higher than for office workers. One instance is in dosing intervals. Many prescription and OTC medications are known to be sedating or otherwise impairing. Per FAA recommendations, pilots taking any of these should wait for at least five times the listed dosing interval on the package before flying. For example, a drug taken once every eight hours requires a 40-hour, no-fly waiting period after the last pill is consumed.

Many medications reduce the symptoms of an illness, but don't cure it. Consider whether a scheduled flight needs to happen at all if you're not well. While this may be difficult in some operations, it's always better to not push it if there's a question about being fit to fly. Before making an ill-advised choice that jeopardizes safety, discuss backup plans for pilots, technicians and other critical personnel who ought to stay home. A safe culture stays well informed and supports good decision-making on and off the ground. NTSB Safety Study SS20-01 and the FAA's OTC medication guide (both widely available online) are foundational references in those pursuits. Be smart about being sick.

Join the Conversation

Search and tweet #FlyWell to add your thoughts, experiences or questions about handling minor illnesses before flying.

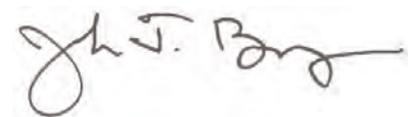
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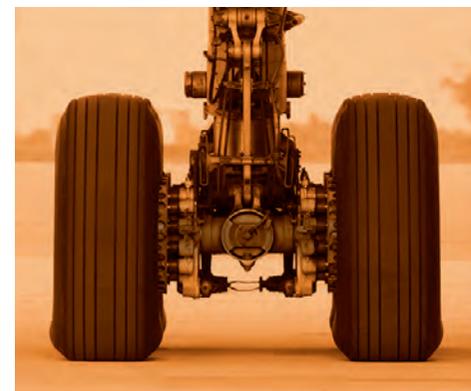
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President and CEO, USAIG





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Illnesses can complicate flight plans, clouding decision-making skills and perception in the cockpit. While taking prescription or OTC remedies might make a pilot feel better, it doesn't always clear one to fly. Identify the active ingredient in any medication you're considering and heed listed cautions to avoid impairment hazards.

- ▶ For meds that are sedating or have label warnings about operating machinery, wait for at least five dosage intervals after your last dose before flying.
- ▶ Consider postponing flights if you're sick enough to require any medication. The underlying condition can be as dangerous as the medication.
- ▶ Consult with your AME or an Aviation Medicine specialist with questions about medications or illness.
- ▶ Apply these guidelines to technicians or other critical task workers to stay safe.

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| Category & Overall Average Ratings for Aircraft Engines | Engine Model | Overall Average 2021 | Overall Average 2020 | Rating Change from 2020 to 2021 | Factory Owned Service Centers | Authorized Service Centers | Cost per Hour Programs | Parts Availability | Cost of Parts | AOG Response | Warranty Fulfillment | Technical Manuals | Technical Reps | Overall Engine Reliability |
|---|----------------|----------------------|----------------------|---------------------------------|-------------------------------|----------------------------|------------------------|--------------------|---------------|--------------|----------------------|-------------------|----------------|----------------------------|
| Turbofan Engines | | | | | | | | | | | | | | |
| Williams International | FJ44 | 8.8 | 8.3 | 0.5 | 8.8 | 8.8 | 8.5 | 8.8 | 7.9 | 8.8 | 9.3 | 8.6 | 8.8 | 9.3 |
| Rolls-Royce | AE3007 | 8.6 | 8.4 | 0.2 | 8.7 | 8.8 | 8.2 | 8.6 | 7.9 | 8.5 | 9.1 | 8.4 | 8.6 | 9.5 |
| Pratt & Whitney | PW300 series | 8.6 | 8.2 | 0.4 | 8.4 | 8.9 | 8.1 | 8.6 | 7.8 | 8.8 | 8.8 | 8.4 | 8.7 | 9.1 |
| Rolls-Royce | Tay | 8.6 | 8.4 | 0.2 | 9.1 | 8.6 | 7.6 | 8.8 | 7.3 | 8.8 | 8.6 | 8.4 | 8.5 | 9.8 |
| Rolls-Royce | BR700 series | 8.5 | 8.1 | 0.4 | 8.6 | 8.7 | 7.7 | 8.5 | 7.0 | 8.7 | 8.9 | 8.2 | 9.0 | 9.5 |
| GE Aviation | CF34 | 8.5 | 7.9 | 0.6 | 8.9 | 8.7 | 8.0 | 8.8 | 7.5 | 8.1 | 8.8 | 8.1 | 7.9 | 9.5 |
| Pratt & Whitney | PW500 series | 8.5 | 8.2 | 0.3 | 8.5 | 8.7 | 7.7 | 8.4 | 7.2 | 8.3 | 9.0 | 8.4 | 8.5 | 9.4 |
| Honeywell | TFE731 | 8.3 | 8.0 | 0.3 | 8.6 | 8.8 | 7.5 | 8.3 | 7.0 | 8.0 | 8.7 | 7.9 | 8.3 | 9.2 |
| Honeywell | HTF7000 | 8.1 | 8.1 | - | 8.7 | 8.9 | 7.8 | 7.8 | 7.2 | 7.8 | 8.6 | 7.6 | 8.1 | 8.8 |
| Pratt & Whitney | PW600 series** | 8.5 | 8.5 | - | 8.8** | 9.0 | 8.4 | 8.7 | 6.0 | 8.1 | 8.2 | 8.8 | 8.5 | 9.5 |
| Turboprop Engines | | | | | | | | | | | | | | |
| Honeywell | TPE331 | 9.0 | 8.1 | 0.9 | 9.8 | 9.6 | * | 8.8 | 7.0 | 9.0 | * | 9.1 | 9.5 | 9.8 |
| Pratt & Whitney | PT6A | 8.5 | 8.1 | 0.4 | 8.7 | 8.7 | 8.2 | 8.6 | 7.0 | 8.3 | 8.9 | 8.4 | 8.8 | 9.5 |
| Turboshaft Engines | | | | | | | | | | | | | | |
| Pratt & Whitney | PT6T/B/C | 9.0 | 8.2 | 0.8 | 9.0 | 9.2 | 8.6 | 9.0 | 8.3 | 9.1 | 9.1 | 9.0 | 9.1 | 9.2 |
| Pratt & Whitney | PW200 series** | 8.6 | 8.2 | 0.4 | 8.9 | 8.9 | 8.5 | 8.9 | 7.9 | 8.8 | 8.9 | 8.4 | 8.2 | 8.9 |
| Rolls-Royce | 250 | 8.4 | NA | NA | * | 7.9 | 7.8 | 7.2 | 6.4 | 7.4 | * | 7.6 | 8.6 | 8.4 |
| Safran Helicopter Engines | Arriel | 7.7 | 8.0 | (0.3) | 7.2 | 8.5 | 6.7 | 8.1 | 5.8 | 7.5 | * | 7.9 | 8.1 | 9.4 |

Ties listed alphabetically by engine model; * Not reportable due to sample size; ** Number of responses just below our threshold for direct comparison with other engines models

► Pratt & Whitney continued

turbofans finished at sixth—with a smaller respondent sample—with an Overall Average of 8.5, which was unchanged from last year.

In the turboprop category, Pratt & Whitney's PT6A had an Overall Average of 8.5, up from 8.1.

Among turboshafts, the company led with the PT6T/B/C and an Overall Average of 9.0, up from 8.2. Readers gave that engine high marks for Factory Owned Service Centers (9.0), Authorized Service Centers (9.2), Cost per Hour Programs (8.6), Parts Availability (9.0), Cost of Parts (8.3), AOG Response (9.1), Warranty Fulfillment (9.1), Technical Manuals (9.0), and Technical Reps (9.1). Pratt & Whitney also came in second place with the PW200-series turboshaft, with an Overall Average of 8.6 compared with 8.2 in the prior year.

The Improvements

Being closer to customers was the mission for P&W's product support organization in the past year, v-p of customer service Satheeshkumar Kumarasingam told **AIN**, which was accomplished through a two-pronged strategy: improving access to the company through the enhancement of digital connectivity and expanding its designated maintenance

facility (DMF) network. "Whether the aircraft is parked or coming in or out, that's where the touchpoints are," he said of the maintenance facility network expansion.

In terms of improving customer access digitally, the company went to a system where its customer portal only requires a single sign-on. The single sign-on, which can be assigned to an owner or a designated person such as a director of maintenance, enables the user to access technical publications, purchase parts, reserve a rental engine, and access P&W's pay-by-the-hour Eagle service plan (ESP). The single sign-on replaces a system in which customers had to provide such information as their specific engine, name, and address, Kumarasingam explained. And if they wanted to reserve a rental engine or purchase parts, that required inputting additional information such as for credit verification. The single sign-on ensures an "agile and quick" experience, he added. Two thousand customers have taken advantage of the single sign-on in the past year. "It speaks volumes in terms of the enhancements and people feeling comfortable to be able to do that," he said.

In addition to improving digital access for product support, P&W has added two more DMFs in the past year, in Chile and Qatar. That brings its network of DMFs to 17 in North and

South America, Europe, and Asia. The DMF concept was first introduced by the company in 2017 in Brazil and has proven to be "very positive," Kumarasingam said. "It gives reach to our customers and we get information about what line items are causing the biggest pain." Those pain points also help P&W determine whether it needs to make product or service improvements, he added. DMFs provide line maintenance and are supported by a network of company-owned overhaul and designated overhaul facilities, as well as more than 100 field service managers positioned around the world.

Lastly, P&W has enhanced offerings with its ESP on the PT6 family of turboprop engines to include offering insurance gap coverage for foreign object damage and providing engine health monitoring and analysis on its newest PT6E turboprop engine to provide proactive maintenance support to those customers. Also, the company has added a dedicated customer account manager for every PW800 customer enrolled in ESP. PW800 customers would include those who own/operate the Gulfstream G500/600 and Dassault's new Falcon 6X, "a different category of customers," Kumarasingam said. "It's less about 'let me manage your event in the shop' but rather 'let me make sure that you are served properly in whatever.'"

Rolls-Royce

The Results

In the engine OEM category, Rolls-Royce received high marks for Technical Reps (8.9) and Overall Engine Reliability (9.6) for turbofans. Readers also gave the company high marks among turboshaft manufacturers for Technical Reps (8.7).

The company's AE3007 and Tay turbofans tied Pratt & Whitney's PW300-series engines for second place in this year's survey, each with Overall Averages of 8.6, up from 8.4 last year. Its AE3007 was noted for Cost of Parts (7.9), while the Tay received high marks for Factory Owned Service Centers (9.1), Parts Availability (8.8), AOG Response (8.8), and Overall Engine Reliability (9.8). Its BR700-series engines also tied for third with GE Aviation's CF34 and Pratt & Whitney's PW500-series turbofans with an Overall Average of 8.5. The BR700-series was also credited by readers with a 9.0 for Technical Reps. The company's 250 engine placed third in the turboshaft category with a smaller respondent sample, recording an Overall Average of 8.4.

The Improvements

Despite the challenges posed by Covid-19 in the past year, UK-based engine maker Rolls-Royce was able to achieve its 99 percent averted missed trip goal as well as another to recover any AOG aircraft within 24 hours anywhere in the world, senior v-p of business aviation customers and services Andy Robinson told **AIN**. Also on the product support side, Rolls-Royce continued its work developing interactive technical publications that include 3D graphics and text instructions that can be downloaded or accessed via Wi-Fi on any device. In a related move, it continued development of its virtual reality training for maintenance crews, the timing of which couldn't have been more ideal, Robinson explained. "As you can imagine, being able to continue training people remotely with the lockdowns was hugely successful," he said.

The entry into service of the Pearl 15 with the Bombardier Global 6500 in late 2019 followed by the 5500 in mid-2020 has meant a "step change in engine health monitoring capability" for Rolls Royce. "It's taken us from being able to monitor around 2,000 engine parameters to closer to 10,000 engine parameters," Robinson said. More importantly, the engine vibration health monitoring unit (EVHMU) included on the Pearl 15 also allows it to monitor engine accessories, which he said are typically what cause engine disruptions. "The fuel pump, or fuel metering unit, or the starter motor, those are the things that historically have never been able to be monitored for health," he added. "Yet with the EVHMU we can. [It is a] step forward for us to ensure an aircraft is available 100 percent of the time."

Rolls-Royce also opened a customer support facility earlier this year in Savannah, Georgia, adjacent to the new Gulfstream Service Center East. The 62,000-sq-ft facility supports G550s and G650s powered by Rolls-Royce's BR710 and BR725 engines, respectively. It will also support the Pearl 700 engine on the new G700 once that ultra-long-range twin enters service.

Robinson said Rolls-Royce also continues to see increasing acceptance of its CorporateCare Enhanced program that builds on its CorporateCare fixed-cost program with more comprehensive coverage. In just the past two years, Rolls-Royce has sold 720 CorporateCare Enhanced contracts.



Rolls-Royce

› GE Aviation continued

doing that again because not only do we see increased utilization on the CF34 side but as the Passport fleet will grow now, we need to make sure we're staffed properly to provide that level of service," Culic said.

The company is also working to expand the number of authorized service centers (ASCs) globally because it's heavily oriented to North America and Europe. That effort includes forward-positioning spare parts. The regions where its service is light are Asia-Pacific and South America. "We're really focusing on those...regions to make sure there's that seamless level of service," he said. In all, the company has 42 ASCs.

A company-wide effort at integrating more lean processes means that the business jet unit is also "looking to apply lean tools more fully and through an entire service process to make sure we're most efficient and reducing our lead times and increasing our responsiveness to drive down AOGs," he said.

Further, Culic explained that GE Aviation is taking lessons learned from the CF34, such as repair processes and turnaround times, and applying them to the Passport. By doing so the company will be better prepared for the time when those engines come in for scheduled and

unscheduled maintenance and "at a cost we've committed to the customer."

Specifically on the Passport, collaboration with Bombardier's company-owned service centers is especially important because the engine powers the Canadian airframer's flagship Global 7500. "We're definitely looking for a premium, seamless experience. We are well integrated with Bombardier at their service centers such that the customer can bring their aircraft in and of course receive both aircraft and engine maintenance," Culic said.

Looking to the future, GE Aviation is leveraging the prognostic engine health management on its Passport to develop more algorithms and analytics to predict impending failures on the engine and use them to turn an unscheduled maintenance event to a scheduled one. That same effort could also serve to increase the engine's fuel efficiency and reduce carbon emissions, Culic said. Also on the Passport, the company is seeking ways to strengthen Passport maintenance through additional locations, parts availability, and the services those new locations would provide.

In terms of GE Aviation's engine hourly maintenance program, OnPoint, the company also is exploring programs and options to potentially provide a solution on carbon offsets, Culic added.

› continues on page 30



GE Aviation

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Cirrus G2+ Vision Jet

by Matt Thurber

Owners of Cirrus airplanes have come to expect regular updates to keep the aircraft fresh and appealing to new buyers, and it's no surprise that Cirrus Aircraft has adopted this philosophy for its entire line, including the SR piston singles as well as the single-engine Vision Jet. Just before the opening of this year's EAA AirVenture show in Oshkosh, Wisconsin, in late July, the airframer unveiled the latest version of the aircraft, the G2+ Vision Jet, with some helpful new features.

