

Aviation International News

AIN
PUBLICATIONS

Vol.50 | No.9

\$9.00

SEPTEMBER 2021 | ainonline.com



MATT THURBER

AirVenture hosts eVTOL flyers

by Matt Thurber

EAA AirVenture Oshkosh roared back to life after last year's pandemic-induced cancellation, bringing hundreds of thousands of visitors and thousands of aircraft to Wisconsin's Wittman Regional Airport in late July. More than 10,000 aircraft flew to Oshkosh and nearby airports and attendance of about 608,000 was within 5 percent of the 2019 show's record, according to the Experimental Aircraft Association.

Although travel from outside the U.S.

remained severely constrained, international attendees came from 66 countries. During 10 days surrounding the show, from July 22 to 31, Wittman Airport saw 16,378 aircraft operations, an average of 116 takeoffs/landings per hour when the airport was open.

While in many respects AirVenture 2021 felt like a normal Oshkosh, it was overwhelmingly positive, with visitors happily welcoming each other back and a profound sense of warmth and friendliness from one end of the show grounds to the other. The show went on, and while only a few people wore masks, the overhanging pandemic did little to curb anybody's enthusiasm.

As usual, there was plenty of new technology to see interspersed with the many beautiful aircraft on display. Two unique aircraft were on hand and even flew demonstration flights that showed what the future of electric flight might look like. Opener's Blackfly personal air vehicle and the Volocopter eVTOL made brief aerial jaunts during the Tuesday afternoon air show, and

judging from the crowds at their exhibits, generated high levels of interest.

Perhaps the biggest news of this year's AirVenture was the FAA's approval of an STC for a new high-octane unleaded aviation gasoline, developed by General Aviation Modifications, Inc. The first STC is just the start, and more piston engine/aircraft models will be covered shortly until the entire general aviation fleet is able to dispense with leaded avgas. *See more Oshkosh news on page 38.*



ROB OLEWINSKI

The Volocopter's capabilities being demoed during a four-minute flight at Oshkosh.

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Read Our **SPECIAL REPORT**

Completions

Business aviation completions and refurbishment specialists and OEMs are busier than ever, meeting the desires of a demanding set of customers.

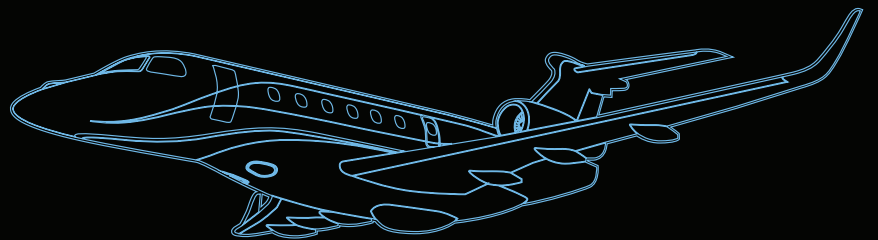
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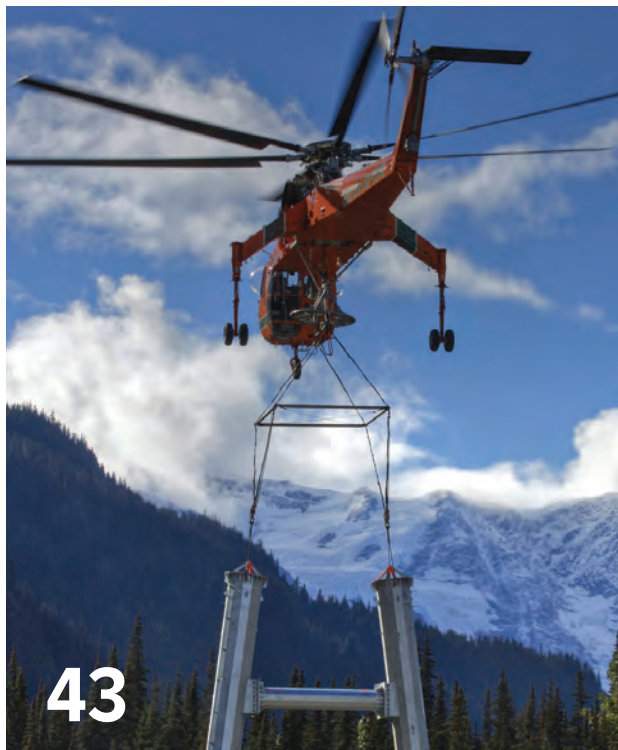
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Aviation International News (ISSN 0887-9877) is published thirteen times per year (monthly plus a special NBAA Convention News issue in November). Periodicals postage paid at Midland Park, N.J., and additional mailing offices. **Postmaster:** Send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

Aviation International News is a publication of The Convention News Co., Inc., 214 Franklin Ave., Midland Park, NJ 07432; Tel.: +1 (201) 444-5075. Copyright © 2021 All rights reserved. Reproduction in whole or in part without permission of The Convention News Co., Inc. is strictly prohibited. The Convention News Co., Inc. publishes Aviation International News, AINAlerts, AIN Air Transport Perspective, AINtv, Business Jet Traveler, BJTwaypoints, ABACE Convention News, Dubai Airshow News, EBACE Convention News, Farnborough Airshow News, FutureFlight.aero, HAI Convention News, LABACE Convention News, MEBA Convention News, NBAA Convention News, Paris Airshow News, Singapore Airshow News, Mobile Apps: Aviation International News; AINonline. PUBLICATION MAIL AGREEMENT NO. 40649046 RETURN UNDELIVERABLE CANADIAN ADDRESSES TO: PITNEY BOWES INTERNATIONAL MAIL, STATION A, P.O. BOX 54, WINDSOR, ON, N9A 6J5, returns il@imex.pb.com.



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As We Go To Press

JSSI, AVFUEL PARTNER ON CUSTOMER SUSTAINABILITY

Aircraft maintenance plan provider JSSI is aligning with industry fuel distributor Avfuel to help its clients meet their environmental sustainability goals. In addition to offering an online carbon dioxide calculator to estimate emissions and adding a simple option to purchase carbon offset credits on its online customer portal, JSSI will have resources available to facilitate the purchase of sustainable aviation fuel (SAF) through Avfuel. Produced from biomatter and residual wastes by Neste, the blended SAF offers lifecycle carbon-reduction benefits over conventional jet fuel. Currently approved for use at blends of up to 50 percent, SAF if used in its neat form can deliver up to 80 percent less greenhouse gas emissions. “With approximately 10 percent of the world’s business aviation fleet enrolled on JSSI maintenance programs, we aspire to have a meaningful impact on our industry objective of reaching carbon neutrality by 2050,” said JSSI chairman and CEO Neil Book.

ROLLS-ROYCE’S PEARL 15 REACHES 100TH MARK

Rolls-Royce has delivered the 100th Pearl 15 turbofan to Bombardier for the Global 5500/6500, reaching the milestone a little more than three years after unveiling the Pearl family and less than two years after the engine entered service. In May 2018, Rolls-Royce revealed the Pearl 15 as the first variant of a new engine family that could have a potential range from 10,000 to 20,000 pounds of thrust and employ key technologies derived from the company’s Advance2 engine demonstrator program. The 15,125-pound-thrust (ISA+15) Pearl 15 was unique in that it fit within the same nacelle package as the Global 5500/6500 predecessors, the Global 5000/6000. The engine entered service on the Bombardier 6500 in late September 2019. In addition to these Global models, Rolls-Royce is developing the Pearl 700 for Gulfstream’s G700 and Pearl 10X for the Dassault Falcon 10X.

WHEELS UP SEES REVENUES, MEMBERSHIP JUMP IN Q2

Wheels Up revenues soared 113 percent year-over-year, to \$285.6 million, in the second quarter, while the number of active members has grown by 47 percent from a year ago, to 10,515. In its first quarterly results release since going public in July, Wheels Up noted flight legs were also up by 146 percent, to 18,234. But at the same time, the company, which owns a fleet of King Airs and Citations, saw a \$1.6 million increase in year-over-year net loss to \$29 million even as its adjusted EBITDA improved by \$7.6 million year-over-year to an \$8.5 million loss. “The accelerating growth in our revenue is a great way to mark our first reported results as

a public company and creates a solid foundation to build upon,” said Wheels Up chairman and CEO Kenny Dichter.

EMBRAER GOES ALL IN ON SUSTAINABILITY

Embraer is embarking on a multifaceted sustainability plan that includes a commitment to carbon-neutral operations by 2040. It is establishing a series of environmental, social, and governance (ESG) targets that range from carbon neutrality to inclusivity and launch of its zero-emission eVTOL aircraft by 2026. Plans call for Embraer to develop products, services, and other sustainable technologies, such as electrification, hybrid, sustainable aviation fuel (SAF), and innovative energy alternatives. The company further will offset residual emissions through efficiency projects, available alternative energy, or advancing technology. To reach carbon-neutral operations by 2040, Embraer has set targets of a 50 percent reduction in net carbon emissions by 2040 from the 2018 baseline, 100 percent energy from renewable sources by 2030, carbon-neutral growth from 2022 with 2021 as the baseline, and the use of SAF this year at its facility in Melbourne, Florida.

GULFSTREAM G500/600 OK'D FOR LOWER-MTOW OPS

Gulfstream has received FAA approval for aircraft service change (ASC) 005 that lowers the maximum ramp and takeoff weights for the G500/600, enabling the twinjet models to use airfields—such as Florida’s Naples Airport (KAPF)—that have 75,000-pound-mtow limits. The G500 has ramp and maximum takeoff weights of 80,000 pounds and 79,600 pounds, respectively, while the G600 has a ramp weight of 95,000 pounds and an mtow of 94,600 pounds. The mod—which is achieved via a placard and aircraft flight manual amendments—lowers these weights to 74,900 pounds for the two large-cabin Gulfstreams, rendering them legal to use at KAPF. On the G600, it also lowers the max landing weight to 74,900 pounds, while the G500’s remains unchanged at 64,350 pounds.

JULY BIZAV ACTIVITY SETS NEW HIGH WATER MARK, SAYS WINGX

Global business jet flight activity in July marked the busiest month since Hamburg, Germany-based WingX Advance began keeping such records in 2006. The previous recorded high of 278,673 departures was set in October 2019, but July surpassed that level by more than 23,000, exceeding 300,000 flights in a month for the first time. That shows a rising trend as both this May and June’s levels exceeded the previous record at 279,006 and 293,048 departures, respectively.



Jo Damato played a key role during and after 9/11 on the GA desk at the FAA Command Center.

9/11 retrospective: lessons in preparedness, advocacy

by Kerry Lynch

Twenty years ago when the 9/11 attacks devastated the world’s economy and plunged the aviation industry into turmoil, NBAA staffers joined together to help tackle the unprecedented challenges faced by the business aviation industry, both in the immediate aftermath and for the longer term.

Jo Damato

In July 2001, Jo Damato, now the senior v-p of education, training, and workforce for NBAA, had joined the association from Executive Jet Management to fill a newly created role: staffing a general aviation desk at the FAA Command Center.

That desk was years in the making, first proposed in 1998 at a peak time of airline delays. Government officials thought it might be a good idea to have a voice from the business aviation sector as well. Damato described those first few months as “quietly drinking from a fire hose,” trying to get up to speed on the inner workings of the nation’s air traffic control system. Yet people at the center weren’t up to speed on business aviation either.

“Nobody was engaging with me and I was still learning how to engage with people, especially at such a mature facility with seasoned air traffic control professionals.” The managers at the desk held by the then-Air Transport Association (ATA), now Airlines for America (A4A), took Damato under their wing and helped her establish her presence at the facility.

By the time September 11 rolled around that year, they were swapping coffee runs. That morning, there was a “commotion” at the Northeast desk. “I didn’t know what it was, but I knew we’d better hold off on our coffee.”

The staff was following a flight that they thought had likely been hijacked. “I don’t want to minimize this, but it played out as something very interesting is happening

right now, but not something terrifying,” she said. But then everyone in the room realized that there may be more than one thing happening, particularly since there was no contact with the pilots.

“It got quiet and everybody was on alert very quickly...and then a gasp from the floor. It was clear that an airplane had made contact with the [World Trade Center],” she said. Initially, “no one was thinking anything more than this is a horrible tragedy and what could have happened on an airplane that created something like that.” When the second airplane went in, she said, “I was 20 feet maybe from the man who was in charge of the floor that day. And he said, ‘Shut it down...nothing in or out.’ And very quickly [the national airspace system] was shut off.”

Incidentally, the national operations manager who made that call, Ben Sliney, a veteran air traffic controller then on his first day as manager of the center, described that morning during a forum held by the University of Texas at Dallas and aired by C-Span. After the second aircraft hit the tower, which he saw on screens inside the center airing CNN, they knew, “This wasn’t the usual hijack by some deranged individual, but that this was a concerted attack by a group of people, and America was under attack.”

Jack Olcott

Then-NBAA president Jack Olcott had arrived early into the offices on the corner of 18th and M Street on the morning of 9/11. Olcott said he usually tried to get in early to avoid the traffic gnarl that occurs during rush hour in Washington, D. C. The day appeared to be typical until he received a call from NBAA’s head of the government affairs office, Pete West, and was told: “Turn on your TV. An

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Operations are up over 2020 through all aircraft categories, led by midsize jets at 34 percent followed by light jets at 32.2 percent, according to Argus TraqPak data.