Chief among these is a performance improvement, thanks to an upgrade to the jet's Williams International FJ44-5A Faded (electronic control) system. The change doesn't affect power output but it delivers a 20 percent "optimized thrust profile" that provides increased performance where it's most needed, during takeoff on hot days and at high altitudes.

The other upgrades include Gogo Avance L3 "Inflight Wi-Fi," USB-C ports, and new paint scheme "colorways" that include Titan Grey, Volt, and Bimini Blue. Another new feature, the Flex cargo management system, was announced more recently. This adds cargo attachments to the seating system, enabling the safe carriage of large items such as bicycles, golf clubs, coolers, and luggage. The Flex system adds no weight to the jet and will be available in the first quarter of 2022.

Of course, the Vision Jet also is fitted with Garmin's Autoland system, branded Safe Return by Cirrus. This means the jet now has two key safety features: the whole-airframe parachute for the rare possibility of engine failure or some other catastrophic problem, such as a midair collision; and Autoland, to help handle the unlikely chance of pilot incapacitation.

Third Vision Flight

To preview the upgrades, I flew the G2+ with Vision Jet program manager Matt Bergwall, who met me at Hillsboro Airport

near Portland, Oregon. Although the flight took place before the heatwave that brought 110+ deg F weather to the area, we were able to observe the improved jet's high-altitude performance while flying from Hillsboro to Sunriver, Oregon, and back.

I've flown the Vision Jet twice before and have also received formal training in the Cirrus SR piston single-engine four-seater, so I'm somewhat familiar with the layout of the cockpit. The Vision Jet and SR are so similar that it's an easy transition; the main difference is that operating the jet's engine is far simpler than efficiently managing a piston engine's controls.

The pilot's (left) seat moves far back on its tracks and lines up with the doorway to make climbing aboard simple. The Garmin-based Perspective Touch+ avionics are a familiar home for a Garmin user but have the added advantage over the SR series of touchscreen controllers mounted at the bottom of the instrument panel. We started the 1,846-pound-thrust Williams FJ44-5A engine, an automatic process typical of modern electronically controlled engines, and then Bergwall set up the Farmington 7 departure and route to Lake County Airport, 231 nm away. The plan was to exercise the G2+ at a higher-elevation airport to test the improved takeoff performance, but given some time constraints, we ended up diverting to Sunriver, which was almost as high and a bit closer.

Having owned an airplane with no nosewheel steering, I'm comfortable with the Cirrus "steer by brakes" castering nosewheel, a characteristic in all Cirrus airplanes. It might seem odd that a \$3 million jet doesn't have nosewheel steering, but it doesn't need it; as long as pilots don't overuse the brakes, it works fine, although you do need to give the jet a little burst of power before making any turns.



The new G2+ Vision Jet adds features that include engine optimization for improved takeoff performance in hot and high conditions, Gogo Avance L3 inflight Wi-Fi, and new paint colors.

With 254 gallons of fuel and two of us on board, the jet weighed 5,747 pounds, 253 pounds below the 6,000-pound maximum takeoff weight. The avionics calculated our takeoff distance over a 50-foot obstacle at 3,453 feet and handily showed our climb gradient of 1,184 ft/nm. The outside air temperature was 22 deg C—ISA plus 6 deg—and density altitude was 664 feet.

I taxied the jet from the modern Hillsboro Aviation FBO to the long runway, 31L, and soon after holding short at the takeoff end, we had completed the before-takeoff checklist displayed on the center multifunction display (MFD) and were ready to go.

Southbound Departure

With takeoff flaps set, I pushed the go-around button to set the flight director cue for the initial climb attitude, switched on the autothrottle, then pushed the power lever all the way forward. Takeoff in the Vision Jet isn't a hurried affair, but once the engine spools up, the acceleration kicks in, and with a gentle tug on the sidestick, we were quickly rotating, climbing, and then retracting the landing gear and flaps. A left turn after takeoff lined us up for the southbound departure route, and with few other aircraft in the area, we soon were climbing to the maximum altitude of FL310.

The Vision Jet is one of the more comfortable airplanes to hand-fly, with prompt response to control inputs and little need to move the controls much to elicit a response. Unlike the piston SR series, which has a control yoke on the outer corners of the instrument panel, the Vision Jet has a real sidestick that pivots fore and aft and side to side. Even though the stick is relatively short, it possesses plenty of control authority, and I could fly the jet most of the time with my fingertips, making small adjustments for the desired amount of bank and pitch.

I reluctantly gave up my hold on the stick after we climbed into the teens and switched on the capable Garmin autopilot, using indicated airspeed mode set at 150 knots. It was a beautifully clear day, with views of all the mountains surrounding the Columbia river gorge.

Leveling off at FL310, I was happy to see that the Vision Jet's avionics now incorporate the handy heading sync feature, which automatically matches the heading bug to a new heading after a turn, when heading is selected on the flight director.

It was ISA +11 deg C at FL310, and speed settled at Mach .525 and a true airspeed of 315 knots (higher than the published maximum of 311 knots) while burning 64 gph. (Fuel indications can be switched between gallons and pounds, depending on the pilot's preference.) Cabin altitude was 8,000 feet.

Advanced Wi-Fi

I tested the Gogo Avance L3 air-to-ground connectivity system during this leg, easily connecting my phone to the internet. Although the L3 system is not as fast as the more expensive L5, the L3's 3G speed is perfectly suited to a smaller aircraft. Owners of light turboprops and jets have been clamoring for a reasonably priced internet solution, and the G2+ is the first "personal jet" to be so equipped. With Avance L3, pilots can surf the web, send and receive emails, and access Gogo features such as moving maps, news feeds, and flight



At 31,000 feet and ISA +11 deg C, true airspeed topped out at 315 knots, while burning 64 gph. Note the heading bug in sync mode, which centers the bug after turning to a new heading.

MATT THURBER

information. Cirrus is also offering an initial Gogo Wi-Fi subscription included in the JetStream ownership cost program, which covers “normal wear replacement, recurrent training, direct support, subscription services, and more for a worry-free ownership experience,” according to Cirrus.

We descended and slowed down for the traffic pattern at Sunriver, and the Vref on final approach was an incredibly low 85 knots, just a few knots higher than the final approach speed for an SR and another reason transitioning to the jet is so uncomplicated.

A major difference remains, however, between a piston SR and the Vision Jet: it’s not hard to get behind the power curve in the jet, and it’s important to keep the power up to a reasonable level and not allow the jet to get too slow and with a low power setting at the same time, although full flaps stall speed is a low 67 knots.

Having flown the Vision Jet only three times and not gone through the type rating training in the full-flight simulator in Knoxville, Tennessee, I find that I try too much to move the throttle to keep the speed at Vref. Bergwall pointed out that this all works better by just setting power at 30 percent thrust and massaging the pitch to keep in the vicinity of Vref. Otherwise, it’s easy to end up slow and with power at around 20 percent, then jam the throttle forward to bring the power up when the speed lags, which is what my final approach looked like.

Nevertheless, the forgiving Vision Jet lands a lot like an SR and my result was reasonably smooth and didn’t use too much runway. Just a light push on the brakes left enough speed to tap on the left brake and turn off the runway.

I taxied back to the beginning of the runway. The airport elevation is 4,164 feet, but the higher summer temperature pushed the density altitude to about 5,500 feet. The takeoff run felt just as short as it was at much lower Hillsboro, and the Vision Jet took off and climbed quickly to the mid-20s for the return leg.

Setting up the RNAV 31L approach to Hillsboro with the touchscreen controller was a cinch, basically the same as using a GTN 750 navigator. I followed the flight director guidance, hand-flying the approach and this time trying to do a better job managing airspeed on final. Just a tiny nudge of back stick as we neared the runway worked perfectly, producing another smooth



MATT THURBER

touchdown, reminding me again why I like flying this jet so much.

While the enhanced engine performance doesn’t change the 1,275-nm range and 311-knot published maximum speed, it does improve takeoff performance at higher-elevation airports, allowing carriage of higher payloads. For example, on an 82-deg F day at Aspen, the total takeoff distance is reduced by 1,000 feet.

The Vision Jet’s roomy cabin, ergonomic cockpit design, terrific visibility, and harmonious flight controls all make for an ideal personal jet package. At \$2.98 million, including the Gogo Wi-Fi, the G2+ costs less than larger and faster single-engine turboprops, and Cirrus’s penchant for rapid product improvement and the jet’s step-up familiarity with the SR piston singles almost guarantees it a receptive market. ■



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FAA warms to virtual rides for line check

by Woody McClendon

What should a charter operator do when a captain needs an FAA 135.299 line check by the end of the month or they will be demoted to first officer status, and the FAA office is in overload and no inspectors are

available? The inability to complete the line check in a timely manner could jeopardize the charter schedule, forcing the cancellation of many revenue-generating flights.

Michael McCullough, assistant director

of operations at Aviation Resource Management and chair of the NBAA's Part 135 Committee, had heard about a potential solution and decided to investigate. It turned out that others were already exploring the application

of video and audio tools, or video and communications technology (VCT), to create a virtual record of a line check flight that FAA inspectors could observe in their offices instead of flying in the airplane. The result: a process for line checks that eliminates the complicated logistics, not to mention risks, that make in-flight line checks a huge challenge.

"We were hearing from our membership that the FAA was starting to conduct these virtual checkrides, but FAA inspectors often didn't know where to start the process," said McCullough. "Our committee decided to take a proactive step and create a document offering some recommended guidelines for virtual 135 checkrides. In the past, proactivity has been welcomed by the FAA, as long as the subject effort complies with applicable FAA guidelines and regulations."

Line Check Guide

The committee's work product is entitled *VCT Line Check Best Practices Guide*. It provides a step-by-step process for organizing a VCT-based checkride, including the video and audio components needed, how to arrange them in the cockpit, and how to work with the FAA to gain approval of the system as a method of documenting the line check.

According to the guide, GoPro action cameras are the suggested video and audio recording devices. GoPro offers a wide variety of simple, rugged cameras that are adaptable to almost any activity, be it a rugged mountain bike ride, a rocket into space, or a flight in a corporate jet. Weighing less than six ounces, these devices are small and can be securely fastened in place with portable clamps or flexible mounts, simplifying the setup process and eliminating the need for complex maintenance approvals. Later model GoPro cameras have built-in stabilization that ensures a rock-solid video.

Two cameras should be used in a flight deck setup, one focused on the flying pilot's instrument panel and the windshield, and the second on the flying pilot's primary instruments. Audio inputs can be captured via a special cable plugged into the headphone connector between the headset and aircraft, then into one of the GoPro cameras.

To initiate the process, the document suggests sending a test video to the FAA that gives the inspector insight into what the flight check will look like, along with a request for approval to conduct the virtual checkride. As well, the entire exchange between operator and the FAA, according to the guide,

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Although this is not an example of a virtual checkride, it does illustrate the use of GoPro cameras to record flight deck video.

should be documented via email. Once the FAA is in agreement, the operator can firm up the VCT configuration and schedule the flight check.

An important part of this process is that a non-flying individual, preferably a company check airman, should ride along on the flight check to manage the VCT process, insuring that the crew being evaluated can concentrate on their flying duties. Once the flight crew is in place in the airplane, before they begin pre-start procedures, that non-flying person should start the GoPro cameras and state for the recording the date and time. When the flight is completed and the aircraft is shut down, the non-flying person announces the time of shutdown and switches off the cameras.

The guide suggests uploading the VCT file to a predetermined portal, then scheduling a remote debrief with the FAA inspector via an online meeting platform. The pilots involved in the checkride should be present for the debrief. Once everyone is in place virtually, the VCT recording will be played. The inspectors will electronically approve the appropriate records or note any failures or incomplete items that could require a re-check.

The FAA has not formally endorsed or approved the guide, according to McCullough. But inspectors have reviewed it and provided comments. Operators should work with their principal operations inspectors (POI) to determine when the VCT checkride process is appropriate. Many FAA inspectors are unaware of or have little knowledge of the process, so it is up to operators to provide as much information as possible to assist POIs in defining a path forward. The NBAA guide is an effective tool in that process.

Real-life Example

In 2020, amid the Covid shutdowns, Ashley Smith Jr., president and director of operations for Jet Logistics, needed to accomplish line checks for two captains on a newly acquired jet. The airplane was based in Scottsdale, Arizona. The POI in South Carolina could not get his office to approve a trip across the U.S. But Smith found out from the flight crew on the airplane that the Scottsdale FSDO was experimenting with virtual line checks.

On further inquiry to both the Scottsdale FSDO and the NBAA, the latter where Smith is a contributing board member, he determined there was such a procedure. If it worked, it would solve his dilemma.

“The Scottsdale FSDO was administering line checks using GoPro cameras installed in the aircraft,” Smith said. “The recordings were then reviewed by the appropriate inspectors, after which they were signing off line checks.”

Smith thought the virtual line check process could help other operators and got McCollough and the NBAA involved in creating the guide so others could take advantage of this opportunity.

Familiar with GoPro cameras in aircraft from his aerobatic flying, Smith applied that knowledge to set up a functional recording system in a Citation XLS that would be the subject airplane for the planned line checks.

“The Scottsdale FAA team gave us some general guidelines,” Smith said, “but explaining that the process was, at this time, not officially approved. Still, it was our only option, so I decided to take the greatest care to provide a well-documented record.”

Early in the setup, one of the GoPros had a battery failure. Smith made sure their documentation added a suggestion to have extra batteries on hand during the flight. He organized the airplane and crew for the flight and flew with them, taking care of the cameras and identifying enhancements that could improve the quality of the record.

“We took the raw footage and developed a better-running, well-notated video record for the FAA,” Smith said. “Using iMovie, the Apple [video editing] app on my Macintosh laptop, we added text notations identifying video scenes in the flight where an inspector could note key points in the flight for the record.

Based on Smith’s video and audio recording, Jet Logistics’ POI was able to approve the two line checks.

“We spent a lot of effort to make sure we got this right,” Smith said. “I do believe this virtual process will work for the industry, provided inspectors at the FSDOs around the country buy into it. To that end, the more we operators develop a well-documented, repeatable procedure, the more likely we are to get FAA inspector buy-in.” ■

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Honeywell Aerospace

The Results

Honeywell's TFE731 and HTF7000 came in at fourth and fifth place in the turbofan category with Overall Averages of 8.3 and 8.1, respectively. The TFE731 Overall Average was up by 0.3 from the 2020 survey while the HTF7000 was unchanged. But readers noted the HTF7000 for Authorized Service Centers with a score of 8.9

The company's TPE331 improved its year-over-year Overall Average for a top score in the turboprop category, up by a full point, recording a rating of 9.1.

The Improvements

A key focus for Honeywell over the past 12 months has been support of its HTF-series turbofan engines, Phil Alcock, Honeywell Aerospace senior director of global field service engineering, told **AIN**. Specifically, the Phoenix-based OEM has introduced a new No. 4 carbon seal on the HTF7000/AS907 series engines on the Challenger 300 and 350, G280, Citation Longitude, and Legacy 450/500 and Praetor 500/600. The new seal is aimed at reducing aft pump events experienced by the fleet, according to Alcock, and allows operators to return to oil filter analysis through normal maintenance intervals.

Another improvement was the introduction of a thermal anti-ice valve through a partnership with GKN. Manufactured by ACS, the new valve is an alternate to the Dukes thermal anti-ice valve that Alcock said was

experiencing reliability issues across the HTF fleet.

For customers of Honeywell's Forge end-to-end flight management platform, the company has rolled out its new E-Engine Interface compatible with Windows 10. Files are viewable via the Honeywell Forge Connected Engines portal and data is sent directly to Camp Systems.

Following implementation of a new MapAero paint system in the production of the HTF-series thrust reverser assembly, Honeywell and its nacelle suppliers have rolled out thrust reverser paint repair for the aftermarket through OEMs Bombardier, Embraer, and Gulfstream and their service center networks.

Alcock noted another improvement, the assignment of a single case number to customer issues. Previously, a customer may have called for a troubleshooting request that's assigned a case number but evolves into a separate case—and number—for Honeywell's spares department to resolve. "All of the details now are entered into one single case with everyone having full visibility and ownership, and that has really streamlined the customer support and made things so much simpler," he said.

Also, as a result of the Covid-19 pandemic and the travel bans that followed, Honeywell partnered with FlightSafety to develop online courses for new and recurrent training for Honeywell customers and their pilots and maintenance staff. "We've had great feedback on those courses," Alcock said.



Safran Helicopter Engines

The Results

Safran Helicopter Engines placed fourth in the turboshaft category with its Arriel engine and an Overall Average of 7.7, which was 0.3 points lower than its 2020 turboshaft Overall Average of 8.0. Readers rated the engine highest for Overall Engine Reliability (9.4).

The Improvements

Safran Helicopter Engines has undertaken a number of improvements over the past year to its product support. That includes "robust" improvement on the Arrius 2B2, which powers the Airbus H135, and on the Arriel 2E, with new software providing more power margin to the H145 that it powers, according to the French engine maker. In addition, rates for bare engines have increased by 50 percent over the past decade with the continuous TBO extensions on a num-

» continues on facing page

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Safran Helicopter Engines

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Mary Cote (Rolls-Royce) This person has the most consistent highest level of customer service in this industry.

Mark Webster (Rolls-Royce) Consistently excellent support and service.

Steve Redmond (Pratt & Whitney) Steve's efforts were critical at times to our initiatives to support Covid 19 testing.

Steve Strine (Pratt & Whitney) Goes above and beyond the call of duty. Is doing the work of three people due to the pandemic.

Troy Lewis (Williams) Troy oversees customer support and has followed up on every uploaded Fadec report I sent to make sure we are being serviced. He also goes out to the various aviation events to talk to customers and answer questions. Very knowledgeable on our engines.

Guy Bonaud (Safran) We have had a long relationship with him, more than 20 years. He is working between France and us, and he understands both cultures. That is important for us.

Mark James (Intercontinental Jet Services) Mark's knowledge of the MU-2 and his management skills at IJSC is keeping the MU-2 alive and well for many more years.

› Safran Helicopter Engines continued

ber of engine variants, including the Arriel 2D and 2E, which have been extended to 5,000 hours.

Continuing on the MRO side, Safran said customer feedback is incorporated into the design of new engine variants so that from initial development, reparability and costs are part of the framework of the engine design so that it can go so far as guaranteeing a much lower cost of ownership in the future. An example of that is the H160's Arrano 1A, the workload of which will be lightened by five times fewer maintenance tasks and global maintenance time reduced by 40 percent compared with previous engine generations.

Safran modernized its 33,000-sq-m (355,000-sq-ft) plant in Tarnos, France, streamlined workshops, and invested in new machinery to improve turn-around times and costs.

Other efforts taken by Safran Helicopter Engines to improve product support have been the creation of two "quick turn" shops in Canada and the UK for customers of its SBH engine support-by-the-hour program. Those shops can inspect an engine and perform a detailed analysis to determine if it can be repaired at one of those locations or whether it needs to be sent to a facility with greater capabilities. Regarding SBH and the company's other by-the-hour maintenance contracts, 50 percent of Safran's customer base has either an SBH contract or a Global Support Package for military and government operators.

In North America, the company has increased fuel control unit and hydro-mechanical metering unit repair capacity by 30 percent. For equipment such as bleed or electro valves, it is increasing capacity of pre-induction tests to avoid unnecessary repairs.

Safran is also optimizing the ratio of repaired parts to new parts, thus reducing the overall cost of a repair or overhaul.



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Bristow seeks leading role in AAM sector

By Charles Alcock

Global helicopter group Bristow has harbored ambitions to diversify its operations for some time, and now it is taking the first steps to become a leading player in the advanced air mobility (AAM)

sector. Last year's merger with rival Era bolstered the companies' combined balance sheets to support the investments needed to implement Bristow's plans. The August 26 announcement of the

intention to add 50 of Electra's new eSTOL aircraft to its fleet is the first visible sign of Bristow's plan to reinvent itself. Ahead of deliveries starting in 2026, the Texas-based group will support

Electra in areas including operations, design, and safety features.

According to David Stepanek, Bristow's executive vice president for sales and chief transformation officer, the new aircraft will complement the helicopters, which have been the backbone of its 250-strong fleet for decades. The company also intends to stay in the oil and gas support market, despite tough conditions that in recent years have seen margins squeezed by over-capacity among helicopter lift providers and oil prices at times hitting new lows.

While acknowledging that the offshore energy industry support business has come under pressure, Stepanek told AIN, "It's going to be around for a long time." He sees the industry being an ally of the AAM pioneers as companies seek new sources of sustainable energy.

More specifically, Bristow envisages eVTOL aircraft potentially replacing some helicopters on flights to offshore platforms, and especially as improved battery technology extends range. In the Gulf of Mexico, oil platforms can be up to 100 miles offshore, while some in the North Sea can be farther away.

"We've taken time to look at how Bristow would fit into the [AAM] value chain and what the roadmap would be," said Stepanek. "We have 70 years of experience of vertical operations in restricted airspace, and we operate on five continents with 12 AOCs [air operators certificates]."

Among the aviation agencies from which the group holds approvals are the FAA, EASA, CASA (Australia), and ANAC (Brazil). It also has operations in countries including Guyana, Nigeria, Suriname, Egypt, Mexico, Trinidad and Tobago, and Turkmenistan.

Bristow feels the international scope of its operations gives it a stronger platform for launching eVTOL operations around the globe than many traditional Part 121 aircraft operators. "We also have IP [intellectual property] in maintaining aircraft in the sort of high-tempo operations that are required for urban or regional air mobility, as well as experience of launching new aircraft into service," Stepanek said.

For instance, Bristow is the launch customer for Leonardo's AW609 tiltrotor. "We can help manufacturers getting aircraft not just certified, but into operation," Stepanek said, explaining that in the company's experience

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new aircraft commonly require some modifications in the first six months or so after starting commercial flights.

What Bristow mainly sees in the new wave of electric aircraft is the potential for a step-change in cost efficiency, in some cases as direct replacements for existing rotorcraft. “Helicopters are very expensive to manufacture, buy, operate, and maintain, and we feel it will be a natural progression for our existing customer base to use these new vehicles for existing needs and maybe also in different ways,” said Stepanek.

One example he offered of new uses was the potential for oil and gas companies to fly employees to onshore bases rather than having individuals drive long distances. Other possible applications for eSTOLs being eyed by Bristow include middle-mile cargo deliveries, which Stepanek sees as “a very ripe market,” and also search-and-rescue services, such as those the company is already handling for the UK’s coast-guard services using Schiebel’s Camcopter drones.

While acknowledging the “aggressive timelines” many eVTOL start-ups are pursuing to get their aircraft to market, Stepanek said that in many cases he feels these pioneers are made of the right stuff. “Looking at their teams, their track records, and their plans for production, these are the type of people who could solve these problems,” he said.

Bristow’s fleet includes aircraft from leading manufacturers including Sikorsky, Leonardo, and Airbus. Stepanek said he sees the new AAM companies spurring legacy companies to offer competitive new technology in the sector, referencing acknowledged eVTOL plans at both Airbus and Bell.

There are also several scenarios in which Bristow could potentially support eVTOL manufacturers in achieving their ambitious plans to launch their own air taxi networks from scratch. This might entail the group acting as an operating partner or providing services such as maintenance and training.

However, Stepanek ended with a note of caution: “We’re in a revolution, but aviation safety and operations are evolutionary.” Through its Target Zero campaign, Bristow has long pursued an objective of eliminating all accidents and incidents resulting in harm to people, and

the company was a founding member of HeliOffshore, the industry’s collaborative safety organization. ■



This story is from FutureFlight.aero, a news and information resource developed by AIN to provide objective, independent coverage and analysis of cutting-edge aviation technology, including electric aircraft developments and advanced air mobility.



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Engineer, icon James Raisbeck dies at 84

by Kerry Lynch

James Raisbeck, who had an aviation career spanning 67 years and made his mark for his engineering and aircraft modifications expertise, died August 31 at the age of 84.

Raisbeck founded his Seattle-based business Raisbeck Engineering in 1973 and designed modifications that have been incorporated on thousands of aircraft. The firm was acquired by Acorn

Growth Companies in 2016, but Raisbeck continued to advise the company and focus on philanthropic interests.

“James was an iconic figure in the aviation industry, best known for King Air



Raisbeck's early modification work improved performance and safety of Sabreliners and Learjets.



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modifications, but his influence reached well beyond that segment of the market,” said Rick Nagel, managing partner of Acorn Growth Companies. “James established and built a company we worked with as a channel partner for two previous Acorn companies before acquiring Raisbeck into our portfolio, allowing us the opportunity to continue James’s legacy of developing products that improve aircraft performance and safety. The entire Acorn and Raisbeck teams will miss his unwavering passion for the aerospace sector and are deeply saddened with his loss.”

Raisbeck’s aviation career began in 1954 in the U.S. Air Force, where he maintained a number of different military aircraft before becoming a flight engineer on the B-36.

After his service in the U.S. Air Force, he attended Purdue University, obtaining a degree in 1961 in aeronautical engineering. He put that degree to work as a research aerodynamicist with Boeing, where he joined the team that designed an innovative trailing-edge flap system that enabled the then-new 707 airliner to fly at speeds as low as 60 knots.

After working on this and other technologies that Boeing folded into its commercial aircraft line, Raisbeck left the manufacturing giant in 1969 and became president and chief engineer of Robertson Aircraft, famed for the development of the Robertson short takeoff and landing (STOL) kits used on a number of general aviation aircraft.

In 1970, he turned his attention to the Learjet wing. After

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studying results from full-scale testing of a Learjet 23 by NASA Ames, he saw opportunities that led to the development of the Mark II and Mark IV low-speed performance systems and the Mark III high-speed drag-reduction packages, the company said, noting Mark II and Mark IV wings became standard technology on Learjet Century III and Softflite versions.

Raisbeck left Robertson in 1973 to launch his own company and in 1976 worked with Rockwell International on a redesign of the Sabreliner series. This resulted in the Sabreliner model 65 being equipped with Raisbeck-designed supercritical wings, with retrofits available for Model 60s and 80s.

The company perhaps is most known for its modifications on the Beechcraft King Air family. That work began in 1981 when Raisbeck saw possibilities for improving the King Air's productivity, performance, safety, and overall usefulness, the company said. This culminated in the Mark VI system for the King Air 200 series that included a number of systems still in use today, such as the ram-air recovery system, dual aft body strakes, and high float gear doors.

Since then, Raisbeck has developed multiple modifications for the King Air and the company said 64 percent of the more than 6,200 King Airs are equipped with at least one of its modifications. In addition, Raisbeck continued to develop modifications for other Learjets and aircraft such as the Airbus A320 and Boeing 727.

His work has been recognized throughout the industry, as well as academia. In 1979, Purdue University presented its Distinguished Engineering Alumnus Award to him, and again in 1999 its Outstanding Aerospace Engineer Award. He also has received the AIAA Commercial Aviation Technical Achievement Award. In 2002, NBAA honored Raisbeck with its Lifetime Achievement Award for Meritorious Service to Aviation, considered one of the association's highest honors. He also has been recognized with the Living Legends Lifetime Aviation Entrepreneur Award, as a fellow of AIAA, and on the National Air and Space Museum's Wall of Honor.

"James Raisbeck's impact on aviation is enormous and enduring. His legacy extends from aircraft innovations to aviation institutions that educate and

inspire, including the Raisbeck Aviation High School," said NBAA president and CEO Ed Bolen.

He also is known for his philanthropic endeavors supporting education, the arts, the Museum of Flight, medical research, and the Raisbeck Aviation High School.

He is survived by his wife Sherry, two daughters, a son, four grandchildren, and two great-grandchildren. ■



Just one of Seattle-based Raisbeck Engineering's specialties was an extensive series of King Air modifications, many of which Beechcraft then Textron Aviation incorporated into the production line.

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Boeing to face shareholder lawsuit over 737 Max lapses

by Gregory Polek

A Delaware judge last month ruled that Boeing's board of directors must face a shareholder lawsuit claiming liability for the twin 737 Max crashes that killed a total of 346 people. In his ruling, judge Morgan Zurn said the first crash—involving a Lion Air Max 8 in October 2018—should have raised a “red flag” that the board did not heed before another Max 8 crashed in Ethiopia less than five months later.

Zurn dismissed some of the investors' claims, including one charging the board with granting former CEO Dennis Muilenburg a \$60 million retirement package to, in effect, buy his silence over the depth of board members' ignorance over the Max. However, the judge did allow the plaintiffs to pursue a claim over board member oversight, citing the directors' failure to establish a reporting system for airplane safety and “turning a blind eye” to evidence of safety problems.

In a statement, Boeing expressed its displeasure with the ruling. “We are

disappointed in the court's decision to allow the plaintiffs' case to proceed past this preliminary stage of litigation,” it said. “We will review the opinion closely over the coming days as we consider next steps.”

In January Boeing reached an agreement with the Justice Department to pay \$2.5 billion in penalties to resolve a criminal charge of conspiracy to defraud the Federal Aviation Administration's Aircraft Evaluation Group (FAA AEG) in connection with its assessment of the Max. In a statement, the Justice Department's acting assistant attorney general said that Boeing employees “chose the path of profit over candor” by concealing material information from the FAA about the faulty operation of the Max's maneuvering characteristics augmentation system (MCAS).

In this latest ruling, Zurn described the evolution of Boeing's corporate culture from one dedicated to an engineering focus to one more interested in



Boeing 737 Max 8s sit parked in Moses Lake, Washington, during the type's grounding in October 2019.

cost-cutting and profits. By 2019, he wrote, the board had become “distanced” from safety information, maintaining no connection with the company's Safety Review Board (SRB), which operated below the level of “most” senior officers.

“Without a board-level reporting mechanism, safety issues and whistleblower

complaints reported to the SRB did not come to the board's attention,” read the opinion. “With the board so distanced from safety information, and on the heels of recent safety incidents and inquiries, Boeing continued to push production and forego implementing meaningful systems to monitor airplane safety.” ■

IAI signs deal with Etihad on 777-300 P2F lines

by Gregory Polek

Israel Aircraft Industries (IAI) and Etihad Engineering have agreed to partner on two new Passenger to Freighter (P2F) conversion lines for Boeing 777-300ERs in Abu Dhabi as demand for cargo capacity continues to surge amid the Covid-19 pandemic. The partners expect the lines to open in 2023.