Argus: bizav ops set to soar in second half of 2021

by Kerry Lynch

Business aviation flight activity in North America is at or near all-time highs and is expected to approach or exceed 300,000 monthly operations in July, August, and October and surpass 2019 levels by nearly 10 percent through the remainder of the year, according to aviation data and safety specialist Argus.

In its 2021 Mid-year Business Aviation Review, Argus noted that “after last year’s record lows, we’ve seen multiple record highs through the first six months, with Part 135 activity setting flight activity records in March, May, and June.”

Argus TraqPak data—which tracks aircraft arrival and departure information on all IFR business jet and turbo-prop flights in the U.S., Canada, and the Caribbean—recorded a slow beginning

of the year, with activity declining 10 to 12 percent from both 2019 and 2020 levels. But that turned in March when flight activity jumped 46.3 percent over 2020, and it since has improved every month compared with 2020 and even 2019. June marked the largest increase from 2019, up 12.1 percent in flight activity.

Year-to-date, flight activity is up 42.4 percent from 2020, while flight hours are up 42.8 percent. With the slower months early on, year-to-date flight activity is still down 1.2 percent from 2019, but flight hours are up 0.3 percent.

Part 91, which has lagged in recovery, came in at a 34.1 percent improvement in the first half of 2020, Argus said, adding, “This is a welcome change after the unprecedented 34.3 percent decline in Part 91 activity from

2019 to 2020.” Fractional activity improved 58.3 percent from 2020 and was up 9.4 percent from 2019. Meanwhile, Part 135 flight activity is up 47.4 percent from 2020 and up 9.6 percent from 2019.

The top 25 operators—led by Wheels Up, XOJet, Executive Jet Management, Jet Linx, and Exclusive Jets—all surpassed 2020 numbers in the first half of the year.

Operations are up over 2020 through all aircraft categories, led by midsize jets at 34 percent followed by light jets at 32.2 percent. But large jet operations also have recovered, improving 27.9 percent.

Going forward, Argus sees the market gaining further strength. As the Part 91 and long-haul markets begin to recover, Argus expects business aviation activity to consistently remain 5 to 10 percent above pre-pandemic levels and up by 32.7 percent over 2020. As operations approach 300,000 in July, Argus predicted peaks in August and October that surpass that demarcation and noted that this would be a first for its TraqPak database, which dates back to January 2007. ■

■ Textron Aviation realigns Denali turboprop under Beechcraft brand

Textron Aviation’s new Denali turboprop single will no longer be branded under Cessna as the company realigns the program. Now known as the Beechcraft Denali, the aircraft will join the Beechcraft King Air 260 and 360/360ER as part of

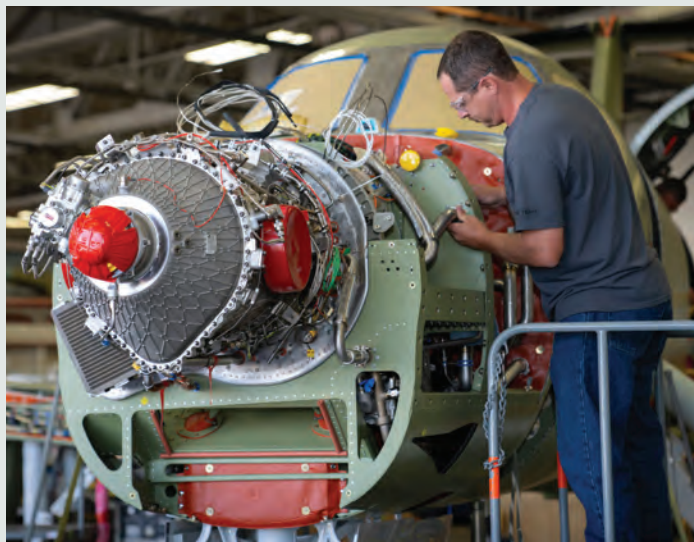
Textron Aviation’s high-performance turboprop product lineup.

“The Beechcraft Denali represents our continued strategy to invest in clean-sheet and current products in both our Beechcraft and Cessna iconic brands. Beechcraft

turboprops are renowned for their versatility and reliability, and the single-engine Denali is a perfect complement to this legendary family of products,” said Textron Aviation president and CEO Ron Draper.

Meanwhile, the Denali development program has recently achieved several milestones as it continues to gain momentum toward an anticipated first flight later this year. In July, the first GE Aviation Catalyst engine was installed on the Beechcraft Denali prototype and the aircraft was powered on for the first time. Engine runs were expected to start in August. To date, the Catalyst engine has completed more than 2,300 hours of ground testing and will soon be flown on a King Air testbed.

Two other Denali flight-test articles are also in development, and three additional ground-test articles will be used for the airframe static and fatigue tests, as well as for cabin interior development and testing. FAA certification of the Denali is anticipated in 2023. C.T.



Now realigned under Textron Aviation’s Beechcraft brand, the Denali turboprop single program is progressing toward first flight later this year and FAA certification in 2023.

■ News Briefs

Embraer Sees Record Bizjet Sales in 2Q

Embraer’s executive jets division saw record sales in the second quarter, president and CEO Francisco Neto said during the airframer’s earnings call on August 13. “We maintained our price discipline strategy and had a strong backlog growth with book-to-bill in excess of 2:1 for this business,” he added. Embraer delivered 12 light jets and eight larger jets in the second quarter, a 54 percent increase from a year ago. For the first half of this year, the OEM has tallied 33 deliveries, a 50 percent rise YoY. For the first time since the start of the global pandemic, Embraer released its forecast of private jet deliveries, which it believes will total between 90 and 95 for the year. Embraer delivered 86 executive jets in 2020.

Maintenance Pavilion Landing at BACE 2021

This year’s NBAA-BACE will feature the show’s first-ever Maintenance Pavilion that will provide maintenance vendors with an opportunity to exhibit their products and services in a dedicated space. The Maintenance Pavilion will be located near the keynote speaker area, advanced air mobility zone, and other “big-draw attractions,” including the indoor aircraft display. “The last two annual NBAA Maintenance Conferences were canceled due to the Covid-19 pandemic,” said Stewart D’Leon, NBAA’s director of environmental and technical operations. “We wanted to do something special for the maintenance community this year because they missed out on dedicated in-person maintenance conferences two years in a row.”

CAE Acquisition To Expand Bizav Maintenance Training

CAE has acquired Global Jet Services in a move that will expand the business aircraft and helicopter platforms for which CAE provides maintenance training. Further, the Montreal-based training provider said the acquisition adds a highly experienced maintenance training team. Combined with the acquisition, CAE will leverage its experience in pilot training to aid its growth in the maintenance training market. Based in Avon, Connecticut and founded in 1992, privately held Global Jet provides on-location maintenance training for a variety of business aircraft and helicopters.

Deloitte See Cautious Recovery in Biz Air Travel

After more than a year of canceled in-person meetings, conferences and tradeshows, and closed workspaces, Deloitte sees business air travel by employees of U.S. corporations bouncing back in the second half of this year. However, the consultancy group said traffic levels will still remain well below pre-pandemic levels until the end of 2022, due largely to lingering uncertainty and concerns surrounding the virus as new waves of infection continue to spread globally.



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The small-scale Hermeus Quarterhorse will be flown autonomously and will be used for flight testing at speeds between Mach 3 and Mach 5.

Hermeus to fly hypersonic small aircraft next year

by Kerry Lynch

Aerospace startup Hermeus, which landed a U.S. Air Force contract for the initial development of a hypersonic business jet for presidential travel, has signed a \$60 million follow-up partnership agreement with the service to flight test its Quarterhorse unmanned small-sized vehicle as early as next year as it progresses toward completion of a full-scale passenger aircraft by the end of the decade.

Anticipated to fly by the end of 2022, Quarterhorse will be used to validate Hermeus's turbine-based combined cycle (TBCC) engine that is based on the GE J85. The aircraft will test speeds between Mach 3 and Mach 5. Hermeus has retained a half-dozen more GE J85s as it proceeds with its development work and "we now have all the turbojet engines we need to complete our first aircraft development program with an iterative,

hardware-rich approach."

Hermeus, which will build Quarterhorse at its recently established factory in Atlanta, has already cut metal for the vehicle. Company executives said by using an autonomous vehicle, Hermeus is derisking this stage of the flight testing.

Plans call to follow with a midsize vehicle that will be used for flight testing for cargo purposes around 2025 that will have longer range and more capable environmental control. That vehicle will be used to help provide a basis for MRO needs before the company proceeds to a passenger version. The planned 20-seat passenger aircraft is targeted for FAA certification in 2029.

The funding through the AFWERX Strategic Funding Increase (STRATFI) program will see the aircraft through the first flight, company executives said.

STRATFI is led by the Presidential and Executive Airlift Directorate under a collaboration including support from the Air Force Research Laboratory.

"Small business partnership is recognized by the U.S. Air Force as an important component to driving innovation. Reducing risk in high-speed transport technologies, as we are doing with this contract, provides near-term and long-term benefits to both the U.S. Air Force and the defense industrial base," said Lt. Col. Joshua Burger, the Vector Initiative program manager who is spearheading the effort. "We are very excited to see Hermeus translate their demonstrated successes in engine prototyping into flight systems."

Hermeus acknowledged the costs involved in testing a TBCC engine across a full flight envelope, but it maintained that by taking a different approach that leverages autonomous and reusable systems, it can achieve its flight test goals and accelerate the learning curve. "Pushing more risk to flight allows Hermeus to move through the engineering lifecycle quickly, reducing programmatic costs," the company said. "When exploring beyond the speeds that airbreathing aircraft have flown before, learning must come through testing in the real world."

The company emphasized its plans to take a dual military/civil path for the development of its hypersonic aircraft. "While this partnership with the U.S. Air Force underscores U.S. Department of Defense interest in hypersonic aircraft, when paired with Hermeus's partnership with NASA announced in February 2021, it is clear that there are both commercial and defense applications for what we're building," said Hermeus CEO and co-founder AJ Piplica. ■

News Briefs

Colibri: Preowned Bizjet Inventory at Historic Low

Inventory of preowned business jets has reached a record low, with approximately 4.65 percent of the preowned fleet up for sale, according to market analysis by UK-based private jet broker Colibri Aircraft. This is the lowest percentage since such recordkeeping began in the 1980s, it said. This is exacerbated by last year's Covid-induced decline in new jet deliveries—at 644, the lowest total since 2004—combined with the private jet sector experiencing high demand as passengers seek safer and more reliable travel methods during a pandemic.

Daher Predicts Record Year for TBM Sales

Daher expects to deliver 50 of its TBM series 900 and 20 of its Kodiak single-engine turboprops this year, Nicolas Chabbert, senior v-p of Daher's Aircraft division and CEO of Daher Aircraft and Kodiak Aircraft told *AIN*. Chabbert said the company's TBM 940 and 910 models were already sold out for 2021, calling the milestone "remarkable" and predicting that 2021 would be a "record year" for the company. "The market is extremely good," he said, despite the fact that Daher, like most aerospace companies, is facing a supply chain struggling to keep up. Nevertheless, Daher delivered 22 TBM 900 series by late July. Daher also sees a wider role and market appeal for its Kodiak utility turboprop single, including government special missions and air ambulance, Chabbert said.

Single Bidder Enters Final Negotiations for Piaggio

Negotiations for the sale of Piaggio Aerospace are entering the final stage with the field of would-be buyers narrowed to a single bidder, the Italian airframer has confirmed. They are expected to soon result in an "irrevocable and binding offer." The company originally received 19 expressions of interest for the acquisition of the corporate assets of Piaggio Aero Industries and Piaggio Aviation, the two companies operating under the Piaggio Aerospace brand. That field narrowed to four earlier this year, and Vincenzo Nicastro, extraordinary commissioner for the company that entered into extraordinary receivership in late 2018, recently obtained approval from the Italian Ministry for Economic Development to negotiate with a single potential investor, it said.

Gulfstream Earns First Sustainable Wings Cert

Gulfstream has become the first company to receive the National Aeronautic Association's (NAA) "Sustainable Wings" certification, for a record-setting round trip from its Savannah, Georgia headquarters to San Francisco on July 24 using sustainable aviation fuel (SAF). The flight in a G500 flown by the airframer's demonstration team reached San Francisco in four hours and 17 minutes.

Avionics sales show gain in 2Q, but still down

Worldwide business and general aviation avionics sales fell 7.1 percent year-over-year, to roughly \$1.07 billion, in the first six months of 2021, according to data released August 9 by the Aircraft Electronics Association (AEA). However, AEA's quarterly 2021 Avionics Market Report did show that second-quarter sales increased 2.1 percent, to nearly \$500.1 million, from a year ago.

The retrofit market accounted for 55 percent of these sales during the first half, while forward-fit sales made up the remainder. According to the companies that separated their total sales figures by world region, 75.2 percent of their year-to-date sales volume occurred in North America (U.S. and Canada) and 24.8 percent took place in other international markets.