In 2019, IAI and GE Capital Aviation Services (Gecas) announced the launch of the Boeing 777-300ERSF, a program that established a P2F conversion dubbed “The Big Twin,” denoting its status as the largest-ever twin-engine freighter. The move appears prescient given the circumstances surrounding a shortage of cargo capacity during the Covid crisis.

Cargo operations have offset airline losses due to the pandemic, as a lack of belly capacity resulting from the reduction in passenger flights and increasing demand in the express package delivery segment has resulted in a need for more dedicated freighters. Meanwhile, the pandemic has led to the accelerated retirement of aging airplanes, adding to feedstock for freighter conversions.

As a result, IAI and others have become more active in the P2F conversion business; IAI also recently signed an agreement with Ethiopian Airlines to establish a conversion site for Boeing 767-300s in Addis Ababa. The new passenger-to-freighter conversion center will join existing conversion sites IAI operates at its campus in Ben Gurion International Airport and in Mexico.

IAI's opportunities for expansion in the sector grew with the August 2020 signing of the Abraham Accords, which normalized economic and political relations between Israel and the United Arab Emirates and Bahrain.

“The Abraham Accords have enabled us to meet [Etihad's] managers firsthand, to see their ability and dedication, in addition to witnessing the company's great capabilities in the field of jet maintenance,” said IAI Group executive vice president and general manager Yossi Melamed. “The agreement we signed adds a significant tier to the relations between Israel and the Gulf States. I have no doubt following this agreement, additional agreements with companies in the region will arrive, and they will economically benefit the sides involved.” ■



Helvetic flight marks first E190-E2 service into London City Airport

A September 2 Helvetic Airways flight from Zurich to London City Airport (LCY) marked the first service into the short-field, obstacle-limited field by the Embraer E190-E2. Registered HB-AZG, the Helvetic Airways aircraft made the trip in 1 hour 20 minutes, reestablishing an essential link for the global financial community.

The E190-E2 gained EASA approval for London City's steep approach in May. The airport's runway extends only 4,950 feet and requires descent angles of up to 5.5 degrees.

“Welcoming Swiss/Helvetic back to London City and in the newest LCY-capable aircraft, Embraer's E190-E2, is a significant milestone for London City,” said London City chief operating officer Alison FitzGerald. “It demonstrates how we are collaborating with manufacturers and airlines to introduce more low-emissions,

low-noise aircraft to our airport, as well as re-establishing a vital business connection which we believe will go from strength to strength as the UK Government begins to further reduce barriers to travel. Our ambition is to be one of the most sustainable airports of our size in Europe, and it is my expectation that we will be welcoming more of these aircraft with more airlines as the industry recovers from COVID-19.”

Embraer aircraft account for nearly 90 percent of all movements at the airport. Meanwhile, the E190-E2 nearly doubles the available range from London City to some 2,200 nm, bringing destinations such as Istanbul, Casablanca, and Moscow within reach, according to Embraer.

Helvetic Airways now flies eight E190-E2s, four first-generation E190s, and four E195-E2s. It took delivery of its first E195-E2 on June 23 and three more during July. G.P.



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Textron Aviation CEO sees positive turn

| by Jerry Siebenmark

Textron Aviation president and CEO Ron Draper told members of the Wichita Aero Club in August that the company is seeing positive metrics that portend increasing demand for the airframer, including utilization of its combined fleet of some 14,000 Beechcraft King Air turboprops and Cessna Citation business jets. Not only has utilization returned to pre-pandemic levels but it is exceeding them by “probably 15 percent” since April, he said during a 40-minute keynote speech.

What’s more, the number of used Citations for sale is down to 4 percent of the in-service fleets, the lowest level in nearly 30 years. “That’s of any Citation,” he explained. “That could be 20-, 25-year-old airplanes. Most people actually want something less than 10 years old. So that’s been great to clean out all the used inventory...it’s a very healthy market right now and when the used [aircraft market] is that healthy, then the new [aircraft market] is pretty healthy as well.” Also, Textron Aviation is seeing more first-time business aircraft buyers. Traditionally, 10 percent of buyers have been first-timers, but the percentage has doubled to 20, Draper added.

Regarding specific models, he said the CJ4 Gen2 unveiled in February and that received FAA interior certification and was certified by EASA in June has developed “a nice backlog.” Meanwhile, the twin-turboprop SkyCourier is about 75 percent of the way through FAA flight certification, with production of the high-wing airplane already underway as type certification and first delivery to launch customer FedEx are expected later this year. While much of the focus on the SkyCourier has been its cargo capability, there is also a lot of interest in it as a 19-seat passenger aircraft.

Following the SkyCourier is Textron Aviation’s turboprop-single Denali, which is expected to make its first flight sometime by year-end. “I wish we had it now,” Draper said of the Denali. “We’d be selling a ton of these right now. We have a lot of customer interest in it. But we’re a couple of years away from that entering service.”

In July, Textron Aviation changed the branding of the Denali from Cessna to Beechcraft.

Draper explained this change was partly a “branding alignment,” as well as a response to the fact that it’s been several decades since Beechcraft had a clean-sheet design

airplane. Switching brands was also a way “just to make sure folks out there know the Beechcraft name’s not going away—we’re investing in it,” Draper said. “Also, we didn’t do it just for employees, but we got a benefit out of that. We’re all one now but you still have a tug on your heart if you grew up under brand B or brand C. Those employees love to see that and so do a lot of our Beechcraft customers around the world.” ■



Textron Aviation president and CEO Ron Draper speaks with Wichita Aero Club members.

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Electric power might transform regional airlines

by Charles Alcock

Much of the momentum for introducing electric aircraft to commercial service is a response to mounting pressure to reduce air transport's impact on the environment and meet targets for reducing the industry's carbon footprint. But increasingly, the companies developing the aircraft say a strong economic case exists for moving away from dependence on jet-A fuel that promises significant reductions in operating costs and the potential to make short, thin routes viable with smaller aircraft.

Ampaire has begun the next phase of UK-based flight trials for its plans to convert nine- to 19-seat regional airliners, starting with the Twin Otter and the Islander, to hybrid-electric propulsion. The company's Electric EEL technology demonstrator is operating between Exeter Airport and Cornwall Airport Newquay in the southwest of England to evaluate operational needs for commercial services that the company says could start by 2024. Senior vice president for global operations Susan Ying told *AIN* that Ampaire has also started work on a clean-sheet design for a hybrid-electric 19-seater.

The trials, using a converted six-seat Cessna 337 Skymaster, are part of the UK government-backed 2Zero program (Towards Zero Emissions in Regional Aircraft Operations), which is evaluating the case for hybrid-electric flights out of the southwest of England. They follow a series of flights conducted earlier this month in northern Scotland as part of the Sustainable Aviation Test Environment project, which is backed by the UK's Industrial Strategy Challenge Fund and supported by partners including regional airliner Loganair and Highlands and Islands airports.

Ampaire is part of the UK-based 2Zero consortium, which was set up to explore regional aviation electric flight solutions. In 2020, it received £2.4 million (\$3.3 million) from the government-backed UK Research and Innovation (UKRI) agency's Future Flight Challenge fund to supplement around £5 million that the partners are investing themselves. The other partners include Exeter Airport, Cornwall Airport Newquay, Loganair, Rolls-Royce Electrical, the University of Nottingham, the Heart of the Southwest Local Enterprise Partnership, and UK Power Network Services.

Rolls-Royce is working on a new battery system that could be swiftly swapped while aircraft are between flights. The aircraft engine maker is also working on a thermal management system for the electric propulsion system (EPS) with a focus on reducing weight.

However, this is far from being the only option for airlines looking to turn their fleets green. UK-based start-up Faradair is finalizing the design for its Bio Electric Hybrid Aircraft (BEHA). The hybrid-electric 18-seat model will be powered by a Honeywell turbogenerator and electric motors provided by MagniX, which has its own plans to convert Twin Otters to electric propulsion.

Faradair aims to certify the BEHA under Part 23 rules by 2026 and says the fixed-wing aircraft will be able to fly up to around 1,000 nm from runways as short as 1,000 feet. Its projected service ceiling is 14,000 feet and its cruise speed is around 200 kts.

According to company founder and CEO Neil Cloughley, his aircraft has the potential to bypass busier airports, reducing journey times and opening up trips for which no commercial airline service currently exists or would be viable. He has argued that some regional airlines have struggled to sustain profitability by operating from major airports, such as London Heathrow where elevated cost structures make it hard for them to be competitive.

"Imagine if you could carry up to 18 passengers from an airfield five miles up the road [from a major airport] without the crowds, security [delays], and high-cost base," he told an aviation industry webinar in May. "That way, you could start something really interesting, and so our short-field performance will be very significant. Our program is about providing mobility as a service and being disruptive."

In Sweden, Heart Aerospace is developing an all-electric 19-seater called the ES-19 that it says will be ready to enter service by the end of this decade with a range of around 217 nm. In July, United Airlines and its regional affiliate Mesa Air announced a provisional purchase agreement for 200 of the new model, with options for 100 more. The U.S. companies also said they are joining Breakthrough Energy Ventures in a \$35 million Series A funding round for the start-up.

Across the border in Norway, Scandinavian regional airline Wideroe is the launch customer for Tecnam's all-electric P-Volt. Rolls-Royce Electrical is developing a propulsion system for the nine-seat commuter model, which is based on the Italian manufacturer's existing P2012 Traveller twin-piston utility aircraft.

The P-Volt's short takeoff and landing capability should make it suitable for the many small airports Wideroe serves across Norway, where a lot of communities are faced with long road connections to other cities. Prior to the Covid-19 pandemic, Wideroe operated around 400



With its Electric EEL technology demonstrator Ampaire is developing a hybrid-electric propulsion system to convert existing regional airliners.

daily flights to 44 airports, with many of these routes being shorter than 150 nm. The Norwegian government is pressing for the introduction of electrified aircraft on domestic flights starting in 2030 to meet its objective of an 80 percent reduction in emissions by 2040.

Earlier this year, Pipistrel confirmed its plans to develop its Miniliner family of 19-seat regional airliners, which it says will be able to serve sectors of up around 544 nm and at speeds of up to 261 kts. According to the Slovenia-based company's chief technology officer, Tine Tomazic, the aircraft will have 40 percent lower direct operating costs than similar-sized existing twin-turboprop aircraft and be 25 dB quieter.

Pipistrel is evaluating several possible propulsion options for the Miniliners but appears to favor a hydrogen-based powertrain with a 1MW fuel cell system. It is considering both a hybrid configuration with a turbine and direct burn of hydrogen with a goal of being able to operate four 350-km (190-nm) sectors in succession with a 100-km or 45-minute diversion reserve. The aircraft would likely need almost 2,600 feet of runway.

Meanwhile, two hydrogen propulsion specialists are advancing plans to convert existing regional airliners. And these options are due to come to market well before Airbus achieves its objective of getting a hydrogen-powered airliner into commercial service by 2035 under its Zero E program.

ZeroAvia, which has also received UK government funding, intends to install a pair of 600-kW electric propulsion systems and hydrogen fuel tanks on 19-seat Dornier 228 aircraft provided by UK-based operator Aurigny Air and AMC Aviation of the U.S. The company aims to get a supplemental type certificate for the conversion by 2024.

Universal Hydrogen is focusing on plans to convert types such as the ATRs and Dash 8s using a 2-MW fuel cell powertrain and its own concept for storing liquefied hydrogen in capsules that would be loaded into a compartment at the rear of the cabin. In April the California-based

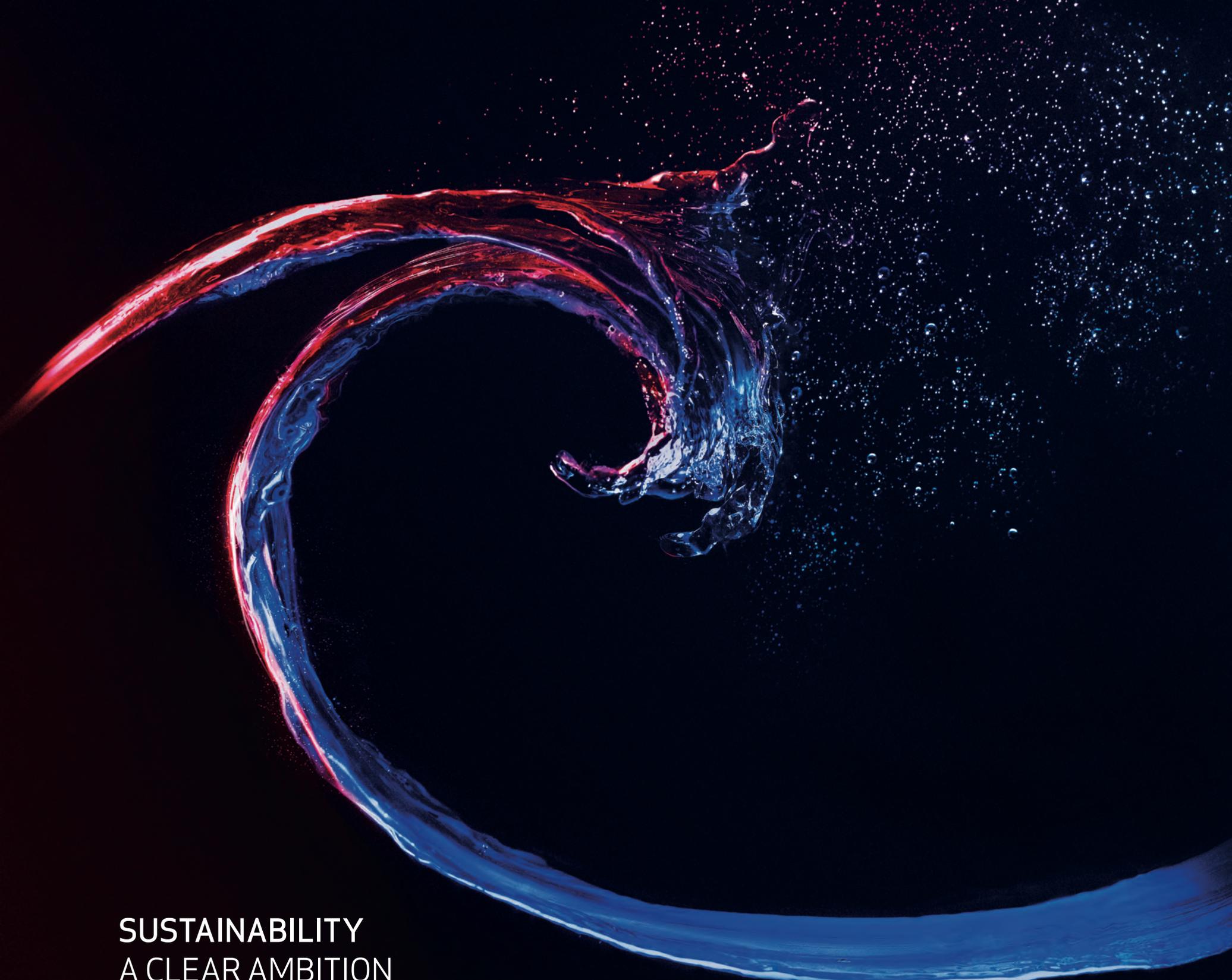
start-up secured \$20.5 million in Series A funding and its backers include JetBlue, Airbus, and fuel cell specialist PlugPower. Icelandair, Spain's Air Nostrum, and Alaska-based Ravn Air have all signed letters of intent to replace their existing Pratt & Whitney turboprops in their Dash 8 and ATR fleets by 2025.

Meanwhile, Ampaire is using the Electric EEL to complete the development of its three-module EPS, which consists of an electric motor, a power inverter unit, and a set of batteries. On the converted Skymaster, this system drives a single propeller at the front of the aircraft, while a Continental IO-550 piston engine, mounted on the rear of the aircraft, acts in the original pusher-configuration role.

After completing flights between Scotland's Orkney Islands and Wick on the mainland, the Electric EEL made a 418-mile flight from Perth to Exeter on August 23. This broke Ampaire's previous record for the longest hybrid-electric sector of 341 miles, during an October 2020 flight between Los Angeles and San Francisco.

Ying told *AIN* that once development work on the EPS is complete it will likely take another two years to finish the STC process for aircraft like the Twin Otter and the Islander. Ampaire, which is now owned by flight booking platform Surf Air, believes it can deliver reductions in operating costs of around 30 percent.

In addition to cutting emissions from jet-A-burning engines, the company says, it can deliver 30 percent reductions in operating costs, which would support a business case for new scheduled services between smaller airports. Ying told an August 24 media briefing at Exeter Airport that the existential challenges faced by regional airlines during the Covid crisis have made it even more imperative to drive down operating costs while also making short-haul services environmentally sustainable. "It's not enough to just demonstrate that the [hybrid-electric] propulsion technology works," she stated. "You've got to be able to show that it's economically feasible and that the operational aspects are as well." ■



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The West 30th Street Heliport in Manhattan is among several facilities in the New York and New Jersey area in the direct crosshairs of anti-helicopter entities.

New York/New Jersey heli traffic draws officials' fire

by Mark Huber

Civil helicopter traffic is under fresh attack in New York and New Jersey, with public officials there moving to shut down heliports and otherwise significantly reduce flight operations.

In New York, an attempt by the town of East Hampton on Long Island to block special VFR (SVFR) at East Hampton Airport (KHTO), a move directed at limiting helicopter traffic, has been blocked via a temporary restraining order issued July 30 by U.S. District Court Judge Gary R. Brown.

East Hampton has a long history of challenging federal preemption when it comes to airspace and airport operations, including a 2016 effort to discriminately apply a curfew only to "noisy" aircraft. The challenge to East Hampton's SVFR gambit was brought by helicopter operator Zip Aviation and supported by NBAA, the Helicopter Association International

(HAI), and the Eastern Region Helicopter Council (ERHC). ERHC publicly labeled the SVFR restriction "illegal." A final ruling is expected this fall.

ERHC had failed to reach a voluntary agreement with the airport for this year's helicopter routing there as per prior years' practice. However, FAA grant restrictions at HTO expire next month and there is strong local support for closing the airport permanently.

In 2019, resident noise complaints about the airport exceeded the total number of flights there by a margin of more than two to one. The town board has until September 20 to extend the contract of FBO Sound Aircraft Services or move to close the airport. If East Hampton closes, helicopter traffic there is expected to shift to the privately-owned Montauk Airport (KMTP).

Meanwhile, the West 30th Street heliport (KJRA) is the latest target in New York City from the Community Board 4's (CB4) Waterfront, Parks & Environment Committee (WPE), which is pressuring the facility's owner, the Hudson River Park Trust (HRPT), to either significantly restrict operations or close it permanently. The heliport has drawn increasing public complaints after becoming a gateway for helicopter ride-sharing service Blade.

In late July, CB4 wrote to elected federal, state, and local officials charging that the heliport is "a significant source of pollution, noise, and safety issues," including "toxic fumes [that] fill the air and linger," conversation disruption, and people "being blown off their bicycles" by rotor wash. "There should be no commercial use of helicopters within the Hudson River Park...We are appealing to you to address these concerns...and make a concerted effort to close the heliport."

CB4 also complained that the 8,000-gallon fuel tank on the site was a potential terrorist target and safety risk. Separately, CB4 asked the HRPT to eliminate ground vehicle parking at the site and relocate it across the West Side Highway. In addition, it asked for a ban on aircraft idling longer than five minutes.

CB4's short-term concerns are part of a consistent end game, which is to close the heliport. In an August 5 letter to HRPT president Noreen Doyle, WPE co-chairs Jeffrey LeFrancois and Maarten deKadt wrote, "We are appealing to you to address these concerns with [heliport operator] Air Pegasus and fix what can be fixed in the short term, while we pursue our efforts for permanent closure of the facility."

In New Jersey, bills introduced into the state legislature last year that restrict and/or ban civil helicopter traffic are garnering fresh support. A5514/S478 instructs the state transportation commissioner to create "rules and regulations to reduce the noise generated by helicopters at airports, heliports, and helistops licensed by the state." Another bill, A5515/S479, would ban heli-tourism in New Jersey. ■

News Update

More Black Hawks Into The Fire

Air Methods unit United Rotorcraft has ordered five Sikorsky S-70 Black Hawks for delivery over the next seven to 18 months. The aircraft will be manufactured at Lockheed Martin's PZL Mielec plant in Poland, and United Rotorcraft will convert the aircraft into Firehawk aerial firefighting aircraft. This conversion fits the helicopters with 1,000-gallon external belly water tanks and a retractable snorkel system that can refill the tank within 60 seconds. These modified aircraft also have the ability to transport up to 12 firefighters or to be outfitted as air ambulances.

Hill Hits The Skids

Hill Helicopters announced plans to offer its kit-built HX50 and certified HC50 turbine single helicopters with a skid landing gear option, in addition to the standard retractable wheeled gear. According to Hill, gear selection would not alter the price, currently listed at \$679,000 for the kit. The Hill skids will be made from composite and aluminum, with steel wear shoes, and include a wide skid heel that will aid landings in snow, mud, and loose gravel. To prevent ground resonance, the skids will be designed with vibration tuning. Hill said the skids are expected to decrease cruise speed by 15 knots, down to 125 knots. Either landing gear option works with the helicopter's pop-out emergency floats, which are located in the aircraft's belly. UK-based Hill unveiled the five-seat HX50 in August 2020. It plans to initially offer it as a kit-built aircraft in 2023, with a FAA certified (Part 27) version—the HC50—following in 2026.

Curtains For Coatesville

The 2019 reprieve negotiated by the Trump administration and several congressional leaders to keep Sikorsky's Coatesville, Pennsylvania helicopter plant open was apparently short-lived. Parent company Lockheed Martin announced that it is shuttering the plant effective March 2022. Coatesville is where final assembly and completion work is done on the Sikorsky S-92 and completion work on the S-76 helicopters. Lockheed Martin said it is moving that work elsewhere and eliminating 240 of the plant's 360 jobs. Last year, Sikorsky delivered just two civil helicopters, according to data from the General Aviation Manufacturers Association.

CHC Buys Babcock Offshore Ops

CHC Helicopter Group (CHC) has completed its acquisition of Babcock International's offshore oil-and-gas aviation business, headquartered in Aberdeen, Scotland. The acquisition expands CHC's fleet by 30 aircraft across the UK, Denmark, and Australia. Babcock's operations there will be held separately and operate independently, while CHC seeks merger approval from competition authorities in the UK and Australia.

Safran runs Makila 2 helicopter engine on 100 percent SAF

Safran has successfully test run one of its Makila 2 helicopter engines on 100 percent sustainable aviation fuel (SAF), the French company announced September 8. For this ground test, Safran used a bio-fuel from TotalEnergies consisting of used cooking oil.

The test run is the beginning of a campaign Safran is launching to evaluate the operational impact of running a helicopter engine on 100 percent SAF using "Bearcat" (Banc d'Essai Avancé pour la Recherche en Combustion et Aérothermique des Turbomachines), an advanced



test bench for turbomachinery combustion and aerothermal testing located at the company's facility in Bordes, France.

Safran engines are already approved to operate with up to 50 percent SAF. Using 100 percent will lower life cycle CO₂ emissions by up to 80 percent compared to traditional jet-A, Safran said. "After the first flight of a rescue helicopter using 40 percent SAF in June, and the fuel's gradual introduction for engine tests at our sites, we are now taking a new step toward using fuel made entirely from renewable sources. These tests are a key step in the realization of future test flights with our helicopter partners," said Safran Helicopter Engines CEO Franck Saudo. **M.H.**

CalFire braces for record year

by Mark Huber

It's another record year for wildfires in California with more than 2.2 million acres burned and 3,200 structures destroyed through August in 7,276 incidents. CalFire aircraft dropped 6 million gallons of water/retardant on these fires, including 3.8 million gallons in August alone. In all of 2020, 3.2 million acres were incinerated, more than three times a typical year's conflagration. And that means it's another bumper year for the firefighters of CalFire, the California Department of Forestry and Fire Protection.



While huge fires have burned in 2021—such as the recent Dixie blaze that torched 922,000 acres and the Caldor fire that burned 218,000 acres through September 11 and was then 53 percent contained—CalFire manages to put down 97.7 percent of all reported fires before they reach 10 acres, said Ben Berman, CalFire's chief helicopter pilot.

CalFire's owned fleet of Sikorsky S-70 Firehawks from United Rotorcraft and Bell UH-1s plays a big role in that containment. So do more than 320 helicopters from 80 vendors that can respond under call-when-needed contracts and CalFire's fleet of fixed-wing aircraft of OV-10 Broncos, Grumman/Marsh Aviation S-2 Tracker

tankers, and C-130s from the California Air National Guard. CalFire is also in the process of building its own C-130 fleet of seven aircraft, which will be equipped with a gravity-fed tank system that can drop up to 4,000 gallons, 1,000 gallons more than the Modular Airborne Firefighting System (MAFFS) currently used by the Guard aircraft with better coverage, Berman said.

As for helicopters, the Firehawks are particularly useful as they can carry three times as much water—up to 1,000 gallons—as the UH-1s and fly up to 40 knots faster (155 knots). They have a maximum gross weight of 22,000 pounds and are permanently configured for transport of up to eight firefighters or for performing search-and-rescue missions.

The Firehawks can fill their 1,000-gallon tanks via the onboard snorkel in as little as 40 seconds. CalFire is in the process of adding up to a dozen Firehawks to its fleet of 12 aging UH-1s and is operating a mixed fleet of 16 helicopters that will grow to 18 by year-end. CalFire's goal is to eventually grow its fleet to 24 helicopters, half of them Firehawks.

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Rotor experts tout SMS and effective use of automation

by Mark Huber

Safety Management Systems (SMS) and intelligent application of new technologies promise to have a dramatic impact on helicopter safety. That was the consensus of a diverse panel of experts at a recent Helicopter Association International (HAI) webinar.

Executives from air ambulance company Air Methods and helicopter OEM Sikorsky touted the benefits of implementing the FAA's voluntary SMS program ahead of the rollout of the anticipated mandate sometime next year. Jennifer Peasley, SMS manager for Air Methods—the nation's largest air ambulance provider with 400 aircraft and 5,000 employees—said the key to SMS acceptance throughout an organization is “keeping it simple.” Lockheed Martin Sikorsky fellow Chris Lowenstein, meanwhile, recommended using the FAA's “four pillars” of safety: policy, risk management, assurance, and promotion while engaging and receiving the support of top management. “If you don't have that, you are not going to get anywhere,” he said.

Lowenstein also advised employing a data management system that is appropriate for the size of the organization.

“There's so much data involved in SMS, data to be managed and handled properly, that that's really important. It's probably the biggest issue, particularly with a large organization.

Lowenstein likened the task of managing SMS data to turning a supertanker, noting that “it takes a long time.” But, he added, it is less burdensome than one might think. “It looks cumbersome, but many operators are already doing much of what is already required by SMS,” he noted. “We found we already had many of the reporting mechanisms in place,” Lowenstein said, while acknowledging the need for process and policy changes.

Peasley cautioned that merely having an SMS will not necessarily make a huge change in accident or incident data but could result in more positive safety trends. “We were able to mitigate those [risks] and see efficiencies throughout our organization” and were able to “drive down things like personal injuries because we can promote and address those things we're seeing in [the SMS] reporting.”

Lowenstein said SMS gives visibility to the role of human factors throughout



Air Methods trains its pilots how to handle inadvertent flight into instrument meteorological conditions in a FlightSafety simulator, as part of the helicopter operator's SMS efforts.

an organization in accidents/incidents. “When I started 25 years ago as an investigator,” he said, “we didn't use the terms ‘crew error’ or ‘human error.’ We just said ‘pilot error,’ and that was very limiting—and it wasn't fair—but that was the state of the industry at the time.” Now the term “human factors” has been expanded to examine the role at the “supervisory and organizational levels” and the “different levels of human error that contribute to an accident,” Lowenstein said.

Increasing automation can also improve safety, but only if pilots train on it and regularly use it, said Bruce Webb, director of aviation education at Airbus Helicopters. “We build fantastic machines,” he commented. “But we're not always using them to their potential because we didn't prepare ourselves to use them to their potential. It takes training to learn those differences.”

This is particularly the case in IFR-equipped helicopters. Webb pointed out that instrument flying is a perishable skill that requires repetition as does the use of technology such as automatic flight control systems (AFCS) or even a basic two-axis autopilot. “There is a lot of good justification to install a system like that when you look at the potential to improve safety,” he said. “But if you don't use those systems when you don't need them, you will not use them when you do. You will revert to how you fly. You'll go back to hand-flying. Don't do that.”

The panel expressed optimism that incorporating autonomous systems and artificial intelligence into helicopters will lessen pilot workload while providing increased safety and that the use of “big data” in the rotorcraft ecosystem would likewise be beneficial. ■



Army accepts first Airbus Helicopters UH-72B

Airbus Helicopters has delivered a UH-72B to the U.S. Army National Guard from its production facility in Columbus, Mississippi. It's the first of 18 currently on order from the Army.

The UH-72B incorporates all the technologies in Airbus's latest corresponding civil helicopter, the H145. They include a five-bladed main rotor, the Fenestron shrouded tail rotor, Safran Arriel 2E engines, and the Airbus-designed Helionix avionics suite with a dual-duplex, four-axis autopilot that provides flight envelope and over-limit protection, automated takeoff, and fully coupled approaches to hover.

The Army first ordered the UH-72A Lakota in 2006 as part of its Light Utility

Helicopter program. Airbus has delivered 463 UH-72A Lakota helicopters in nine configurations to the U.S. Army, Navy, and National Guard. The final UH-72A model was delivered in September 2020. The Army began using the UH-72A as its primary rotorcraft training aircraft in 2016 and eventually built its training fleet of Lakotas to 204 aircraft. The move to the more complex UH-72A was controversial, but the Army defended it, saying it provided the opportunity to integrate simulators into primary training, allowed students to stay with the same airframe longer, and better prepared them to fly more sophisticated twins such as the UH-60 Black Hawk, AH-64 Apache, and CH-47 Chinook. **M.H.**

› continued from page 41

CalFire's record fire-fighting year

The current fleet distribution means that CalFire can have a helicopter at a fire within 20 minutes.

The contracted fleet is divided among type 1, 2, and 3 helicopters, with 50 percent falling into medium-category ships like the Huey. Types 1 (heavy) and 2 (light) are equally divided at 25 percent each. The light helicopters primarily provide traffic control and logistical support.