"While it's encouraging to see a modest increase in sales compared to the second quarter of last year, this report is somewhat mixed as it ended a string of sales increases over the preceding nine months," said AEA president and CEO Mike Adamson. "The avionics industry is still facing some headwinds with various supply chain issues and global travel restrictions. With new products and services entering the market, the resounding success of recent trade shows, and resilient consumers, there are still positive signs for general aviation to continue its climb."

Dollar amounts reported by AEA for its quarterly business and general aviation aircraft electronic sales reports use net sales price, not manufacturer's suggested retail price. They include all components and accessories in cockpit/cabin/software upgrades/portables/certified and noncertified aircraft electronics; all onboard hardware; batteries; and chargeable product upgrades from the participating manufacturers. Amounts do not include repairs and overhauls, extended warranty, or subscription services. C.T.



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VistaJet now has four Bombardier Global 7500s in service.

Vista Global notes record growth in first-half 2021

by Jerry Siebenmark

Vista Global Holdings began 2021 with a record start as VistaJet sold more than 8,000 new annual subscription hours, an increase of 67 percent from a year ago and 41 percent jump from 2019, the air charter company reported August 9. Meanwhile, deposit members at Vista Global

subsidiary XO jumped 82 percent, with three times as many sales in the period versus last year.

Vista Global's on-demand services grew by 67 percent year-over-year across all markets and by 55 percent compared with 2019. On-demand hours flown

increased 67 percent between 2020 and 2021. By region, Middle East flight hours grew 153 percent during the period while they increased 76 percent in North America and 41 percent in Europe. North America accounts for most of the total Vista Global departures, at 71 percent.

"It has been an exceptional start to 2021 for Vista and we are making groundbreaking progress in all corners of the world in enhancing our position as the global pioneer within the business aviation industry," said Vista Global founder and chairman Thomas Flohr. "Vista has seen a record first half of the year across all metrics and is seeing huge demand for our subscription and on-demand based offerings."

Dubai-based Vista Global noted that its North American footprint has grown in the past year with the acquisitions and integration of Red Wing Aviation, Apollo Jet, and Talon Air, which has allowed it to serve clients with aircraft in the light jet category as well as aircraft management services. In terms of owned aircraft, the company has added four Bombardier Global 7500s available for service under the VistaJet brand, and 15 new aircraft during the first half at XO.

Activity around the upgrading of interiors of VistaJet and XO aircraft—including in-flight connectivity—also continues, the company added. ■

Big boost in Bombardier 2Q

by Kerry Lynch

Bombardier marked one of its strongest quarters in years in the second quarter with a 1.8:1 book-to-bill, 50 percent jump in year-over-year revenues to \$1.5 billion, and 45 percent increase in deliveries that included 11 Global 7500s. As a result, the Montreal-headquartered, pure-play business jet maker gave a rosier outlook for the year of an anticipated 120 deliveries versus the original projection of somewhere in the 110 to 120 range and \$5.8 billion in revenues versus \$5.6 billion.

Also encouraging to executives is significant progress made in its debt, reducing the maturities due over the next three years by some 75 percent with \$1 billion remaining, an amount that it said will enable it to

"more effectively focus on the execution of its strategy." Through asset sales, cost-cutting, debt restructuring, and other measures, Bombardier has been able to reduce its gross debt by \$2.7 billion this year

In the results announcement on August 5, Bombardier president and CEO Éric Martel called the second quarter "exceptional on all fronts" and said he would summarize it as "much better—better revenues, better profitability, better cash generation, better service revenues, and perhaps most importantly, better aircraft sales."

Bombardier delivered 29 aircraft from April through June of this year, up from 20 in the same period a year ago, at the height of the global pandemic. In addition

to the 11 Global 7500s, the totals from the most recent quarter included six others in the Global family, nine Challengers, and three Learjets. A year earlier, nine Globals were handed over, along with nine Challengers and two Learjets.

In the first half, deliveries have increased to 55 (33 Globals, 18 Challengers, and four Learjets), up from 46 (18 Globals, 23 Challengers, and five Learjets) in the same six months last year. Despite the ramp-up in Global 7500 deliveries, backlog maintained steady at \$10.7 billion throughout this year, with strong sales coming across all of the company's aircraft portfolio and production nearly sold out for the year.

While upping Bombardier's delivery estimates to the top of the previously announced range and encouraged by the strong business jet market, Martel said the company was not yet ready to adjust its production plans. "We're really focused on filling the backlog, making it more predictable...We also have to be humble. The market is very strong right now, but...sometimes things can change rapidly. So, we have to be careful and assess also the impact of what's happening right now."

As far as market demand, Martel sees momentum carrying forward into Q3 but that it would be "quieter" than the second, finishing strong by year-end. Sales have been particularly strong in North America, but fleet sales have gained momentum, and Bombardier is seeing some new customers coming into the market. ■



The rise in business aviation usage has spurred an improved financial forecast at Bombardier.

News Briefs

Cirrus Aircraft's Vision Jet Gets Another Upgrade

Cirrus Aircraft last month began delivering an upgraded G2+ Vision Jet with optimized engine performance, Gogo in-flight connectivity, and new exterior paint options. Priced at \$2.98 million, the G2+ builds on the G2 version unveiled in 2019, which featured increased cruise altitude, speed, and range, along with a Garmin-based Perspective Touch+ flight deck and autothrottle. Last year, Cirrus added Safe Return Emergency Autoland, its branding for Garmin Autoland, to its jet. On the G2+, the Williams FJ33-5A engine has an optimized thrust profile that provides up to 20 percent increased performance during takeoff. Meanwhile, a Gogo Avance L3 system adds high-speed connectivity.

Surf Air Bets Big on Hybrid-electric Caravan

Surf Air Mobility has committed to buying up to 150 Cessna Grand Caravan EX utility turboprop singles from Textron Aviation and plans to replace their Pratt & Whitney PT6 turbine engines with hybrid-electric propulsion systems beginning in 2024. The provisional order is for 100 Grand Caravan EXs and options for 50 more, with deliveries to begin in the second quarter of 2022. Surf Air Mobility plans to develop a hybrid-electric propulsion system and will seek an FAA STC to install the system in its Caravan fleet. The powertrain will use a turbo-generator to charge batteries that run an electric motor-driven propeller.

EBAA, IBAC Launch Sustainability Program Test

EBAA and IBAC announced the pilot launch of their Standards & Training for Aviation Responsibility and Sustainability (STARS) program. It is intended to evaluate the clarity and feasibility of a framework of social and environmental standards to be implemented across the business aviation value chain. Thus, the program will introduce industry-wide best practices that will dovetail with existing IS-BAO and IS-BAH safety guidelines. Like IS-BAO and IS-BAH, it will employ an auditing process to ensure integrity. Scheduled to run through December, the pilot will involve six initial members: Air Charter Services UK, CAT Aviation, Flying Group, Luxaviation Malta, Time to Fly, and a Switzerland-based corporate flight department.

Flexjet Obtains AOC, Adds Malta

Flexjet Europe is expanding its reach with the receipt of an air operator certificate (AOC) for Malta. The AOC comes as Flexjet has expanded its fleet by 40 percent in Europe year-to-date. Flexjet Europe established a new operational center in Malta in Sliema, building on its headquarters in London; tactical control center in St. Albans, UK; and maintenance facility in Milan, Italy. An Embraer Legacy 500 is the first Flexjet aircraft to operate under the Malta (9H) registration.

Gulfstream 2Q orders see significant surge

by Kerry Lynch

Gulfstream Aerospace's deliveries dropped by a third in the second quarter to 21 but the Savannah, Georgia manufacturer saw strong demand at the same time, resulting in a book-to-bill ratio of 2.1:1, parent company General Dynamics (GD) reported on July 28.

In releasing second-quarter results, GD chairman and CEO Phebe Novakovic called the second quarter the strongest in terms of the number of units in "quite some time" and said that "from an order perspective, the quarter bordered on spectacular."

Total funded backlog of GD's Aerospace group—including Gulfstream and Jet Aviation—grew to \$13.155 billion at the end of the second quarter, up from \$11.545 billion at the end of the first quarter, and \$11.874 billion a year earlier. Including both Gulfstream and Jet Aviation, the book-to-bill ratio on the quarter was 2.03:1.

Novakovic said the orders were particularly remarkable because they did not rely on fleet sales. She added that they tilted toward the large-cabin products but are across the board for its in-service models, along with the ultra-long-range G700.

In turn, Gulfstream is increasing production rates for the rest of the year with plans to deliver 71 aircraft and leaving open the possibility of pulling forward a few extra deliveries to meet demand, she said.

However, in the most recent quarter, Gulfstream's deliveries of 18 large jets and three mid-cabin were down from the 26 large jets and six mid-cabins handed over in the same period in 2020. Novakovic noted that GD previously cautioned that the second quarter of 2021 would be lower in terms of deliveries because Gulfstream had to adjust production as it grappled with supply chain issues and market struggles in general that came earlier in the pandemic.

As a result, though, GD's Aerospace Division saw revenues drop year-over-year in the second quarter by 17.8 percent to \$1.622 billion. This was down \$352 million from \$1.974 billion in second-quarter 2020.

For the six months, Gulfstream delivered 49 aircraft (43 large-cabin, six mid-cabin), down from 55 (46 large-cabin, nine mid-cabin) in the first half a year ago. Revenues in the period slid \$156

million from \$3.665 billion in the first half of 2020 to \$3.509 billion this year.

Despite the drop in revenues, the Aerospace group's earnings were up \$36 million

to \$195 million in the second quarter and by \$16 million to \$415 million in the first half.

Regarding the services side of Aerospace, Novakovic conceded that the recovery has been slower outside the U.S. and that the company was off original targets. But improvements in the U.S. are bringing services to about 95 percent of 2019 levels.

Novakovic also was encouraged by progress on the new G700 flagship, with 1,600

test hours now accumulated from the five flight-test aircraft, and she said the jet remains on target for entry into service later in 2022. But she cautioned that "much remains to be accomplished, particularly with respect to the certification of the new Rolls-Royce engine." She added that there were no issues with the Pearl 700 engine program, but that there is a lot involved with the certification of a new engine. ■

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Formula for avoiding disaster

by Stuart "Kipp" Lau

It is summer and I am going sailing. Each summer, I set a goal to spend more time in the cockpit of a sailboat and less time on the flight deck of an airplane. Ironically, during the summer months I read about flying and in the winter read about sailing. There is as much to learn at eight knots as there is at Mach 0.80. Many of these lessons are applicable whether you are on the water or in the air.

Seamanship and airmanship are similar—both involve the art or mastery of operating a vessel and a highly specialized skillset. Each requires not only good handling skills, but a thorough understanding of weather, navigation, communication, mechanics, rules, and regulations. Without this foundational knowledge, the captain of a yacht or aircraft can find themselves in peril.

For mariners, the classic "go-to" book to safely operate a sailboat is John Rousmaniere's *The Annapolis Book of Seamanship*. Rousmaniere in addition to being an accomplished sailor is a leading authority on seamanship and safety. First published in 1983 (now on its fourth edition), *The Annapolis Book of Seamanship* outlines the "Formula for Disaster," the eight contributing factors found in most marine accidents. A single factor, on its own, may be chalked up to an opportunity to learn, but the accumulation of several factors may ultimately lead to a disaster.

For the aviator, the concept of a chain of errors leading up to an accident is commonplace. Many of the factors listed below can be related directly to aviation crashes. In fact, each is linked to a high-profile helicopter crash. Here are the eight contributing factors listed in Rousmaniere's Formula for Disaster:

1. A Rushed or Ill-considered Departure

Time pressures, whether real or perceived, are powerful and can cloud judgment. Often, delaying a departure is the safest bet. The NTSB cited "self-induced pressure by the pilot to complete the flight" as a likely contributing cause of the Kobe Bryant helicopter crash that killed nine. Waiting for the fog to lift and delaying the start of a youth basketball game is a much better outcome than flying into deteriorating weather.

2. The Route Is Inherently Risky

Choosing the wrong route may be risky. On a boat, too close to the shore may include hazards such as narrow channels, unpredictable currents, or shallow water, while too far out may expose your crew to higher winds and larger waves.



Stuart "Kipp" Lau

“Poor leadership: On a boat, the crew looks to the skipper for leadership. In a single-pilot helicopter, the pilot must rely on other resources for support.”

In an aircraft, the wrong route can prove to be deadly. Flying too low in areas of rising terrain in foggy conditions has contributed to many aviation crashes, including the Kobe Bryant crash. Likewise, flying in other areas, such as in mountainous terrain, requires special skills and training. As an example, strong winds can cause extreme turbulence on the leeward side of a mountain range.

3. The Route Has No Alternative

When planning passages, sailors consider intermediate destinations where they can seek refuge if conditions deteriorate. Contributing to the Kobe Bryant crash was a complete lack of preparation or a plan. Once the weather began to worsen, the pilot continued to fly under visual flight rules (VFR) into instrument meteorological conditions (IMC). In this case, the pilot could have sought refuge by landing at an alternate, such as a soccer field or some other safe place.

4. The Crew Is Unprepared

The skills and capability of a crew may vary. Each crew must know its personal limitations. The pilot in the Kobe Bryant crash continued flight into IMC even though he lacked proficiency in flying on instruments and was not qualified to fly the Sikorsky S-76 in IMC.

5. The Boat Is Unprepared

A vessel must be suitable for its mission. As an example, some boats are not suitable to sail long distances in open waters.

Likewise, some aircraft are not suitable or certified to fly in IMC. The operator of the helicopter in the Kobe Bryant crash was only authorized to fly under VFR. The aircraft was equipped with an autopilot, however, in the final NTSB accident report, there was never a determination whether it was operable. Regarding other safety equipment, the accident aircraft was not equipped with a terrain awareness and warning system (TAWS) or voice or data recorders.

6. Leadership Is Poor

On a boat, the crew looks to the skipper for leadership. In a single-pilot helicopter, the pilot must rely on other resources for support. In the case of the Kobe Bryant crash, the NTSB cited organizational shortcomings and pointed to the operator's "inadequate review and oversight of its safety management processes."

7. There Is Excessive Faith In Electronics

Automation dependence is a concern in all modes of transportation. Specific to boats, there is a familiar theme, an "over-reliance on electronics can result in a degradation of basic seamanship skills."

In aviation, there is a similar concern that automation is degrading manual flying skills. In the Kobe Bryant accident, due to the absence of a flight data recorder, it is difficult to determine the level of automation used before the accident.

8. The Crew Panics After an Injury

Injury to a crewmember on a boat is a distraction and can lead to poor decision-making. This is one area that was not a factor in the Kobe Bryant crash.

However, in a July 2019 crash of an AW139 in the Bahamas, investigators determined that the pilots were likely under external pressure from the aircraft's owner to complete the flight since his daughter was ill. The flight as planned would have taken family members and friends from a private island to a Florida hospital. The helicopter crashed shortly after takeoff at night with no external visual references—the cause was determined to be spatial disorientation.

Four Rules of Preparation

Lessons from the "Formula for Disaster" fall into four main buckets. These are referred to as the "four basic rules of preparation" and include: prepare the boat, prepare the crew, choose a safe route, and prepare for emergencies.

NBAA outlines top safety concerns

NBAA's Safety Committee released an updated list of its Top Safety Focus Areas for 2021-2022 as it looks to highlight key areas that it believes the industry should focus on and address. Designed to promote safety discussions and new and ongoing initiatives within the industry, the list is broken into three main areas: addressing preventable accidents; engaging on unique operations concerns; and implementing mitigation strategies.

Areas surrounding preventable accidents include loss-of-control inflight, runway excursions, controlled flight into terrain, and ground operations and maintenance accidents. Unique operational concerns cover flight crew and maintenance operations proficiency, single-pilot accident rate, procedural non-compliance, and fitness for duty. And mitigation strategies include safety management systems implementation, safety manager qualification and training, and increased use and sharing of safety data.

"The Safety Committee took a deep dive into the previous Safety Focus Areas to look at what priorities are actionable, then broke the topics into usable chunks," said NBAA Safety Committee chair Jeff Wofford. "This structure will help the committee focus its efforts and collaborate with other standing committees, helping to prioritize the topics with the most potential for safety improvements."

The committee plans to focus on these areas throughout the upcoming year and use the list to shape agendas at events such as the Single-Pilot Safety Standdown. **K.L.**

Translated to aviation, these rules would include the highest level of equipment for each aircraft and the highest level of training for each pilot. To manage all of this, organizations would support the operation with a functional safety management system with the appropriate risk assessments. ■

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

Stuart "Kipp" Lau writes about safety and airmanship. He welcomes your e-mails at: stuart.lau3@gmail.com.



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9/11 lessons

airplane just hit the World Trade Center.”

Olcott said his first thought was some general aviation airplane had deviated off course from along the Hudson River and hit the 110-story building. “And my thoughts were all like others’. That’s a shame; it’s a tragedy. And I suspect, there’ll be a lot of finger-pointing about general aviation.” He turned on the television and saw the plumes of smoke coming out of one of the towers. “While I was watching, another airplane, obviously an airliner, hit the remaining tower. It was clear that this was no random accident. This was something quite significant. After that event, things unfolded very rapidly.”

Doug Carr

During this time Doug Carr, now senior v-p of safety, security, sustainability, and international operations for NBAA, had received a call from the office alerting him that a small aircraft had hit the World Trade Center.

Carr headed into the office while running through a response to this aircraft crash in his mind. He knew that even with a small airplane, it would be front-page news. “I’m thinking what’s the weather looking like and where did they leave from? I’m trying to put together the pieces in my head about that and things I know we’re going to be asked about.”

He took the George Washington Parkway to head towards the office, and “I’m driving by the Pentagon and the third airplane goes in and the fireball, and all of that happens.” Drivers on the opposite side of the road came to a complete stop. “Nobody knew what to do, seeing what just happened.” But Carr knew that the situation was grave and journeyed into the office where the team assembled to put the pieces together.

The Aftermath

The moment had reverberated throughout NBAA, as it did the entire aviation industry and the nation. And, it reshaped security from the government’s standpoint. At the time there was no Department of Homeland Security. Nor a Transportation Security Administration. The FAA handled aviation security in-house.

Since then, the business and general aviation industry has seen security protocols evolve over the years and lasting requirements implemented. These include the Twelve-Five Standard Security

Program for air charters, the Alien Flight Student Program for international flight training candidates training inside the U.S., and the increased use of no-fly zones and temporary (sometimes permanent) flight restrictions with “gateway airports.”

Business aviation still can’t fly into Ronald Reagan Washington National Airport without an armed security officer aboard,

an approved DCA Access Standard Security Program, and vetting through a gateway. A Special Flight Rules area outer circle and Flight Restricted Zone inner circle capturing the “Maryland 3” airports (Hyde Field, Potomac Airfield, and College Park Airfield) remain in place. So too do ongoing restrictions over Disney parks, sporting events, and certain areas where the President travels.

But looking back, Olcott said having the resources in place to mobilize quickly was critical for not only NBAA but the industry at large, enabling them to weather through the turmoil of the time and its aftermath. And the measures that are still in place now are a far cry from some of the proposals and initial restrictions put in place in the immediate aftermath.

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Comlux created a relaxing spacious room in this rendering of an ACJ320neo interior. The company has already delivered two ACJ320neo interiors, one last fall and another this spring. A third will be delivered this fall, and a fourth is in the completion process.

Completions & Refurbishment

Highlights of a remarkable turnaround year

by James Wynbrandt

The cabin completions and refurbishment business was already reeling before the onset of Covid-19, suffering from economic doldrums and the grounding of the Boeing BBJ Max. After suspending operations up and down the supply chain to gather information and formulate and institute mitigation procedures with wartime vigor and speed, the industry roared back to life amidst the pandemic-induced lockdown. Facilities filled as owners used downtime for cabin and maintenance work. An ongoing wave of first-time buyers sought refurbishments, as executive airliner owners began to step up to new-generation ACJs and BBJs or upgrade their current rides, bringing completion centers to capacity. And the Max returned to service last December, capping a remarkable turnaround year. This year shows no signs of slowing down.

At the Completion Centers

Greenpoint Technologies capped 2020 with a BBJ 787-8 delivery, and the

pioneering Boeing completions specialist is awaiting induction of a green BBJ Max 8 at its Moses Lake, Washington, facility. (Currently having auxiliary fuel tanks installed, Greenpoint said.) Could the Boeings there soon share hangar space with Airbus platforms? New CEO Klaus Koester and parent company (as of 2018) Safran have long relationships with Airbus, and Greenpoint is “working with multiple Airbus clients” now, senior director of sales Chad Thorne told **AIN**, adding, “Greenpoint would be honored to become an Airbus authorized completion center.”

The recently delivered 787-8 Dreamliner, designed in collaboration with the client’s representatives, features open, multi-functional living spaces and distinct, private rooms. This marks the fourth Boeing 787 completion, with two more under contract.

For the Max interiors, Greenpoint has been creating traditional cabin designs with progressive technology. Though interior design details can’t be shared

due to non-disclosure agreements, “It’s designed to be the client’s digital concierge,” said design director Annika Svore Wicklund, and borrows elements from Greenpoint’s Ascend narrowbody cabin concept. This features an interior that proactively responds to requests through reliable gesture and voice controls, with technology concealed inside bespoke cabinetry and natural materials. The interface “maintains a relatable and timeless interior aesthetic, and is as natural and intuitive as communicating with a friend across the room,” Wicklund said. Transparent OLED displays expand across the windows, showcasing a serene nature scene, and celestial-inspired valance panels with embedded lighting illuminate as guests move throughout the cabin.

Overall, said Wicklund, Greenpoint sees a customer “shift in focus to health and wellness, including a touchless cabin experience, increased humidification, noise reduction, steam showers, dedicated gyms, and anti-microbial

material finishes.” Additionally, “We have witnessed the desire to connect with nature,” as seen in its Affinity widebody concept, which uses biophilic design incorporating organic, sustainable design elements, balancing “sustainable design with innovative technology.” The Affinity cabin incorporates natural elements from organic materials and live green feature walls that display nature scenes on expansive OLED displays, complemented by lighting aligned with circadian rhythms.

Jet Aviation delivered in May the first BBJ Max, its VIP cabin exuding “a cozy home-like” interior, designed in-house for an undisclosed customer, said Jeremie Caillet, vice-president, VIP completion programs. The Basel, Switzerland-based company anticipates the model’s return will spark an industry uptick. “When new-generation models come to market, we see a surge of interest” in new and aftermarket completions, Caillet said, citing the BBJ 787 and ACJneo in recent years. “Hopefully we’ll see the same with the [BBJ] Max, now that it’s back online.”

The Jet Aviation engineering team designed a stronger interface connecting the interior to the airframe to accommodate the Max’s 16 g certification, up from



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SmartSky Network's next-generation air-to-ground connectivity products and services have been engineered for one goal: to get the right data to the right person at the right time, to provide the greatest possible benefit to those who fly.

“Access to reliable Internet on business aircraft is no longer considered a luxury; it is an expected feature that passengers rely on to maximize their productivity. With 98% of aircraft predicted to have some level of connectivity within the next 15 years, operators are increasingly seeking cost-effective connectivity solutions.”

- NBAA CONNECTIVITY SUBCOMMITTEE

Charles Darwin would have loved aviation; it's always evolving. Piston engines evolved into turbines. Turbines into hybrids. Gauges into EFIS. EFIS into voice-controlled. You get the picture.

And aircraft connectivity is evolving—fast. Not long ago, it involved a sky phone and ACARS. Then came email, Wi-Fi, and ACARS over IP. Now, well, from video to streaming data, it's a whole lot more.

“When I talk connectivity, I think of it in terms of establishing a reliable, real-time connection between the passengers and their online world, the crew and relevant flight information, and the aircraft's IoT [Internet of Things] telematics and the maintainers and OEMs,” explained SmartSky Networks LLC's VP of marketing and partnerships, Brit Wanick. “To take it a step further, it's about connecting various application and service developers with the data they need so they can create and deliver new and innovative capabilities.”

“Today, those are all the parts of an aircraft's connectivity ecosystem,” he added. “There are key interactions between them that focus on the data going onto and coming off the aircraft to get the right data to the right person at the right time for the right purpose. It's a concept that's not unique; one that has driven mobile app development from the music industry to Fintech.”

“We experience it [the concept] every day on the terrestrial network and we should accept no less from airborne connectivity solutions,” Wanick continued. “The ability to have all this come together is why our SmartSky network, advanced shipsets (airborne radios and high performance antennae), and transformational digital platform and application-layer, Skytelligence® are such key elements in delivering the kind of connectivity ecosystem we want.”

DATA HERE, THERE, AND EVERYWHERE

In prior-generation inflight connectivity systems, the network provider's primary responsibility was to furnish the connection from said network to the aircraft. Consideration for why the operator needed the connectivity and how it would be used was secondary and often resulted in the experience being less than positive.