Berman said that not all 320 contracted helicopters are always available, as some are also contracted to other entities such as the U.S. Forest Service or public utilities. The contracts “don't mean we have access to them all the time.” But that number of helicopters would rarely be needed. Berman said CalFire has put 40 helicopters on the Caldor fire to date. But marshaling that kind of response can

still stretch resources, he said. “We work constantly trying to shift resources to efficiently use the ones we do have.”

Those resources are most often needed on a large scale where the topography is challenging, the winds are strong, and roads are sparse. Such was the case with the Bridge Fire in Auburn, California, in August. “It's hard to get heavy equipment in there, the whole river valley had a lot of dead fuel [on the ground], and the wind just came whipping in like a blowtorch,” Berman said. “It was throwing spot fires sometimes six miles away. So those spot fires would turn into another 150 acres that would divide our forces. And it's almost impossible to get heavy equipment in there so you have to build strategic fire-breaks using nothing but hand crews.”

Berman noted that the Dixie fire that consumed nearly one million acres broke out at a campground and quickly grew to 2,500 acres. He and his crews dropped 250,000 gallons of retardant on nearby communities just so residents could gain road access. ■



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Hands On

Flying Garmin's 505 HFCS

by Matt Thurber

Garmin has added a second rotorcraft—the Bell 505, which is equipped with a Garmin G1000 avionics suite—to the list of FAA approvals for its GFC 600H helicopter flight control system (HFCS). The first certification program for the GFC 600H was the Airbus Helicopters AS350 AStar, with certification obtained in February 2020. In the Bell 505, Garmin added some new features to the GFC 600H installation to continue improving safety and utility, including a higher-torque servo for the pedals (for the optional third axis), because in the 505 these are not hydraulically boosted. Bell is offering the GFC 600H as the preferred autopilot for new 505s and its service center network will install them as retrofits for the aftermarket, as will Garmin dealers.

Most 505s are flown by owner-pilots or pilots hired by the owners, according to Garmin OEM sales manager Chris Bauer, with about 40 percent operated in professional, commercial-type operations. Many owner-pilots are new to flying helicopters but are familiar with Garmin avionics in fixed-wing aircraft. “The Garmin solution has safety-enhancing features and benefits that can help protect a fixed-wing pilot moving to rotorcraft,” he said. “There is also commonality and a ton of familiarity in terms of how the autopilot works, the modes, and how to fly it. The commonality is so they don’t have to learn how to manage the flight control system every time they switch aircraft.”

In the 505, what pilots will see with the GFC 600H is the NVIS-compatible GMC 605H mode controller at the top of the console. The 605H also contains its own attitude and heading reference system (AHRS), and both the 605H’s and the G1000’s AHRS must be working for the autopilot to be airworthy. There is a separate flight control system (FCS) on-off switch lower on the console—easy to reach in case of the need for an emergency shutoff.

New collective and cyclic heads, which Bell and Garmin developed jointly, have new features. The cyclic has a disconnect switch, LVL (level) mode button, a hat switch for trim, and a force trim release (FTR) button. The collective is fitted with a yaw on/off and yaw trim switch (if the optional yaw servo/third axis is installed). The yaw trim is new in the 505 and not available on the AStar, allowing the pilot to set a ball-out-of-center yaw position. Setting yaw out of trim can be helpful when an observer needs to look at something on the ground. Some pilots also like to fly with just the yaw axis engaged, according to Bauer, and that’s possible in the 505.

Two or three GFS 83 “smart” servos are installed in the 505, with the pitch and roll servos mounted under the floor and in parallel with the flight controls, so the cyclic and collective move when the autopilot is operating. Each servo contains two processor boards in a fail-passive design, each of which computes the movement needed by the servo motor, as requested by sensors and the pilot, explained Bauer. But if the GFC 600H computer commands and the servo processors don’t agree, then the autopilot won’t input an erroneous movement. Garmin also added envelope protection features such as limit cueing (Helicopter Electronic Stability & Protection or HESP) and the LVL mode.

Improvements added to the 505 installation, following the AStar certification, include a reversionary heading/track mode, which will maintain heading using GPS track even if the heading source fails; improved handling during slow-speed flight, both tightening up the yaw axis when transitioning to forward flight and during a groundspeed-hold hover; sensor data to improve station-keeping during hover and when doing pedal turns; displays of the references used by the autopilot in groundspeed and hover-hold mode so the pilot can see what the helicopter will do when letting go of the controls; enhanced aural alerts to help the pilot recognize the autopilot mode; and a new “ding-dong” alert that tells the pilot when a transition has been achieved—for example, when in IAS mode and capturing an altitude, or when an abnormal mode change occurs. This is so the pilot knows the transition happened while looking outside, but also to look at the mode controller to verify what has changed. Finally, the 505 GFC 600H adds a new function for the failure of some inputs. If attitude inputs fail, for example, and the servo



Now certified in the Bell 505 light single helicopter, Garmin's GFC 600H flight control system is available as a new-build option or retrofit package.

still has power, it will hold the cyclic in the same position it was in when the failure occurred and indicate the failure to the pilot. This is an improvement over an autopilot that simply shuts off with a loss of sensor input and prevents such a problem giving the pilot a helicopter that is diverging from control. It’s “fail safer,” Bauer explained.

Flying the 505 G600H

Garmin test pilot Sean Doyle demonstrated the Bell 505 GFC 600H installation with a flight from Garmin’s facility at McNary Field in Salem, Oregon. Although I don’t have a helicopter pilot certificate, I do have a handful of hours of dual instruction. But he let me fly from the 505’s pilot (right seat) and barely touched the controls during the flight. This isn’t just a testament to how easy the GFC 600H makes flying a helicopter, but also the design of the 505. Even flying the 505 in “wet noodle” mode (without any FCS input), I was easily able to keep the machine well under control.

I lifted off the Garmin pad and hovered briefly before transitioning into a climb then turning toward the southeast. Once above 1,000 feet, I leveled off, then engaged the autopilot and tried out various modes. First I engaged the FCS, which can be done either with a button on the mode controller or by pushing the FTR switch on the cyclic. This engages the FCS

in pitch, roll, and yaw, and this could also be done by pushing the LVL button.

We ran through some of the “upper modes” such as altitude hold (ALT), vertical speed (VS), indicated airspeed (IAS), heading (HDG), and NAV, then spent some time demonstrating safety functions. The LVL mode really works, just as it does in fixed-wing applications, bringing the 505 back to straight-and-level from fairly radical bank and pitch attitudes. I also pushed the controls through the limit-cueing thresholds to test the HESP functions, and it’s clear that this is a helpful tool for pilots who spend most of their time looking outside.

The most fun part of the flight was using the FCS while flying through a canyon along the Santiam River. Doyle explained that the FCS helps the pilot in situations like this keep focused outside, looking for obstacles, ensuring a safe operation without having to focus too much attention on controlling the ship.

I flew down into the canyon, pulling up into a hover above a small island where the river made a 90-degree turn. While it felt extremely challenging to be maneuvering a helicopter in such a tight space, the FCS helped me feel confident that I could put the 505 exactly where I wanted it. Finished with the hover, we climbed out of the canyon and headed back towards Salem.

Doyle had me set up the RNAV approach to Runway 31 at McNary Field, and I used the FCS to fly the coupled approach, which it did perfectly smoothly. Over the runway, I brought the 505 to a hover. Then we flew back over to the taxiway near the Garmin facility to practice some more precision maneuvering, flying in a yaw out of trim condition and trying the various hover modes. I compared flying along the taxiway with and without the FCS engaged, and it was much easier with it switched on.

The 505’s easy handling was underscored when I landed on the Garmin helicopter pad without any assistance from the autopilot.

Having flown two helicopters with the GFC 600H HFCS, I believe it’s a product that helps make flying safer. As Bauer pointed out, “it’s more than just an autopilot,”



Flying along Oregon's Santiam River in the Bell 505 using the GFC 600H flight control system.

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Ross Aviation Adds To Florida Footprint

Ross Aviation has expanded its network in the booming Florida market with the acquisition of Stuart Jet Center, one of two service providers at Witham Field Airport (KSUA). Rebranded as Ross Aviation at Stuart Jet Center, the location marks a change in Ross's long-held strategy of keeping the names of FBOs unchanged whenever possible.

"We recognize the history of the Stuart Jet Center name and it is highly descriptive so there's a lot of brand equity in it, but we are one network and one company and we're building the brand around Ross Aviation flight hospitality," Ross CEO Brian Corbett told *AIN*, adding that the discussions to acquire the location have been ongoing for more than a decade.

The 53-acre leasehold features 15 acres of lighted, secure ramp, and more than 340,000 sq ft of hangar space that can accommodate the latest ultra-long-range business jets. A new 30,000-sq-ft hangar with an adjoining 6,000 sq ft of office space is slated to open soon.

Additionally, the facility has a 7,000-sq-ft, two-story terminal with a passenger lounge and refreshment bar, pilot lounge, showers, concierge, valet parking, crew car, and on-site car rental. A recently launched interior upgrade on the crew and passenger areas is expected to be completed within six months. KSUA, with its 5,828-foot main runway, has had U.S. Customs service since 2019.

The staff, including the members of the Capen family who formerly owned the location, will remain. The move brings Ross to 19 FBOs at 16 airports, mainly in the U.S. The Stuart location is now among the 17 Ross Aviation locations to join the Paragon FBO Network.

Sheltair Expanding at Rocky Mountain Airport

One year after opening its FBO terminal at Denver Rocky Mountain Metropolitan Airport, Sheltair has broken ground on a new hangar with attached office space. The \$10 million



Sheltair held a double celebration of breaking ground on a new hangar and commemorating the one-year anniversary of its terminal at Rocky Mountain Airport.

project will provide a second 30,240-sq-ft hangar that will mirror an existing building in the FBO facility.

To be equipped with a 210-foot-wide and 28.6-foot-high door, the hangar will be able to accommodate the latest generation of large-cabin business jets. In addition, the new facilities will include 6,000 sq ft of office space for tenants, as well as 16 covered and 94 total auto parking spaces.

Sheltair said the new hangar facilities will help it to meet the busy tenant and transient traffic that has come with the strengthening economy in the region.

Appleton FBO: New Name, New Management

Appleton International Airport (KATW) in Oshkosh, Wisconsin has assumed control of the operations of its lone FBO from Express Airport Services and, in the process, changed the name of the facility from Platinum Flight Center to Appleton Flight Center.

Outagamie County-owned KATW, home to 75 aircraft and to a rapidly-expanding Gulfstream completions center, features an 8,000-foot main runway and a U.S. Customs facility.

The airport is just 24 miles from Oshkosh and the primary reliever for AirVenture, the world's largest fly-in gathering. As a result it typically sees hundreds of aircraft during the week of the event.



Appleton International Airport has assumed control of its lone FBO and changed its name to Appleton Flight Center. The airport also has a U.S. Customs facility.

Carver Aero Makes Inroads in Illinois

Iowa-based Carver Aero has acquired two aviation businesses at Illinois's Aurora Municipal Airport (KARR)—LumanAir Aviation Services, one of two on-field FBOs, and aircraft maintenance and servicing company ATS Illinois.

Family-owned LumanAir, in operation for more than 60 years, has a 15,000-sq-ft terminal with passenger and pilot lounges, three conference rooms, a flight-planning area, and crew cars. Open from 6 a.m. until 10 p.m. with after-hours call-out available, the FBO also offers flight training, aircraft charter and management, an avionics shop, and an FAA Part 145 repair station.

Carver, which operates several turboprops and a light jet under its Part 135 charter certificate, has three FBOs in Iowa, and in July purchased one in Wisconsin, making its first foray outside the Hawkeye State.

Avflight Extends FBO Network with Plattsburgh Facility

Avflight has established its 24th FBO with the addition of a location at New York's Plattsburgh International Airport (KPBG). Its new facility will serve upstate New York, southern Quebec, and Vermont and is proximate to popular leisure destinations such as Lake Champlain and the Adirondacks.

"The addition of Avflight Plattsburgh provides a key position for the Avflight network in the Northeast," said Avflight v-p of finance Garrett Hain. "This location serves as the ultimate gateway to thriving international businesses and leisure destinations throughout the region."

Avflight said it will establish its new FBO out of an existing facility at KPBG that includes a 12,852-sq-ft heated hangar, more than 100,000 gallons of fuel storage, self-serve avgas pump, 200,000-sq-ft ramp, and 5,600-sq-ft FBO terminal building. Once updated, Avflight said the FBO will feature passenger and pilot lobbies, flight-planning room, snooze room, and 12-person conference room.

The facility can accommodate any size of business jet and offers 24-hour

fueling (jet-A and avgas), Avfuel contract fuel, Avtrip rewards, U.S. Customs, aircraft parking, hangar space, ground handling, GPU/power cart, courtesy transportation, rental cars, catering, aircraft maintenance, weather service access, and concierge services.

Aeroplex Group Finishes VNY Hangar Project

Airport real estate developer and project management firm Aeroplex Group has completed a \$16.8-million development project at California's Van Nuys Airport (KVNY) that adds 62,000-sq-ft of hangar space and a rooftop 544-kilowatt solar system.

Aircraft charter/management provider Sun Air Jets will occupy the facility, which is located at the Signature Flight Support FBO. It will complement Sun Air's existing operation at the airport and provides exclusive hangar, terminal, office, and shop space, said Aeroplex, which will provide ongoing property management services for the facilities.

Completed in 20 months, the nearly 5-acre project includes two 31,000-sq-ft hangars with 8,400 sq ft of attached offices, shops, lounges, restrooms, and conference rooms, and 77,900 sq ft of ramp area.

The rooftop solar system comprises 1,280 panels, providing 578 metric tons of carbon offsets. "This project not only fuels the regional economy and creates high-skilled jobs in the community; it improves air quality by meeting California's green building standards," said Aeroplex managing partner Curt Castagna. "Despite the unprecedented challenges posed by the Covid-19 pandemic, our project team adopted protocols to move this project forward."

Moscow FBO to Receive Upgrade

UTG Private Aviation, one of Russia's largest business aviation service providers, is starting a major upgrade of its FBO at Moscow Domodedovo Airport. The project, which is expected to be completed by mid-2022, includes a complete renovation of its FBO terminal and the construction of aircraft hangars and a helipad.

FBO executive director Elena Zhdanova told *AIN* that the company is applying the U.S. model for its terminal makeover—"not pretentious, but convenient with adequate cost of provided services," she said. "We are creating a fundamentally new system based on the existing terminal, which involves its complete renovation, as well as overhaul of the apron and building of a helipad."

According to Zhdanova, the project also involves construction of hangars for storage and maintenance and the development of related services such as on-site aircraft catering. ■



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Embraer Expands NE Service Center Network Capabilities

Embraer has expanded the list of aircraft models that Hawthorne Global Aviation Services and Jet East Aviation can provide maintenance under their authorized service center agreements with the Brazilian airframer. This further strengthens Embraer's Northeast U.S. service network following the closure of its company-owned service center at Bradley International Airport in Connecticut. Long Island, New York-based Hawthorne adds the Phenom 100/300, Legacy 450/500, and Praetor 500/600 to its MRO services. Previously, Hawthorne's authorized service was limited to the Legacy 600/650. Meanwhile, Jet East, at Trenton-Mercer Airport in Trenton, New Jersey, adds the Legacy 450/500 and Praetor 500/600 to its Embraer-authorized maintenance capabilities. That facility had already been maintaining the Embraer Phenom 100/300. Pro Star Aviation in Londonderry, New Hampshire, also recently expanded its Embraer aircraft maintenance capabilities.