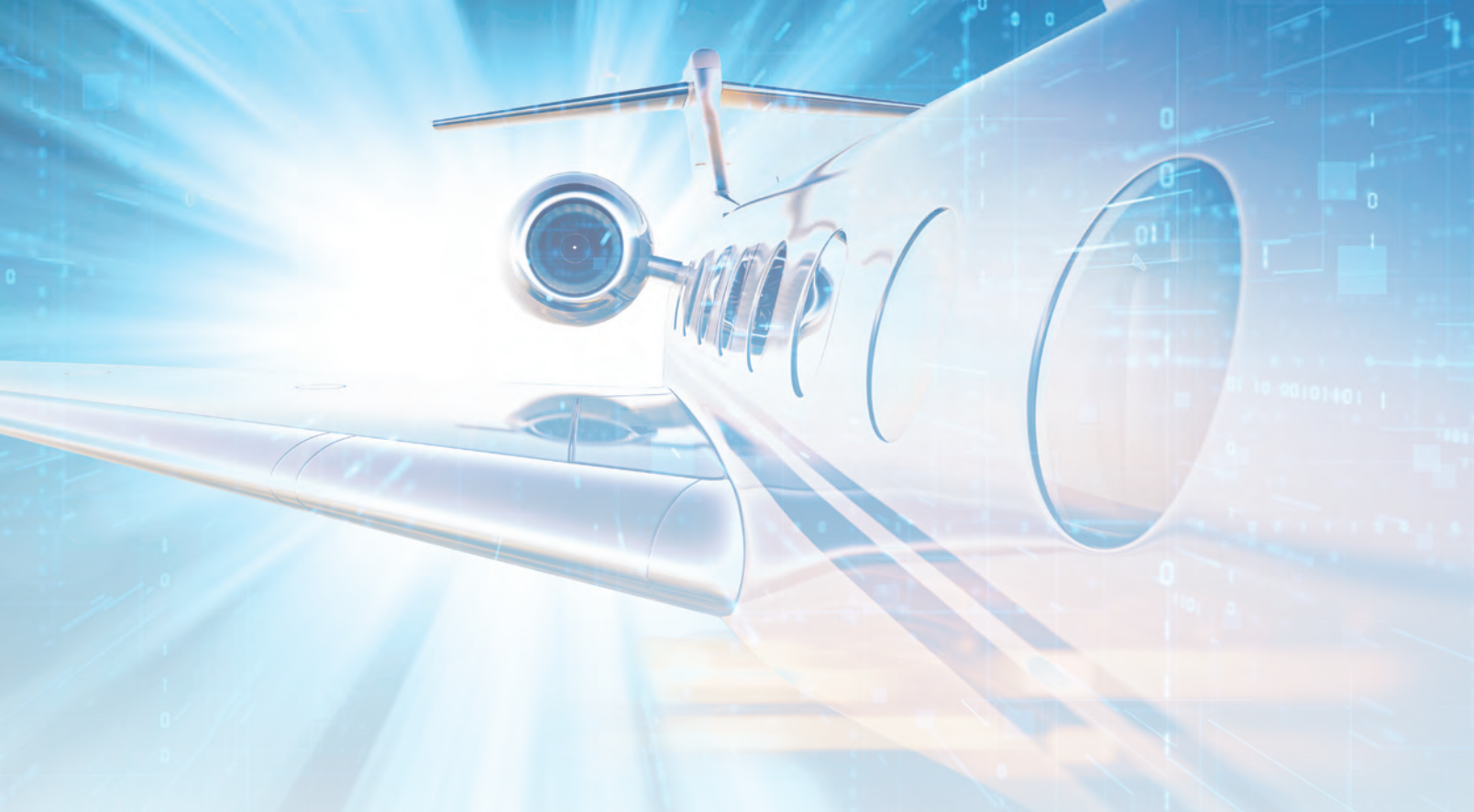
As Wanick explained it, a well-rounded connectivity solution needs to combine a reliable, secure connection with the interoperability to meet the aircraft operator's rapidly evolving needs in today's world.

“We know that for many business aircraft SmartSky's products and services are a core part of a broader solution. As more and more midsize and larger business jets travel internationally, they are adopting hybrid air-to-ground and satellite connectivity services that include both flight deck and passenger applications,” he added.

“Applications and data using our patented Skytelligence platform can have many advantages when working within SmartSky's air-to-ground network. But when that aircraft travels internationally, Skytelligence's open data exchange means those same applications and data will be available to operate on any network, albeit the utility of some applications may diminish on less capable links due to bandwidth or latency limitations. As a network provider, our role is to provide connections, and Skytelligence makes data accessible through those connections.”

While the ability to seamlessly move data between SmartSky's CONUS air-to-ground network and an IP-based satellite provider's network is evolutionary, it's still just one part of today's aircraft-centric communications ecosystem. A real connectivity solution requires getting all that data on and off the aircraft as quickly, reliably, and securely as possible.

But, not to worry, SmartSky has that covered, too.



“BEAM ME UP, SCOTTY...”

The mounting problem facing every connectivity service provider is that as more and more aircraft access the Internet, the trillions of data bits they’re moving need to all hit the available bandwidth at the same time. The traffic jam is mind-numbing and will bring your onboard user experience to a screeching halt.

SmartSky Network’s new, from-the-ground-up, air-to-ground network eliminates that problem once and for all when you are traveling over the continental U.S.

“To deliver true connectivity, you have to be able to get data off the aircraft as quickly as you send it to the aircraft – that’s high throughput,” Wanick said. “And the round-trip has to be as close to real-time as possible – that’s low latency. The reason is that when people build applications and services today, they do it in the context of a network that is terrestrial. Inflight business aviation users are only a subset of their entire user base, so it often doesn’t make sense to design it specifically for inflight use.”

“We need to deliver capabilities that closely replicate how a terrestrial connection operates for the applications we want to use to work properly on the aircraft,” he continued. “Do that, and we suddenly deliver more than a network; we actually give you access to something of value.”

One example Wanick gave was the need to create a VPN (Virtual Private Network) on the aircraft just as you would working remotely from your home or the nearest coffee shop.

“A VPN is highly dependent on low-latency and the consistency of the network connection,” Wanick said. “You need to maintain a full-time, low latency bidirectional link to keep that private tunnel open. Latency is impacted by the distance the signal has to travel, but also by congestion. In legacy inflight connectivity architectures, multiple aircraft must share the same wide area signal, sometimes including terrestrial users in the same footprint, all of which means they may have to effectively wait for their turn to use the system. When congestion is high, latency goes up, and the connection breaks down.”

The SmartSky Network eliminates that problem by connecting each customer aircraft through the company’s patented beamforming technology.

“Beamforming simply means that with SmartSky-connected aircraft one beam talks to one aircraft at a time,” Wanick explained. “Customers using other connectivity services all share a common, wide ‘spot’ beam, so their performance degrades as adoption increases. Not so with SmartSky, as our network is capable of generating many thousands of independent, simultaneous beams, each one communicating to a single aircraft at a time. Our beamforming gives you enhanced security, faster speeds, lower-latency—and scale to support consistent performance even as more aircraft use the SmartSky network over time.”

“A lot more aircraft can transmit and receive a lot more data, and they all get the same level of performance because each one has its own dedicated connection,” Wanick added.

CAPACITY SOLVES PROBLEMS

As aircraft owners start to look at various connectivity solutions, they ultimately fixate on the network's "speed." And that's often a mistake.

"We try not to focus on peak speeds—they can be hit for a second, but typically the need for fast connectivity lasts much longer," Wanick said. "For common activities like streaming videos, working with cloud-based office applications or video-conferencing, customers should be looking at the network's latency (sub 100 milliseconds is great) and consistent overall throughput numbers, measured in Gigabytes per hour of capability, even at peak-usage times. That's a better indicator of the airborne experience that the service will deliver for business aviation."

"Our beamforming helps, but another real differentiator is the spectrum allocation we are using. We have a much wider spectrum available to operate over, and that provides us with orders-of-magnitude more capabilities," he continued.

"Because of the way we allocate our spectrum use, we essentially can provide 10x the typical performance of other air-to-ground systems currently available. More bandwidth equals more throughput, and more throughput equals greater capacity and an enhanced connected experience."

And, as Wanick explained earlier, in today's world, connectivity is a two-way street. To enjoy services like video conferences, you need to get data off the aircraft as efficiently as you get it on. Only then will you enjoy a true "office-like" environment at FL400.

"Also, because you now have sufficient data capacity flowing both ways, you can do that and still move data off the aircraft that supports advancements in predictive maintenance and other new-generation service-related capabilities," Wanick said. "Passengers, crewmembers, engines, avionics—all require real-time connections to do their best work."

No doubt you're wondering whether SmartSky's network will be 5G from the beginning. While well intentioned, you're asking the wrong question.

"What does a 5G network really mean to a business aviation operator or passenger?" Wanick said. "The fact is there are multiple 5G and 4G technologies we use, but it's all about using the right ones to deliver a network in the sky that matches the pace of peoples' lives on the ground. Optimizing the combination of the latest networking technologies for an airborne network is at the core of what SmartSky does, and our focus is on delivering not just a network with the latest moniker, but on outcomes that meet business aviation's needs."

"Using the best available technologies to create and deliver the best overall connectivity experience, no matter what we call it—that's our driver," he added.

BETTER IN-FLIGHT CONNECTIVITY BEGINS ON THE GROUND

Like most things in aviation, the improved user connectivity experience that SmartSky strives to deliver is the sum of a lot of individual parts. And it all starts with the terrestrial network that connects the aircraft to the Internet.

"We're deploying a completely new terrestrial network," Wanick said. "There's a tremendous amount of infrastructure, and getting it all correct will provide our customers with the significant benefits we've been discussing. One of the biggest pieces is how we deal with interference caused by ground-based users of the same radio spectrum we are using in the air."

"Because of the unique way we've created the physical infrastructure and the system's software, we can use our beamforming technology to optimize the signal-to-noise ratio," Wanick added. "The way we do it is informed by many of over 200 worldwide patents we hold on our technologies and innovations. It's pretty advanced, but we've had a team of some of the best minds in TELCO [telecommunications] and aviation connectivity working to solve the challenges faced when making data feel as immediate and available at 35,000ft as it does on the ground in terms of speed, security, and utility."

While SmartSky has assembled a virtual "dream team" of air-to-ground connectivity experts, Wanick stressed that putting together all of the various components to create the right user experience requires a lot of added insights.

"The best overall value solution for any customer may be our air-to-ground network, and it may be our system working alongside a satellite solution," he said. "By providing interoperability for data and applications between the two networks seamlessly, our Skytelligence platform represents an understanding of that need and how we are working to deliver the best solution."

"No matter what the correct value solution is for each customer, it will be provided by our installation partners and dealers," Wanick said. "They have the knowledge of aircraft types and what the customer's needs are. A full set of connectivity services requires a full suite of capabilities anywhere in the world. We can help them deliver that like no one else."



the 737 classic's 9 g interior.

Design-wise, he said, "We're seeing a trend toward an environment that is tranquil and peaceful," rather than the "technological 'gimmicks' that have probably been prevalent" in recent interiors. "It still has that technology, but it sits behind this peaceful tranquility."

Jet Aviation also delivered a trio of ACJ320 series jets (a classic and two neos), one featuring "the quietest cabin we ever delivered," said Caillet. The company performs acoustic analysis of incoming green aircraft before induction, he said, "with our proprietary equipment and technology to map exactly where the sound will be invading in the cabin. Then we apply our new technologies and new soundproofing materials exactly where they should be." Jet Aviation also avails itself to sister company Gulfstream Aerospace's acoustic labs in its quest for quietness.

Four projects (three for returning customers) are in Jet Aviation's Basel completion center now: an ACJ319 and 320 and a BBJ 787 and 777. Concurrently, Jet Aviation is receiving a "significant" level of requests for proposals for both widebody and narrowbody cabin projects from head of state and high net worth individuals, said Caillet.

In July, Jet Aviation opened a new production center at its Basel base, integrating all its production activities in one central location, greatly enhancing efficiencies, the company said.

Lufthansa Technik (LHT) had "one of best years in history" in 2020, and this year "seems similar," said Wieland Timm, vice-president sales, VIP, and special mission aircraft at the Hamburg, Germany-based MRO. With return of the Max, LHT has fielded many requests for completion proposals, starting in the second quarter.

More widebody than narrowbody refurbishments are now underway, a reversal of the usual balance. "The widebodies' owners chose to upgrade their current aircraft rather than replace them with a new model," said Timm. With many aircraft having 10-year-old cabins, new cabin management systems (CMS) and in-flight entertainment (IFE) systems are among the most common upgrade requests.

Several customers are also adding bionic air filtration systems to their current aircraft, as well as anti-microbial surface treatments. Requests for directional infrared counter measures defensive systems are also common, especially on larger aircraft. Previously, demand for such systems was "mostly for head-of-state [aircraft], but now demand is coming from beyond," Timm reported.

Another major trend: a reduction in the number of onboard monitors, in conjunction with growing demand among owners for "a cinema room with tremendous

monitors" of up to 110 inches and with curved screens, said Timm. "This is the future."

Long-term financial considerations tend to dominate interiors choices. "Most [owners] are focusing on resale value," he said, "whether using primarily for their own or for dedicated on-demand chartering to get revenue back." LHT also offers aftermarket solutions for owners who want to modify their LHT cabins for the charter market, without changing the configuration.

Meanwhile, total VIP conversion of a trio of A350s for the German government is proceeding sequentially. The government cabin furnishings are very similar to those in high-end corporate VIP cabins, sans the special woods, gold inlays, and other custom touches some such cabins incorporate, with a focus instead on functional elements. The first of the government's new generation Xtra widebodies is now



This night scene emphasizes Greenpoint's Affinity widebody concept, which fulfills customers' "desire to connect with nature."

flying with an interim cabin, to meet near-term lift needs, and LHT is installing a complete VIP cabin on the second, scheduled for delivery next year. The third A350 refurb will follow immediately, and after its delivery, the interim cabin on the first of the trio will be replaced with a full VIP interior.

Comlux Completion's U.S. facility is full with both ACJ and BBJ completions, having delivered its first ACJ320neo interior last September and its second this spring. A third neo, for a DC Aviation Group customer, is slated for delivery this fall, and a fourth, inducted in April 2021, is also in completion. The recently delivered neo's interior features many intricate, detailed deco panels with complex, compound shapes, creating a layered look on cabin bulkheads. The third neo cabin is being created "in collaboration with a premier luxury brand, something new and novel for us," said Daron Dryer, CEO of the Indianapolis, Indiana facility, a division of Swiss executive airliner services specialist Comlux Group.

Its first BBJ Max 8, in-hangar since the 2019 Max grounding, is also undergoing

cabin outfitting, among other Boeing projects, and the level of requests for completion proposals for both OEMs' platforms is "good," Dryer said.

Comlux is also developing a proprietary, decentralized/decoupled IFE/CMS system that can be controlled and upgraded "from a zonal perspective" and will help future-proof the system, Dryer said.

Comlux is also partnering with ACJ to outfit the cabins of the first 15 of the European consortium's ACJ TwoTwenty, newest member of the ACJ fleet. Customers can choose from a selection of pre-defined configuration options, providing "a unique interior within a minimized time frame," Dryer said. The interiors feature spacious, open designs using materials and textiles such as natural fibers colored without chemical dyes, with options including veneers and other components created with sustainable processes, while

their orders are now coming back again, asking about completions for their green aircraft." He expects the Max's return to service to spark an uptick in completion activity industry wide.

Basel-based AMAC also expects an increase in refurbishments coming from preowned transactions, "purely through the amount of pre-purchase inspections that we are carrying out."

The recent opening of Hangar Five, dedicated to large-cabin business jets, is also leading to a spike in refurbishment activity at AMAC.

MRO and Refurbishment Facilities

Constant Aviation's MRO facilities at Cleveland, Ohio, and Orlando Sanford International Airport in Florida both have interiors centers and both are undergoing major upgrades as refurbishments continue. Constant's Sanford team recently completed total refurbishment on a Challenger 604 that included "enhanced functionality with just the right amount of modern touches," said senior design manager Lauren Brocklehurst, including a custom-design divan inspired by a "Soho couch" and new livery. A Global Express is undergoing a similar transformation now at Sanford. The Cleveland facility this year completely refurbished a Gulfstream G650 with a three-cabin layout, adding an angled entertainment unit in the aft cabin; Kalogridis Deconnel on the window lines for added texture and movement; Cambria countertops by Scott Group Custom Carpet; and fabric inserts on leather seats for comfort on long-range trips.

Duncan Aviation has developed and introduced several new cabin resurfacing processes, offering customers lower costs and downtime and more design possibilities than traditional refinishing treatments like re-veneering. With lockdowns eased, owners "want to be flying, so we need to reduce down times as much as we can," said Nate Klenke, Duncan sales manager, modifications.

In June, Duncan used hydrodipping, a process adapted from the automotive design world, to refinish the cabin of a Citation XLS in a 10-day turn. Hydrodipping involves removing an interior component and dipping it in a tank by a mechanical arm, where a hydrographic image—ranging from fine wood grain to a fanciful scene, or any image desired—is applied to the surface.

The Citation's lavatory cabinet, vanity, aft dividers, pocket doors, drink rails, tables, left-hand forward galley, and right-hand forward entertainment cabinet were resurfaced with a design similar to a flat-cut walnut veneer over a grey background. New table inserts and minor leather work

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9/11 lessons

Information Chain

Damato said immediately after the attacks, ATC personnel turned to her and the ATA manager and told them to start talking to their members, make sure they knew who is on their airplanes, and

if they haven't gotten into the air, don't.

She called NBAA headquarters and coordinated with her immediate manager Bob Lamond, now retired but who was director of air traffic at the time. Lamond headed right to the Command Center and worked with Damato through the time.

She realized since NBAA had a presence at the Command Center, they were considered essential personnel and allowed

to stay. "I think that if we had not finally staffed that position, I'm not even sure we would've gotten into the facility now."

At headquarters, NBAA staff turned the board room into a command center and brought in phones and hooked up screens. Calls poured in, asking how NBAA could get their flight in the air. "We were getting calls literally from movie stars and their flight operations saying, 'Hey, I've got a

really important thing in Europe. I need to leave tonight.'"

Along with having a spot at the Command Center, another factor worked in NBAA's favor: it had recently launched a website. Olcott estimated that the website had only been fully live for about six weeks.

"Back then," Carr recalled, "websites didn't have the functionality they do today. They were very text-based."

To reduce the burden on the services, NBAA stripped out all of the graphics and turned it into a continual update for members. Lamond and Damato would call in information and Jason Wolf, who is senior director of information architecture for NBAA and headed up the newly established website at the time, would then post the details.

"Our website became a critical piece of communication capability for us," Carr said. "We sent everything we could to the website. We probably would not have been nearly as effective if we didn't have the website and the ability to turn it into this massive repeater for the information that we knew."

The Big Unknown

At the same time, though, the aftermath shed light on how little people outside of the industry knew about business and general aviation.

On the positive side, despite the initial grounding in the aftermath, business aviation was still able to step up on a limited basis. "We became useful," Damato said, noting the association was getting a number of questions about what business aircraft could do. Business aircraft were called in to fly in special footpads for search dogs, to help with telecommunications companies that had just lost infrastructure, and to fly blood to where it was needed, among other missions. "There were a whole bunch of unique one-offs that business aviation was able to satisfy because we have resources," Carr said.

Once Command Center officials learned more about NBAA and business aviation, then the questions came: "Can you explain [Part] 91 to us? Can you explain 135 to us?" Damato said, information ultimately taken into consideration as the notams were being developed for operations in the aftermath.

Business Aviation as the Threat

"There were various study groups within government saying, well, we can't let business aviation fly because we really don't know what's in the airplanes. Then there was a thought that we can't let charter up. Why? Because the bad guy may charter a plane," Olcott said. "So, there were a lot of groups, finding

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reasons why everything except the airlines and the military should be grounded.”

The Aircraft Owners and Pilots Association (AOPA), in a retrospective it wrote for the 10-year anniversary of 9/11, noted efforts to restore general aviation flight began immediately after the attacks. “Two days after the FAA grounding, limited airline service was restored, and soon after that, the Bush administration announced that the ‘U.S. aviation system has been restored.’ But general aviation was still grounded, and, in horror, we realized GA was taking the brunt of the fear the attacks had engendered. Were small airplanes now the terror of the skies?” AOPA had asked in an article written by Julie Summers Walker.

Olcott said the general aviation community coalesced to “fight the good fight” with numerous meetings with then-Transportation Secretary Norman Mineta. All the associations got involved—the AOPA, General Aviation Manufacturers Association, and National Air Transportation Association, among them.

“There were multiple outreaches up and down the government chain,There was a substantial amount of communication,” Carr said.

Damato said this is where she really learned to advocate, explaining the industry.

Carr added: “Some of the initial conversations that Jo was having are really

insightful. They really didn’t know about us. This just highlighted pretty brightly that there wasn’t a lot of awareness up and down the chain within the government at the time of what general aviation or business aviation was, what it’s capable of doing, how it operates—all the things that lead to the policies that are being developed.”

This factored in as the airspace gradually freed up in chunks. “That took us a few weeks to go through,” Carr said. General aviation was permitted to fly IFR flights beginning on September 14 and VFR followed gradually beginning on September 19.

But a number of restrictions lingered, some still in place. It wasn’t until February 2002 that a Special Federal Aviation Regulation was issued permitting limited operations to the so-called “D.C. Three” airports.

And, business aviation flights were not permitted to fly into DCA until 2005, when the DASSP was established. That took years of negotiations. The DASSP protocol rolled out with requirements for vetting of the pilots, passengers, baggage, and itineraries—and an approved armed security officer. NATA’s Coyne was aboard that first flight in, a Hawker 1000 operated by New World Jet for Jet Aviation on Oct. 18, 2005.

Security Part of Bizav DNA

Olcott stressed the need to explain that security is part of the DNA of business

aviation. “We argued that security was nothing new in business aviation...it was integral to business aviation. It was industrial security.”

Carr added that the industry was able to ward off initial attempts of potential draconian measures through this advocacy. “The places that people started for discussions about security would have been devastating if that’s where they ended,” he said.

As an example, he pointed to the Twelve-Five security program that imposed new and built on existing security protocols for charter of aircraft weighing 12,500 pounds or more. “That was going to be a program that started at 6,000 pounds—so a pretty small airplane,” he said, adding: “We saw the need to engage pretty heavily directly and frequently. That was, and still is, a continuing effort because what we do doesn’t always look like what people are used to seeing when it comes to aviation security.”

Approaching Security Issues

All of these efforts have shaped the community’s approach to security issues. “I think 20 years ago, we had maybe somewhat of a naive approach that people obviously knew who we were.” Now, Carr said, “The changes that are required...is how to approach a situation. We must validate what they know before we go much further.

The past 20 years have shown, he added,

“that you’ll get a lot farther if you go in with an eye towards education and not just starting right out on the ground floor and trying to fix a problem.”

Another evolution over the past 20 years is the grassroots engagement from the community. “Security has been a pathway towards additional engagement,” Carr said. “Twenty years ago, NBAA was absolutely comfortable with being the voice, the sole voice, for business aviation on so many of these issues, because there was an avoidance of the public light. But today I think we’ve demonstrated the value of being engaged, having your voice counted.”

Not only who advocates but how they advocate is changing, Olcott added. “We as a community had focused on justification, [which] to me seemed almost offensive. You advocate for something you believe in...something that has benefit to society, a benefit to people. Those arguments came in very handy when we were trying to keep [GA] from being grounded after 9/11.”

Perhaps one of the biggest takeaways from 9/11 for Olcott was preparedness, even for the unimaginable. “Plan to have resources in place before you need them. Because once you have a challenge, it is too late to develop resources. We could not have developed the Command Center presence unless we had previously looked at the problem.” ■

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AIN Product Support Survey

by Jerry Siebenmark

Garmin is once again the Overall Average leader in the Flight Deck Avionics segment in **AIN's** 2021 Product Support Survey, with readers giving the Olathe, Kansas-based avionics manufacturer a rating of 8.6, followed closely by second-place finisher Collins Aerospace's rating of 8.3 and Honeywell's 8.1 rating. Universal's 8.2 rating, a 0.1 decrease from last year, is broken out separately as the number of responses fell just below our threshold for comparison with the other OEMs.

In the Cabin Management Systems (CMS) segment, Honeywell led with an Overall Average rating of 8.3, with a tie for second place between Collins and Gulfstream Cabin Management, each of which received an Overall Average rating of 7.9—a 0.1 increase for Collins but a 0.4 decline for Gulfstream.

New to this year's CMS listing is Cessna/Beechcraft Cabin Management, which earned a 7.8 Overall Average for a third-place finish, ahead of Lufthansa Technik at a rating of 7.4.

In the new Airborne Connectivity segment, Gogo Business Aviation was the top finisher with an Overall Average of 8.5, on par with **AIN** readers' rating of the Broomfield, Colorado-based company last year in the Cabin Electronics segment. Honeywell was just behind at 8.3, a 0.2 gain from last year. Satcom Direct finished third with an Overall Average rating of 8.2, which was 0.3 lower than in the 2020 survey. Collins received an 8.3 rating, up from 7.8 a year ago but with a smaller number of respondents preventing direct comparison with the other OEMs.



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 avionics, connectivity, and electronics manufacturers over the last year and to report this information to **AIN** readers. The goal is to encourage continuous improvement in aircraft product support throughout the industry.

NEW SURVEY PLATFORM

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.
- » Allowed user to specify Integrated Flight Deck Avionics, Stand-alone Flight Deck Avionics, Cabin Management Systems, and Airborne Connectivity.
- » Added a new category for Cost per Hour Programs.

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:

- » 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 Product Reliability—Satisfaction with reliability over last 12 months for this aircraft model

THE RESULTS

In total we recorded 1,450 avionics system 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 Cabin Management Systems from Airborne Connectivity. In prior years these two were grouped together in a single table.

Respondents were also asked to recognize individuals who have provided them with exceptional product support and service. Select individuals are highlighted in this report.

COMING NEXT

The 2021 **AIN** Product Support Survey results will conclude with the publishing of results for turbine engine manufacturers in the October issue. ■

Garmin

The Results

In addition to recording the highest Overall Average for Flight Deck Avionics with an 8.6 rating, Garmin received top ratings in every category: Cost per Hour Programs (8.6), Parts Availability (8.6), Cost of Parts (7.6), AOG Response (8.5), Warranty Fulfillment (8.9), Technical Manuals (8.5), Technical Reps (8.5), and Overall Avionics Reliability (9.0).

The Improvements

Lee Moore, Garmin's director of avionics product support, said in the past year the company has expanded its product self-service support with more video and FAQ (frequently asked questions) content for those customers who prefer self-help to phone or email support. Garmin also added staff to both its customer support and distributor support teams to increase coverage during peak demand hours, while at the same time offering more internal training options for tech-

nicians. Additionally, Garmin expanded its operating hours into the weekends to better serve pilots.

In terms of fulfilling Garmin's commitment to continuous improvement and innovation in its products and services, the company has continued refining and growing its field quality reporting process through automation, thereby expediting the flow of feedback directly from owner/operators, service centers, and installers to the correct design and manufacturing engineering teams. As a result of restrictions caused by Covid-19, Garmin shifted its focus slightly from providing in-person training to expanding its virtual training offerings with more content added to its eLearning library and hosting quarterly webinar sessions for installers and pilots.

"Garmin maintains an immersive culture of continuous improvement, innovation, and customer-first focus," Moore said. "As such, we are always working on enhancements to our products, services, and support."