Avcon STCs Dual 400-amp Starter-generator for King Airs

Avcon Industries has received FAA STC approval for its dual 400-amp starter-generator special mission power system installation for Beechcraft King Airs equipped with Pratt & Whitney Canada PT6A-67A turboprop engines. As STC'd, the installation provides a total generator capacity of 800 amps, according to the Newton, Kansas-based subsidiary of Butler National.

A user-customizable power distribution system with 400 amps of power from two dedicated electrical buses is featured in the modification that is intended to optimize special mission operations.

Jet Aviation Completes Basel Production Center

Jet Aviation has completed work on an 8,000-sq-m (86,000-sq-ft) production center at its Basel, Switzerland maintenance and completion facility. The center, which comprises 5,000 sq m of renovated space and a 3,000-sq-m extension, brings together the cabinet shop, interiors and finishing shops, and sheet-metal shops in one location.

Duncan Expands Honeywell Component Repair Services

Duncan Aviation has entered the final phase of a Honeywell Aerospace sales and repair service agreement announced earlier this year in which the MRO provider assumes responsibility for the component repair and exchange services for specific avionics content, flight controls, electronic flight control instruments, air data, and attitude



Duncan Aviation added 1,000 sq ft of shop service space at its Lincoln, Nebraska location to accommodate 50 additional test sets and 12 new workbenches for Honeywell work.

heading reference units on legacy platforms. As part of that new work, Duncan has added 1,000 sq ft of shop service space at its Lincoln, Nebraska location to accommodate 50 additional test sets and 12 new workbenches.

RAS Group To Offer Mobile Aircraft Exterior, Interior Mx

Jet MS subsidiary RAS Group has established a mobile repair team (MRT) for business aircraft interior and exterior repair and overhaul. The UK-based company's MRT services include seat and minor interior trim repairs, decal replacement, and paint touch-ups, as well as onsite damage assessments for aircraft exteriors and interiors, evaluation of the affected areas, completion of a critical areas list, and a cost and time estimate to return aircraft back to service.

Bombardier, Rolls-Royce Agree on Leased Engine Pool

Bombardier and Rolls-Royce have reached an agreement in which the Canadian airframer will have a pool of Rolls-Royce-owned leased BR710 engines on-site at its service centers for Global customers whose aircraft are equipped with the turbofan engine. The agreement is expected to reduce Global

aircraft operators' downtime and costs.

The program will launch first at Bombardier service centers in Wichita; Tucson, Arizona; and Hartford, Connecticut, and will expand to include service centers at London Biggin Hill, Berlin, and Singapore.

Spirit Aeronautics Expands Services to Texas

Avionics provider Spirit Aeronautics has expanded to Fort Worth Meacham International Airport in Texas by co-locating in MRO provider Baker Aviation's new 70,000-sq-ft hangar. From that location, Columbus, Ohio-based Spirit Aeronautics will provide avionics installation and complex modifications in partnership with Baker's repair station services.

MRO Insider Adds Reviews of Maintenance Providers

Maintenance quoting software provider MRO Insider has released an upgrade that will allow any aircraft operator with "meaningful feedback" to post public reviews of service providers listed on its platform. According to the company, the new feature is available to all operators and is currently not tied to any maintenance requests made through the MRO Insider network. The company will review, verify, and

approve all reviews submitted through the system. A future upgrade will allow providers to respond to the reviews.

Precision Aviation Buys King Air Landing Gear Specialist

Atlanta-based Precision Aviation Group has acquired Trace Aviation in a bid to expand its aircraft landing gear work. Based in Jackson, Mississippi, Trace specializes in Beechcraft King Air and 1900 landing gear exchanges and overhauls. Specifically, Trace provides repair of worn bores and bushings, brace assemblies, hydraulics, actuator housings, cylinder bearings, and axles for Beech 1900s, as well as King Air 90, 100, 200, and 300 variants.

Kansas-based Global Parts Acquired by VSE for \$38M

VSE Corp. has acquired business and general aviation parts distributor and MRO provider Global Parts Group for \$38 million in cash. Based in Augusta, Kansas, Global Parts Group's distribution business supports airframe components while its MRO services focus on the repair of hydraulics and pneumatics. The deal is expected to provide VSE with access to Global Parts' more than 3,000 small- and medium-sized business jet customers who represent more than 100 platforms.

Increasing Utilization Prompts Constant's AOG Expansion

Constant Aviation has expanded its AOG mobile response network by nearly 15 percent this year because of growing demand, the Cleveland-based MRO provider and Directional Aviation subsidiary reported. The company added strategically located base stations in Scottsdale, Arizona; Los Angeles; and Salt Lake City.

Complete Aircraft Group Acquires Aerocare Aviation Services

UK-based aircraft tooling, parts, and components provider Complete Aircraft Group has acquired business aviation MRO Aerocare Aviation Services. As a Part 145 outfit, Aerocare has been providing maintenance, repair, modifications, interior refurbishment, and exterior paint for nearly three decades.

Aerocare will retain its name under the new ownership.

Gogo Taps Jet East as Authorized Dealer

Maintenance provider Jet East has been named an authorized dealer for Gogo Business Aviation, enabling the Trenton, New Jersey-based company to provide Gogo's suite of in-flight connectivity products and services.



Bombardier service centers in Wichita; Tucson, Arizona; and Hartford, Connecticut, will be the first sites to house a pool of Rolls-Royce-owned BR710 engines for lease to Global operators.

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PRELIMINARY REPORTS**Challenger Accident Claims Six****BOMBARDIER CL-600-2B16,
JULY 26, 2021, TRUCKEE, CALIFORNIA**

The twin-engine jet was destroyed during an attempted circling approach to the Truckee-Tahoe Airport, killing the two pilots and four passengers. Prevailing weather included 11-knot west winds gusting to 16, broken clouds at 2,300 feet agl, and four miles visibility in the smoke from nearby wildfires. The Part 91 flight had departed from Couer d'Alene, Idaho, about 90 minutes earlier and proceeded uneventfully through its arrival into the airport environment.

Descending through FL260, the crew was told to expect the RNAV approach to Runway 20 and requested a circle to the longer Runway 11, though winds from 280 degrees would make this a downwind landing. They were told to expect that, then cleared for the approach after one turn in a hold north of the initial approach fix. The tower controller offered the option of crossing the field to enter a left downwind for Runway 29, then cleared them to land on Runway 11 after they reported the runway in sight.

Radar data show that the Challenger flew a close-in base leg, then overshot the runway. Surveillance footage confirmed witness accounts of its "low altitude and abnormal flight path;" one described it passing just 20 feet over the trees. It entered a steep left bank in a nose-low attitude before striking trees and then the ground, igniting a fire that consumed the aircraft.

Four Killed in R66 Crash**ROBINSON R66, AUG. 1, 2021,
COLUSA, CALIFORNIA**

The pilot and three passengers were killed when the helicopter crashed into an open field in clear weather during daylight hours. A witness driving south about half a mile from the site reported seeing it flying straight and level eastbound at an estimated 50 to 100 feet above ground level, so low that he thought it might have been a cropduster. It made an abrupt left turn, briefly disappeared behind trees, and then descended into the ground.

Recorded ADS-B data provided by the FAA showed that the helicopter took off from Willows at 12:07, flying west toward the foothills before turning south over the towns of Lodoga and Stonyford, then turning east again. Altitudes were not captured. It flew east for about 12 minutes, turned to the southeast for two minutes, then turned east again about 0.7 miles from the accident site.

Conquest Succumbs to Dual Engine Failure**CESSNA 425, AUG. 11, 2021,
HELENA, MONTANA**

The pilot and two passengers suffered serious injuries when the airplane went down short of the airport in Helena, Montana. The flight was en route from Faribault, Minnesota, to its planned destination of Missoula, Montana, at FL240 when the pilot reported that the left engine had lost power and requested a diversion to Helena. He advised Helena approach that they were 16 miles from the airport, descending through FL190, and might "need to lose altitude to land on Runway 27." The controller cleared the pilot to maneuver north before entering the traffic pattern on a right base leg.

Eight minutes after the initial power loss, the pilot reported that the right engine had also flamed out. The airplane was about eight miles north of the airport at 7,900 feet msl, roughly 4,000 feet above airport elevation, but struck trees after turning back towards the airport.

The pilot reported having filled the tanks with 207 gallons of Jet-A immediately before the flight.

Twin Commander Destroyed Departing Thunder Bay**ROCKWELL 690B, AUG. 16, 2021,
THUNDER BAY, ONTARIO, CANADA**

The twin turboprop went down immediately after takeoff, killing the solo pilot. A brief statement from the TSB indicated that immediately after rotation it entered "an extreme bank to the left" that continued until it crashed inverted onto Runway 7.

New Owner Loses Control of TBM 700**SOCATA TBM 700,
AUG. 20, 2021, URBANA, OHIO**

The airplane was destroyed, killing the solo pilot, when it crashed in a nearly vertical descent from 12,100 feet. The pilot checked in with Cincinnati approach while descending from FL200 en route from the Erie-Ottawa Airport in Port Clinton, Ohio, to Cincinnati Municipal Airport (Lunken Field), then entered an unexpected left turn. The pilot did not respond to the controller's inquiries, and radar contact was lost.

A witness roughly two miles from the accident site described seeing the airplane "at a high altitude in a nose-dive descent toward the terrain...not turning or spinning...headed straight down." He did not see "signs of distress, such as smoke, fire, or parts coming off the

airplane, and he stated the airplane's engine was at full throttle."

According to acquaintances, the pilot had bought the airplane about nine days before, during which time he had logged "several hours" of ground training and about 15.5 hours of dual instruction in the airplane.

No Injuries in G-IV Nose Gear Collapse**GULFSTREAM GIV, AUG. 21, 2021,
FORT LAUDERDALE, FLORIDA**

The pilots aborted the takeoff in response to an intensifying shimmy during the takeoff roll, and all 14 onboard evacuated the aircraft without injury after it veered off the right side of the runway and struck a concrete slab supporting main approach lighting equipment. Both the pilot and co-pilot reported that the shimmy "progressively got worse and worse" as the airplane accelerated to 100 knots, an account corroborated by a third pilot (not type-rated) in the jump seat. The pilot immediately aborted the takeoff and applied brakes and reverse thrust, but the nose gear collapsed during deceleration. The jet veered right and departed the runway. The four flight crew members and 10 passengers deplaned through the main cabin door.

An FAA inspector found the steering safety "pip" pin normally situated in the nose landing gear torque link on the runway some 2,215 feet from the main wreckage. The bulk of the nose landing gear assembly was some 900 feet further down the runway. The safety pin normally installed through the pip pin was intact and still attached to its lanyard cord.

FINAL REPORTS**Inadequate Training Faulted in Loss of Helo****MD HELICOPTERS MD600N,
JUNE 14, 2018, NGAMATEA STATION,
NORTH ISLAND, NEW ZEALAND**

The pilot's reluctance to fly the helicopter using manual throttle control—a procedure in which he'd never received formal training—left him unable to correct excessive variations in main rotor rpm following the failure of the full-authority digital engine control (Fadec) system. He instead attempted a forced landing in rough terrain. The helicopter landed hard, bounced, and rotated 90 degrees, during which the main rotor severed the tailboom. Violent vibrations destroyed the airframe and a catastrophic overspeed of the engine caused an uncontained failure of the power turbine, igniting a fire in the engine compartment. None of the five occupants were wearing helmets. Three, including the pilot, suffered severe head

injuries, and one passenger died in hospital the following day.

The helicopter was one of only two MD600N helicopters in New Zealand at the time and had a history of electronic control unit (ECU) anomalies that could not be replicated during troubleshooting. The system's logic responded to detected abnormalities in the ECU's primary channel by transferring control to the reversionary governor; subsequent failure of the reversionary governor caused it to revert to a fixed fuel flow to keep the engine running. Moving the collective would change main rotor rpm; to control this, the emergency procedure required the pilot to switch Fadec to manual mode and use the twist throttle to compensate.

The pilot had begun training for his type rating two months before the accident. Both he and his instructor reported that they did not practice this procedure in the aircraft due to concern about possible engine overspeed during the transition to manual control. The TAIC found that his answer to the question regarding an ECU failure on his written exam "made no mention of the correct actions required" and had been graded incorrect but not subsequently corrected. They also reported that the manufacturer claimed to have a procedure for training pilots to use manual throttle control, but it was considered proprietary and only offered in its own training facilities.

Severe Gust Caused Dynamic Rollover**AIRBUS HELICOPTERS AS 350B3,
APRIL 6, 2020, SKJELBREITJØRNA, NORWAY**

A stiff gust "at the worst possible time, as the longline was being pulled taut" banked the helicopter past its critical rollover angle during external load operations in support of powerline construction. The resulting crash destroyed the helicopter, but the Norwegian Safety Investigation Authority credited the pilot's helmet with helping him avoid serious injury.

Forecast winds exceeded the operator's 30-knot limit for sling load work, but actual conditions varied considerably. The two-meter-tall equipment container was attached to the helicopter by a 15-meter line with a six-meter extension, requiring a minimum altitude of 24 meters (79 feet) to lift it. In-cockpit video showed that the pilot's foot slipped off the right pedal as he corrected an initial roll to the left, leading to a left yaw. The bank angle reached 31 degrees as the cargo hook load indicator showed two green lights, corresponding to a load of at least 100 kilograms (220 pounds). The left roll became a right roll as the helicopter continued to rotate; the pilot attempted to release the load, but 12 seconds after the initial bank, the main rotor blades struck the ground. ■

The material on this page is based on reports by the official agencies of the countries having the responsibility for aircraft accident and incident investigations. It is not intended to judge or evaluate the ability of any person, living or dead, and is presented here for informational purposes.



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Jetex now stocking SAF at Paris Le Bourget FBO

by Chad Trautvetter

Jetex announced in August that it is now offering sustainable aviation fuel (SAF) at its Paris Le Bourget FBO that is produced from used cooking oil by TotalEnergies in France. Because Jetex does not hold fuel inventory at any location, the company procures SAF from Air Total at Le Bourget when there is a requirement from an operator.

In its neat form, SAF can reduce life-cycle carbon emissions by up to 80 percent. Jetex Le Bourget also uses a fully electric refueling truck, which further reduces the carbon footprint of the operation. Jetex said it typically pumps a 30 percent SAF blend, but noted that this percentage can be changed based on client requirements. Turbine engines are currently approved to run on up to a 50 percent SAF blend, however.

According to Jetex, the use of SAF is a major focus for the company and forms part of its commitment to achieving net-zero carbon emissions by 2050. In February, the company partnered with Shell to offer carbon credits to customers at Jetex FBOs at airports in Dubai, UAE; Paris; Singapore; Dublin, Ireland; Dusseldorf, Germany; and Salalah, Oman. Jetex added that Jetex can arrange SAF through its



suppliers at various locations, including London Luton, Biggin Hill, and Heathrow, as well as Bristol, UK.