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Category & Overall Average Ratings for Avionics, Cabin Management Systems, and Airborne Connectivity	Overall Average 2021	Overall Average 2020	Rating Change from 2020 to 2021	Cost per Hour Programs	Parts Availability	Cost of Parts	AOG Response	Warranty Fulfillment	Technical Manuals	Technical Reps	Overall Avionics Reliability
Flight Deck Avionics											
Garmin	8.6	8.4	0.2	8.6	8.6	7.6	8.5	8.9	8.5	8.5	9.0
Collins Aerospace	8.3	8.1	0.2	8.2	8.4	7.3	8.3	8.8	8.3	8.3	8.8
Honeywell	8.1	7.9	0.2	8.1	8.1	7.1	8.2	8.6	8.1	8.2	8.5
Universal Avionics **	8.2	8.3	(0.1)	8.4	8.4	7.1	8.3	8.4	8.4	8.5	8.0
Cabin Management Systems											
Honeywell	8.3	8.1*	0.2	8.3	8.2	7.6	8.4	8.9	8.4	8.5	8.5
Collins Aerospace	7.9	7.8*	0.1	8.3	8.0	6.9	8.0	8.4	7.6	8.2	8.2
Gulfstream Cabin Management	7.9	8.3	(0.4)	7.9	7.7	6.5	8.1	8.5	8.1	8.3	7.9
Cessna / Beechcraft Cabin Management	7.8	NA	NA	7.7	7.6	6.6	8.0	8.1	8.0	8.0	8.0
Lufthansa Technik	7.4	7.2	0.2	8.0	7.8	6.3	7.3	7.8	6.9	7.5	7.5
Airborne Connectivity											
Gogo Business Aviation	8.5	8.5	-	7.9	8.7	7.7	8.7	8.8	8.2	8.9	8.6
Honeywell	8.3	8.1*	0.2	8.6	8.3	7.6	8.3	8.6	8.0	8.4	8.5
Satcom Direct	8.2	8.5	(0.3)	7.5	8.2	7.1	8.5	8.4	8.1	8.8	8.4
Collins Aerospace**	8.3	7.8*	0.5	8.0	8.2	7.4	8.2	8.5	8.4	8.7	8.7

*2020 overall average included scores for both Cabin Management Systems and Airborne Connectivity.
 **Companies that received a low number of responses; ratings not included in the bolded high scores.
 Ties listed alphabetically (except for low-response companies).

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Textron flies high on stronger Q2 deliveries

by Jerry Siebenmark

Benefitting from a rebounding business aviation market, Textron Aviation reported higher revenue and profit in the second quarter and the first half of 2021, driven by increased deliveries and growing

aftermarket business, according to its parent company Textron Inc. The manufacturer of Cessna Citation jets and Beechcraft turboprops also expanded its backlog by \$689 million to \$2.7 billion, pushing backlog into

the six- to nine-month range and resulting in a book-to-bill ratio “at close to two,” Textron president and CEO Scott Donnelly said on an earnings call held July 29.

For the second quarter, the Wichita



airframer delivered 44 jets (including five Longitudes and seven Latitudes), up from 23 last year, and 33 turboprops, up from 15 last year.

“In terms of new equipment, that order activity continues to be strong here as we’ve gone through the end of the quarter, so I think the sustainability appears to be quite strong,” Donnelly said on the call. “As we’ve seen through the course of the year, we have an awful lot of new customers coming to the market, which I think is great. We’ve got very low used aircraft for sale; it’s sort of record low levels, so people are coming into the market. There’s not a whole lot to be had out there in terms of quality, relatively new used aircraft, and that’s driving a lot of strength in the new side.”

Donnelly characterized the new customers coming to the market as mostly high-net-worth people as well as small business owners. In terms of sustainability in demand, he added that the company is starting to see an uptick in demand from the European and South American markets, the latter of which is “a dominant part of our turboprop market.”

Revenue for the quarter was up from a year ago by \$414 million to \$1.161 billion, while profit during the period was \$96 million compared with a year-ago loss of \$66 million. For the first half of the year, profit was \$143 million on revenue of \$2.026 billion versus a loss of \$63 million on revenue of \$1.619 billion in the same period last year. Backlog grew \$1.1 billion in the first half of the year, Donnelly added.

Not only did the higher revenue reflect increased deliveries, but also growth in aftermarket sales. “Demand is there [for] flying,” he said. “If you looked at that, it is at the highest levels we’ve seen in a very long time in terms of daily utilization.”

As a result of the steadily improving financials, headcount at Textron Aviation is increasing both through recalls of laid-off workers and new hires, though Donnelly didn’t provide specific details.

Donnelly also noted on the call that Textron Aviation’s newest aircraft, the SkyCourier, has achieved more than 1,200 hours of in-flight testing and remains on track for entry into service later this year. ■

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Dassault orders climb quickly in first half

by Kerry Lynch

Dassault Aviation has reported a steep decline in business jet deliveries in the first half of this year but a significant jump in orders, including the first for its newly unveiled flagship Falcon 10X. At the same time, the French airframer is laying the groundwork for the Mach 0.925, 7,500-nm model, making plans to add or upgrade facilities in multiple locations in France.

Dassault delivered six Falcons from January through June of this year—a significant drop from the same period in 2020 when 16 were handed over. However, the company booked orders in the first half of 2021 for 25 aircraft valued at €1.413 billion (\$1.66 billion), compared with five valued at €669 million during the first half of last year, when the Covid pandemic took root, the company reported July 22.

“The business aviation market showed encouraging signs of improvement during the first half of 2021, particularly with the recovery of air travel in the U.S.,” the company said, calling the pre-owned end of the market buoyant. However, Dassault added that “price pressures remain.”

With the jump in orders, Dassault’s Falcon backlog grew to €2.86 billion, up from €2.15 billion at the end of 2020. The backlog encompasses 53 Falcons, including nine special-mission aircraft. At the end of 2020, the backlog stood at 34 Falcons.

Dassault expects deliveries to ramp up through the remainder of the year, which is in keeping with its earlier guidance of 25 deliveries this year and an anticipated increase in net sales. However, with the decline in first-half deliveries, net sales dropped to €702 million, versus €1.060 billion a year earlier.

The May 6 unveiling of the Falcon 10X was a long-awaited highlight for Dassault, which had held off initially in hopes of a live presentation. With the introduction, Dassault is throwing its hat into the ultra-long-range ring, bringing its wide-cabin aircraft to a market that also includes Bombardier’s Global 7500 and

the in-development Gulfstream G700. Equipped with Rolls-Royce Pearl 10 engines, which can run on 100 percent sustainable alternative fuels, the 10X will be able to

make flights from New York to Shanghai and Paris to Santiago.

With service entry planned for 2025, Dassault is making some facility upgrades throughout its factories—including reconfiguring the hangar in Biarritz that houses the Falcon 6X and 10X programs—with completion anticipated in August 2022. It also is building a 10X wing assembly facility, scheduled to be complete in 2022, along

with a paint shop in Martignas.

In the shorter term, Dassault is expanding a facility in Istres for the 10X system testbed.

Meanwhile, its new Falcon 6X took to the skies on March 10, and now three development aircraft are in service, with 40 flights and 130 hours completed by the end of June. Dassault said the aircraft have demonstrated “excellent flight behavior and performance in line with expectations.” ■

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were also accomplished.

The Lincoln, Nebraska-based MRO recently used vinyl wrap, another alternative finish to veneer, in refurbishing cabinets on a Challenger 300, Klenke said. A laminate attached to a phenolic backing, the vinyl is wrapped onto cabinets and a finish is then applied. Sublimation, another refinishing process, allows creating finished interior surfaces on complex shapes, including window and cabinet panels. Sublimation involves heating a covering material and vacuuming it down onto the panel or a form. Duncan recently acquired a large thermal vacuum for applying sublimation in interior refurbishments.

Meanwhile, in June Duncan delivered a refurbished Falcon 2000 EX EASy and is currently refurbishing a G550.

Klenke sees future demand for refurbishments in current trends, noting that “people are moving toward having a management company or a fleet operator manage their airplane,” while these same operators “are now starting to brand their fleets” for the charter market. For these operators, “whether people will charter it depends on the age of the airplane and how it’s equipped,” he said, “And they won’t charter unless you have a well-kept interior or a relatively newly refurbished one.”

In a heads-up to all refurbishment prospects, Klenke warned about supply chain issues. “We’re seeing fabrics, leathers, mechanical parts, electrical parts, all becoming more difficult to get, and lead times extending. The planning process has to be way out in front.”

The dearth of new aircraft deliveries helped drive refurbishments at **West Star Aviation**. “Some clients are not willing to wait for new aircraft manufacturing, so they are buying used and refurbishing them to their own liking,” said Debi Cunningham, vice-president of marketing at the Alton, Illinois-based MRO.



Duncan Aviation’s re-imagining of a G550 interior builds on the classic lines of the best-selling ultra-long-range jet while adding utility and comfort.

West Star expects the trend to continue.

The recent trend has been that interior designs are mission-defined. For private family use, clients like “seating that will accommodate the entire family, with areas for sleep and comfort,” Cunningham said. For corporate customers, “office in the sky connectivity...along with interior materials that are easy to clean and maintain” are preferred.

Among design trends, color coordination between the aircraft’s interior and exterior “has totally gone out,” Cunningham said, with customers treating inside and outside as “two different canvases to showcase their tastes.” Meanwhile, the current color preference for earth tones has yet to shift back to the jewel tone palette with which it historically alternates. Soft grays and whites and black have become more popular over the last few years, she said, but color choices overall are literally “all over the spectrum, making everyone’s aircraft completely customizable to their tastes.”

West Star used Zoom and Facetime calling with clients to keep projects moving forward during the lockdown, but now “customers are back in the design center and in-house, and in-person meetings are back, for which the interior design of an aircraft is

still the best way,” Cunningham said.

Elliott Aviation, focused on aircraft from King Airs to midsize jets, is seeing strong demand for personalization in its refurbishment projects, with owners “really getting involved in the design process,” said Megan Welch, director of interior sales and design. The style trend is contemporary. “Contrast is a huge design element,” she said. “Less is more; strong contrasts—darker cabinets, lighter seats; and good carpets pulling two tones together—the modern look.”

Custom seat design is part of the trend, including two-tone designs and styled leather inserts popular in high end autos. LED color lighting, Welch said, tunable to “complement what your flight mission is: entertainment, reading, or rest,” and for luxury convenience touches like illuminating or backlighting cup holders, is also very popular. Sister company Elliott Technologies offers its proprietary Prism LED cabin lighting through some 20 dealers nationwide.

Galley upgrades are likewise in high demand. Whatever the anticipated project, the Moline, Illinois-headquartered MRO makes sure all options “from the cockpit, through the cabin, to the lavs,” are presented to and discussed with clients.

The owners of all the aircraft coming to **Innotech Exeaire**, which specializes in Bombardier platforms, for heavy checks in the past year “want wood veneers and paint touched up and new carpets when they arrive,” said Logan Brown, sales director at the Montreal-based company. “We can give them a quote on how much to touch up the entrance area, the first wood where the hands go, or for a full soft goods update.”

IFE and cabin connectivity refreshes, 4K monitor installations, and upgrades to cabin management systems, are also popular. (Innotech is an authorized Honeywell avionics VAR as well as Cessna Citation service center.)

Formerly a major completion contractor for Bombardier Globals and Challengers, Innotech sold the airframer its completion business a decade ago but sees opportunity in the aircraft it once finished.

“We still have the capability to do a full completion, the staff’s tribal knowledge is still there,” said Brown. “We’ve targeted a lot of aircraft we completed ten years ago, to see about providing complete refurbishment and paint services.”

Innotech is also collaborating with parent company Innotech Exeaire Aviation Group, which provides production support services, to bring OEM quality to aftermarket refurbishments.

International Jet Interiors (IJI) of Long Island, New York, and avionics and maintenance services provider **Pro Star Aviation** of New Hampshire often partner on interior projects. Known for creating bespoke interior designs that nonetheless reflect clients’ unique sensibilities, the pair were tapped in April by PLBY Group—the former Playboy Enterprises—to design and install the interior for a new iteration of the Big Bunny, the late Hugh Hefner’s private jet. Reimagined this time within a Bombardier Global Express, the partner companies are “contractually

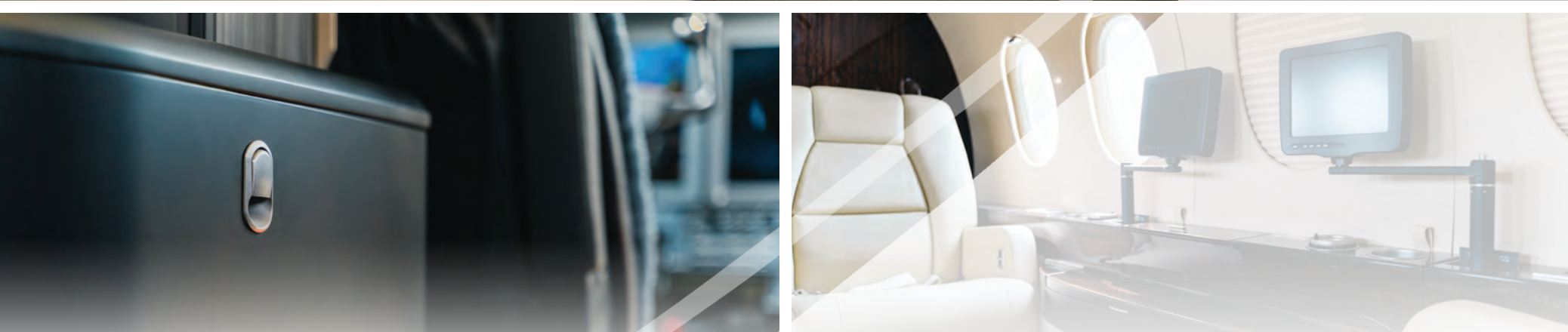
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West Star Aviation’s Alton, Illinois, facility refurbished this Citation 560, with full soft goods replacement and sand stain over refinished matte wood.