“We take pride in being part of the aviation community that has yet again proven to be accountable and responsible, taking a positive step towards reducing carbon emissions,” said Jetex fuel director Sufiyan Asif. “Jetex has reiterated its stance towards this goal by making it easier for customers to avail SAF at its FBO base at Paris Le Bourget. We are pleased to be able to include SAF arrangements as part of our services for customers looking to meet the challenge of carbon neutrality.” ■

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| Total Non-Requested Distribution | 4,974 | 5,721 |
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| Percent Paid/Requested | 79% | 76% |
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| Total Requested Print Distribution & Requested Electronic Distribution | 38,401 | 36,394 |
| % Paid/Requested Print & Electronic Copies | 87% | 84% |
| Certified correct and complete September 30, 2021 by David Leach, General Manager. | | |

**Within 6 Months**

Nov. 4, 2021

ICAO: Runway Surface Format

In response to the on-going Covid-19 pandemic, ICAO delayed the applicability date of the new global reporting format (GRF) for assessing runway conditions to Nov. 4, 2021. ICAO, in partnership with key international organizations, will continue to provide support to member states and stakeholders as they emerge from the current crisis and revise their implementation plans.

Nov. 25, 2021

Canada: ELTs

Starting on Nov. 25, 2021, Canadian-registered commercial and private aircraft are required to have an emergency locator transmitter that broadcasts simultaneously on the 406 MHz and 121.5 MHz frequencies. Foreign-registered aircraft operating in Canada must have at least one 406 MHz ELT by November 25.

Dec. 2, 2021

Australia: Flight Operations

Ten new flight operations regulations will consolidate the operating and flight rules, as well as certification and management requirements, for a variety of aircraft and operations, which will apply to all pilots and operators in Australia. The new rules will all commence on Dec. 2, 2021.

Dec. 7, 2021 **NEW****U.S.: Pilot Records Database Review**

Under the recently established FAR Part 111, Pilots Records Database (PRD), no entity may permit an individual to begin service as a pilot until the entity (including Part 135 air taxi and Part 91 air tour operators) has evaluated all required information, including that from FAA records, by Dec. 7, 2021. However, reviewing entities will be allowed to let an individual begin service as a pilot without first evaluating records if it has made a documented, "good faith" attempt to access all the necessary information maintained in the PRD and received notice from the FAA that information is missing pertaining to the individual's previous employment history as a pilot.

Within 12 Months

April 30, 2022

Columbia: ADS-B Out Mandate

Starting on April 30, 2022, unless specifically authorized by ATC, no person may operate an aircraft within Colombian territory in any controlled airspace or other airspace in which a transponder is required without ADS-B Out operational capability.

June 10, 2022 **NEW****U.S.: Pilot Records Database Reporting**

Reporting information to the Pilot Records Database about individuals employed as pilots in commercial operations (including Part 135 air taxi and Part 91 air tour operators) is required starting June 10, 2022. Required information encompasses drug and alcohol testing results, training, qualification, and proficiency records, final disciplinary action records; records concerning separation of employment; and verification of a motor vehicle driving record search.

Sept. 16, 2022 and Sept. 16, 2023

U.S.: UAS Remote ID

New FAR Part 89 requires that after Sept. 16, 2022, no unmanned aircraft system can be produced without FAA-approved remote ID capability. After Sept. 16, 2023, no unmanned aircraft can be operated unless it is equipped with remote ID capability as described in new Part 89 or is transmitting ADS-B Out under Part 91.

Beyond 12 Months

Nov. 13, 2022

Australia: Airport Certification

Revised Australian airport certification regulations (CASR Part 139) and an accompanying revised manual of standards (MOS) went into effect on Aug. 13, 2021. Under a transition period, operators of certified airports have until Nov. 13, 2022 to fully comply with the requirements and MOS publications.

Dec. 31, 2022

New Zealand: ADS-B Out

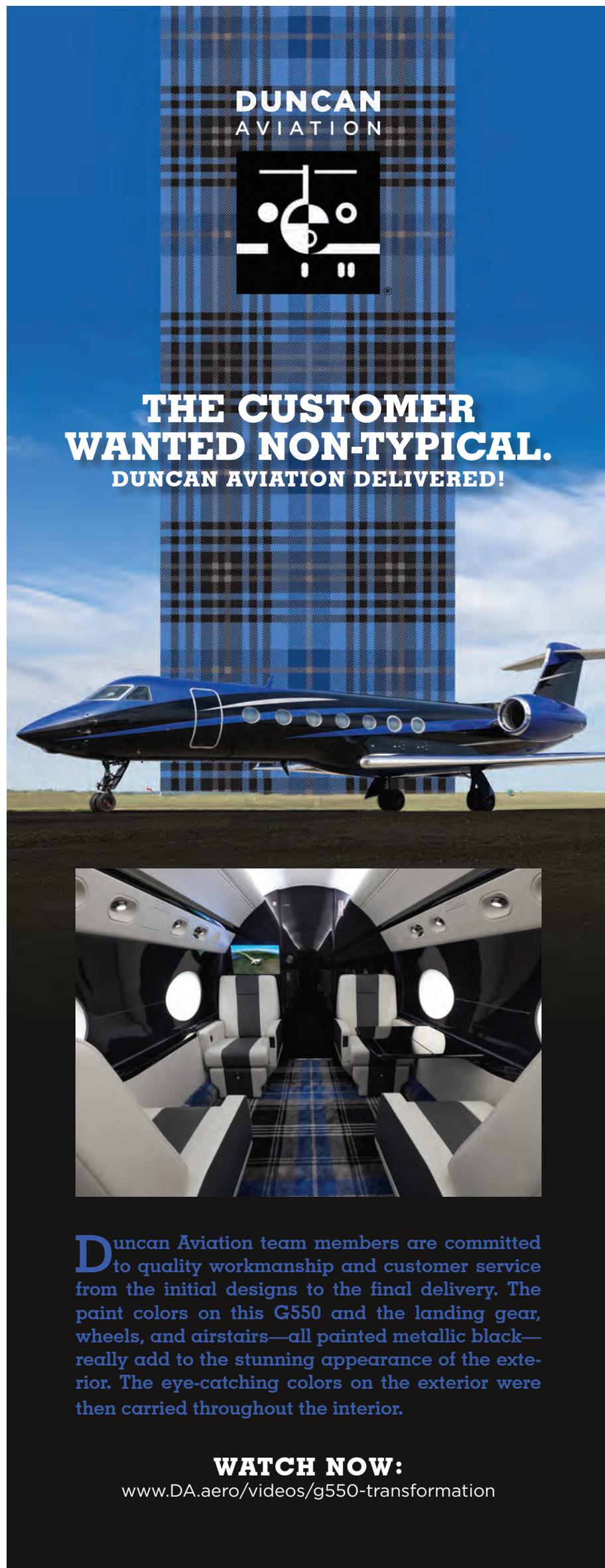
Covid-19 pandemic implications prompted New Zealand to extend its ADS-B out compliance date for one year from the previous deadline of Dec. 31, 2021. The ADS-B provisions, already mandatory for aircraft flying above 24,500 feet, will apply in the rest of New Zealand's controlled airspace by Dec. 31,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

Dec. 31, 2022

Mexico: CVRs and FDRs

Cockpit voice and flight data equipment requirements for turbine aircraft operations (including air taxis) go into force incrementally from Dec. 31, 2020 through Dec. 31, 2022 based on the number of aircraft that are in an operator's fleet. The rules generally apply to turbine airplanes with 10 or more passenger seats and large turbine helicopters.

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



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Global Aerospace is promoting **Rachel Barrie** to succeed Nick Brown as group CEO, effective January 1 and subject to regulatory approval. Brown is retiring after serving with Global Aerospace for 17 years. Barrie has 18 years of aviation insurance experience and has been with Global Aerospace since 2007, most recently as group chief underwriting officer.

David Edwards has been appointed CEO of the *Royal Aeronautical Society (RAeS)*, succeeding Brian Burridge. Edwards most recently was chief executive of the Air Charter Association, is a former executive v-p of Qatar Airways, and has spent 15 years with Gama Aviation.

Ryan Latham has been named president of *Hartzell's Aerospace Welding Incorporated and Aerospace Manufacturing Incorporated (AWI-AMI)*. A U.S. Army veteran with more than 25 years of manufacturing experience, Latham has held management roles at Howmet Aerospace and Pratt and Whitney.

Stanton & Partners Aviation has named **JP Nunez**, president of sales and partner, to head up its recently opened U.S. headquarters in Boca Raton, Florida. Nunez, who joined the firm a year ago, has more than 23 years of corporate aviation experience and previously served as v-p of sales for Gulfstream Aerospace. Also serving at Stanton & Partners' U.S. office are Bill Arrazola, a former regional v-p of sales for Gulfstream, and Allan Baylis, formerly a sales support manager at Gulfstream.

Omni Aircraft Maintenance has appointed **Caleb Benner** as president. Benner, who has more than 20 years of aviation experience, has served as director of maintenance for Omni Air Transport and Omni Aircraft sales for the past five years and also led the development of Omni Aircraft Maintenance.

Wheels Up has appointed **Gene McKenna** as chief product officer to steer the continued expansion of its Marketplace platform as well as the entire product portfolio. McKenna, who has more than 18 years of product management experience, has founded and sold two internet companies in the events and travel industries and held leadership positions at Acxiom Digital and Groupon.

Electra has appointed **Robie Samanta Roy** COO. Roy joins Electra from Lockheed-Martin, where he most recently was v-p for technology in the Government Affairs group and also served as corporate v-p for technology strategy.

Lufthansa Technik has appointed **William Willms** as CFO and a member of the executive

board. Willms has held roles in the Lufthansa Group over the past 13 years, initially as director of finance at Lufthansa Technik and most recently as head of group strategy.

Flydocs has promoted **John Howell** to chief commercial officer and **Joretha Augustine** to chief people officer. Howell joined flydocs in 2016 as business development manager for the Middle East and the Asia-Pacific and has since been director of global sales and director of commercial marketing. Augustine joined flydocs in 2020 as global HR manager and has worked in human resources for manufacturing and mining companies.

Thomas Chatfield has joined the board of directors of the *International Aviation Services Organization (IASO)*, which represents aviation services companies globally. Chatfield founded and is CEO of private jet completions specialist Camber Aviation Management and has 35 years of aviation experience.

Planephx has appointed **Pete Ring** v-p of growth and strategy, **Adam Webster** v-p of customer experience, and **Michael Cohen** chief technology officer. Ring has spent the past 15 years with aviation organizations, including Avidyne, FreeFlight Systems, and Thommen Aircraft Equipment. Webster has 25 years of experience in operator software, aircraft acquisitions, and marketing products as well as management tools for Part 135 and 91 operations. Cohen has more than 30 years of coding and software development engineering experience, most recently with Amazon on the Echo Show product line.

Jet Support Services, Inc. (JSSI) has promoted **George Kleros** to senior v-p of JSSI Advisory Services. Kleros has a 30-year background in aviation maintenance and most recently was senior v-p of strategic event management and fleet support at JSSI.

West Star has named **Craig Duncan** as Textron project manager at its facility in Chattanooga, Tennessee. Duncan has more than 25 years of aviation experience and has held roles with Cessna and Garmin.

Empire Aviation Group has named **Mathieu Chavrot** global director of aircraft sales and acquisitions. Chavrot has nearly 17 years of aviation leasing and sales experience with companies including GE Capital, Falcap, and R4A.

Robert "Bud" Ramseyer has joined *Infinity Aircraft Services* as maintenance director, bringing 30 years of aviation experience. Ramseyer spent 20 of those years

with Motorola Aviation as an A&P/IA technician, maintenance manager, crew chief, and inspector. Infinity sister company B. Coleman Aviation, meanwhile, has named **Jonathan Hill** maintenance controller. Hill previously spent seven years as a maintenance controller and quality assurance inspector with Travel Management Company. Also, **Robert Cummins** was hired as a quality assurance manager for the Coleman Jet management department. Cummins previously served with a Part 135 operator for 11 years as a quality manager.

Duncan Aviation has named **Logan McCabe** to lead its satellite repair station at Chantilly Air in the Washington, D.C. area. McCabe has served with Duncan for more than seven years, beginning as an installations specialist in Fort Lauderdale, Florida, and later becoming crew leader at the satellite in Austin, Texas.

Pentastar has named **Kevin Housner** director of health, safety, and environmental. A former aircraft maintenance technician and maritime enforcement specialist with the U.S. Coast Guard, Housner previously served as a safety specialist in the excavating industry.

Jet East has hired **Brian Sprecher** as sales director for the Southeast territory. A U.S. Marine Corps veteran, Sprecher brings 28 years of aviation experience with such companies as Atlantic Aero, Landmark Aviation, Greenwich Aero Group, Constant Aviation, and C&L Aviation Group.

Cobi Lane has joined *Duncan Aviation* as director of production operations in Provo, Utah. Lane spent the past 21 years with Gulfstream Aerospace in various operations and customer-service positions and also spent seven years with the U.S. Air Force.

West Star has promoted **Matt Vogel** to director of information technology. Vogel, who joined West Star in 2002 and most recently was IT manager, has more than 27 years of IT experience.

Brent Wiggins has been promoted to senior manager of the AOG team for *Stevens Aerospace and Defense Systems*. An A&P, Wiggins has held positions ranging from technician to director of maintenance with companies such as L-3, Nicholas Air, and Wing Aviation Group.

Weston Aviation has appointed **Suzanne Rayner** as aviation fuel account manager. Rayner has 19 years of oil industry experience, and formerly served with Air bp.

Caitlyn Andrews has joined *Blackhawk Aerospace* as marketing coordinator. Andrews, who will support marketing, trade-show, and social-media activities, recently graduated summa cum laude from Texas State University.

Chris Ströh has joined *C&L Aerospace* as a field service representative. Ströh has a 25-year maintenance background, serving as a senior field engineer who set up maintenance bases in several African nations and consulting for operators in Africa.

West Star has promoted **James Davis** to aircraft maintenance supervisor of the Gulfstream department at its facility in East Alton, Illinois. Davis, who joined West Star in 2014, has more than 23 years of aircraft experience and previously served with Anheuser Busch, Worldwide Aircraft Services, Eureka Aero, and DynCorp.

Banyan has promoted **Abby Self** to store manager of the Banyan Pilot Shop. Self joined Banyan in December 2019 as the store buyer and has more than 13 years of retail and merchandising industry experience.

West Star has appointed **Randy Miller** technical sales manager for the Challenger/Global division at its Grand Junction, Colorado facility. Miller has more than 25 years of aviation experience including stints at StandardAero, Textron Aviation, and Western Aircraft.

Elliott Aviation has promoted **Bill Forbes** to director of avionics sales. Forbes, who joined Elliott in 2018 as avionics sales manager, has 25 years of aviation management experience, including with Executive Aircraft Maintenance and Cutter Aviation.

Christophe Simon has joined the *Heli-One* sales and business development team as director of sales for EMEA. Simon has more than 20 years of aviation industry experience and previously held sales roles with Airbus, Thales, and Bombardier.

Duncan Aviation has added **Hector Soto** to its turbine engine service sales team. Soto, who will work with clients in Texas, Oklahoma, and Arkansas, brings 35 years of experience in airframe/engine maintenance, customer service, and regional sales to his new role.

Alex Díaz has joined *Duncan Aviation* as territory manager for Central and Northeast Mexico. Díaz worked as an intern at Airbus and has since held roles with a customs agency, freight forwarder, and automotive manufacturer. He was most recently at ALE Service Center. ■



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