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Embraer deliveries rebound

by Kerry Lynch

Embraer is continuing to see a rebound in deliveries, handing over 34 executive and commercial jets in the second quarter. This was double the 17 deliveries the Brazilian manufacturer reported a year ago

when the pandemic had shuttered most of international travel and also exceeded 2019's second-quarter shipment tally of 26 aircraft.

Executive jet shipments jumped from



Embraer celebrated the delivery of the 600th Phenom 300 in the second quarter as it saw deliveries of the model increase by four units and shipments across the board double year-over-year.

13 a year ago to 20 in the most recent quarter, propelled by a boost in Praetor deliveries from three in second-quarter 2020 (one Praetor 500 and two 600s) to eight in the same span this year (three 500s and five 600s). Phenom 300 deliveries also strengthened in the second quarter to 11, compared with seven a year ago. In all, Embraer delivered 12 light jets and eight large jets in the second quarter.

For the first half of the year, executive jet deliveries increased to 33, compared with 22 a year ago. Light aircraft deliveries rose from 14 in the first six months of 2020 to 22 this year, while large jets climbed from eight to 11 year-over-year.

Its commercial deliveries also picked up in the second quarter from four a year ago to 14 most recently. In the first half, commercial shipments improved from nine a year ago to 23 this year.

Backlog has returned to pre-pandemic levels, reaching \$15.9 billion by the end of June, Embraer reported. This is up 12 percent from the end of the first quarter and up \$500 million from the \$15.4 billion at the end of second-quarter 2020.

Embraer marked the quarter with the delivery of the 600th Phenom 300-series business jet, which went to Fayetteville, Arkansas-based Superior Capital Holdings. It also delivered the first limited-edition Phenom 300E aircraft, part of the Porsche Duet collaboration, to a Fort Lauderdale, Florida customer. The company additionally completed its first conversion of a Legacy 450 to a Praetor 500 jet in Brazil. That brought the total 450 conversions to Praetor 500s to 20, including in Europe, North America, and Brazil. ■

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NTSB investigators near the site of some of the wreckage of the DHC-2 Beaver that was involved in the midair collision near Ketchikan, Alaska, on May 13, 2019.

Alaska crashes highlight lack of FAA oversight

by Colleen Mondor

In 2018 and 2019, Alaskan small commuter and air-taxi operator Taquan Air Services was involved in three accidents that caused serious injuries and fatalities. While they appear unrelated at first glance, a closer examination reveals a company struggling with deficits in training and operational control coupled with a lack of FAA oversight.

The federal issues in particular raise many questions. Taquan Air cycled through five FAA principal operations inspectors (POIs) in the 15 months before the most recent crash. These inspectors suffered from excessive caseloads, heavy travel schedules, lack of relevant aircraft knowledge, and dearth of experience in Alaskan Part 135 operations. Two of them were based in South Carolina, on the other side of the country.

Taquan's third accident during this period occurred on landing in Metlakatla harbor on May 20, 2019. Flight 20 was a scheduled trip for the Ketchikan, Alaska-based FAR Part 135 operator. Both the pilot of the de Havilland Beaver and the single passenger, an epidemiologist for the Alaska Native Tribal Health Consortium, were killed in the accident.

In its probable cause report, the NTSB determined weather was not a factor and the pilot failed to compensate for a quartering tailwind while landing. The pilot had an estimated 1,623 hours total time and only about 27 hours on floats.

Its second accident was a midair collision on May 13, 2019, near Ketchikan. Both Taquan Air and Mountain Air Service, the operator of the second aircraft, were flying tourists from a Royal Princess cruise ship. Taquan Air was operating a de Havilland Turbine Otter, Mountain Air a Beaver. All four passengers and the pilot on the Beaver were killed; one passenger was killed in the Otter and nine seriously injured.

The Mountain Air pilot was a local owner

and operator of his single aircraft air taxi and although his personal flight records were not found, investigators determined he had about 11,000 hours total time with an initial competency check in the Beaver seven years earlier. He had flown with four local operators in the past, including Taquan Air. The Taquan Air pilot was a seasonal employee and former airline pilot with about 25,000 hours total time.

In its probable cause report, the NTSB determined "the inherent limitations of the see-and-avoid concept" prevented the pilots from avoiding each other before the collision.

Taquan's first accident during this span was controlled flight into terrain on July 10, 2018, in the area known as Jumbo Mountain, about nine miles from Hydaburg. Taquan Air was operating a Turbine Otter on a contract charter for Steamboat Bay Fishing Club to Ketchikan, 80 miles away. Six of the 10 passengers received serious injuries.

The NTSB determined this accident was caused by the pilot's decision to fly under visual flight rules into instrument meteorological conditions. The pilot, a longtime seasonal hire and retired airline captain, had 27,400 hours total time.

Jumbo Investigation

In the Jumbo Mountain accident, investigators found that the pilot, flying the second of three company aircraft that departed the lodge, crashed about 8:35 a.m. while flying in heavy rain and clouds. He told the NTSB that after realizing early on that conditions precluded his ability to stay on his planned route, he diverted only to find himself in "rapidly deteriorating circumstances."

He attempted to execute a climbing, 180-degree right turn but lost situational awareness, thought he glimpsed water, and

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DASSAULT AVIATION GOES BIG IN THE LONG- RANGE SEGMENT

Dassault Aviation's calling card has long been lean, agile aircraft that reflect fighter jet heritage, never lacking comfort, but still presenting a comparatively modest ramp presence. More the efficient sports sedan than the grand SUV of intercontinental jets.

The pilot-pleasing 7X, the first business jet with a digital flight control system, typified this ethos. Its handling and smooth ride inspired confidence in pilots and their passengers. The fly-by-wire 8X offered more passenger space, more range and the quietest cabin in the sky.





In the all-new 6X, scheduled to enter service in 2022, Dassault has taken the next step with advanced flight control technology (test pilots already give its handling raves), while abandoning any shyness about putting a bigger airplane on the ramp.

Change is in the wind, and Dassault is adapting with renewed emphasis on the passenger experience. “Times and trends change,” says Carlos Brana, Dassault’s executive vice president, civil aviation, discussing the evolution of the large-cabin segment. “Passengers want space and the comforts of home, especially on long flights. They very much want to stroll up and down the aisle, to freely visit and mingle with passengers in other sections of the aircraft—and not be hunched over because of low ceiling height.”

The 6X introduces a new standard in long range cabins. “It is wider and taller than current business jets,” says Brana. With a width of eight feet six inches (2.58 meters) and height of six feet six inches (1.98 meters), it has the largest cross section of any business jet flying. It will be eclipsed in cabin size only by the Falcon 10X ultra-long-range jet now in development.

A True Widebody Cabin

The interior design, from Dassault Aviation's in-house Design Studio, launches a new aesthetic--all flowing, uninterrupted lines that enhance the feeling of spaciousness. "Homes used to have dedicated dining rooms set apart from kitchens," Brana notes. "Today, home buyers want big open expanses for families to congregate, dine, and relax. It's a bit the same for business jets."

Reflecting the design team's achievement, the 6X cabin has received several prestigious design awards, including the 2021 Red Dot prize for premium cabin design, the International Yacht & Aviation Award, and recognition as the "Best of the Best" in aviation in 2021 by the Robb Report.



The cabin is divided into three living areas, in part so that passengers on long flights can choose a spot for rest, work or dining. The 6X can carry 16 in comfort, but typical passenger loads will be far smaller, allowing teams or families to really spread out and relax. Operators can customize each section according to their tastes, and also optimize certain areas for the type of mission they will fly. Those who routinely travel long distances can choose an extended entryway for more galley storage space and equipment. Opposite a longer galley, operators can opt for a crew rest area allowing a resting pilot privacy and the space to lie flat and get some quality off-duty time.

At the other end of the cabin, operators can opt for private lounge or stateroom configurations so that passengers can also rest peacefully and have the privacy to change either into more comfortable flight attire or business clothes to look sharp upon arrival.

Times have also changed, notes Brana, with regard to expectations of a healthier environment on board. “Passengers want better air filtration, lower pressure altitudes, more natural light, and ultra-quiet cabins.”

In the 6X, cabin air is refreshed continuously and run through hospital-grade HEPA filters for the healthiest possible experience. Cabin altitude pressurization is maintained at a low 3,900 feet (1,189 m), when cruising at 41,000 feet (12,497 m), greatly reducing fatigue.

Thirty extra-large windows in the 6X offer nearly 5,000 square inches — some 35 square feet — of viewing/window space, the largest in the aircraft’s class. A unique skylight in the entryway adds natural light to a part of the cabin that is usually difficult to illuminate well. And even allows a bit of stargazing at night high above any haze or city lights.

The abundant ambient light is complemented by a new LED lighting system that adds another dimension to passenger comfort. “We are able to adapt cabin lighting to work with circadian rhythms and help passengers adjust to multiple time zones,” Brana says. “But jet lag is more than disrupted circadian rhythms. We’ve combined improved natural and cabin lighting with fresh air flow, low cabin altitude and a serene, quiet cabin to overcome travel fatigue almost completely.”

The Quietest Cabin

Dassault plans a cabin as quiet as the 8X, which leads the industry in the sounds of silence. At an average of 49dB, the 8X in flight is as quiet as a living room in the suburbs. To achieve equivalent sound reduction in the 6X, Dassault will acoustically map the cabin of a test aircraft equipped with a full interior. With this process, Dassault is able to identify noise “hotspots” and apply the correct materials and dampeners to eliminate them.



Onboard Communication and Entertainment

Dassault recognizes that passengers are interacting with technology in new ways. While they can still enjoy streaming content on bulkhead or side ledge monitors, it's more likely they'll want entertainment and news on their personal devices. Passengers will be able to manage all this content, including a vast library of news and entertainment programming through the FalconCabin app. For communications they'll have worldwide high-speed broadband connectivity thanks to an optional Ka-band connection, once again through their own devices. Service subscriptions are easily managed by the flight department through another app called FalconConnect. As expensive as aircraft in the Falcon 6X class are to operate, flight departments and owners do care about efficiencies, and FalconConnect lets a flight department monitor and manage communications service to satisfy passenger needs, while minimizing costs.



Technology and Safety Innovations

The 6X benefits from the tribal knowledge Dassault's engineering organization has gained through development of preceding Falcons and military aircraft alike. That includes flight deck technology transfer from Dassault's advanced Rafale fighter jet, with its finely tuned Digital Flight Control System. DFCS improves handling, safety, and ride in turbulent conditions.

The 6X represents Dassault's latest advance in digital flight control technology, managing primary and, for the first time, secondary flight control surfaces such as flaps and flaperons, as well as nose wheel steering for better tracking in gusty conditions and on wet runways.

The 6X is the first business aircraft to incorporate flaperons, active high-speed deflection control surfaces that can act as both flaps (increasing lift) and ailerons (roll control). Integrated into the DFCS, flaperons are especially beneficial during approaches with a steep descent profile (for example, on the steep glidepath into London City airport), increasing drag while maintaining a high-lift coefficient.

As an added benefit, "digital flight controls save weight and improve reliability," Brana adds. But not all digital flight control technology is equal. "The 'magic' in DFCS has much to do with experience in programming flight laws," Brana explains. And no company in business aviation has more experience in developing digital flight control laws and related hardware than Dassault, which has developed fly-by-wire technology in its fighters over more than four decades. It is the only business jet manufacturer that designs and manufactures its own Digital Flight Control System, one that provides more functionality and safety than any other.

The 6X's spacious, ultra-widebody flight deck offers more headroom than the flight deck in any other business aircraft, and 30 percent more window space than previous models, providing greater situational awareness in the air and on the ground. The broader flight deck allows entry and egress without climbing across the center console, and there's more storage space for the crew's gear. The pilot seats recline to 130 degrees, allowing pilots to get into a more comfortable position on long-range flights.



The French Touch

All business jet interiors today exude luxury, but Dassault has a more distinctive style, which it proudly refers to as the "French touch." "It's a unique combination of premium styling and elegance with high-tech innovation, a blending of the most advanced digital design and finest old-world craftsmanship," Brana says. "When the world thinks about French products, they probably first think of Hermes scarves and Dom Perignon champagne. Probably no one outside of the aerospace industry thinks of the Rafale fighter or CATIA," Dassault Systèmes' 3D industrial design software relied on by industries worldwide. "We have this soft and hard side to the French touch that creates something unique — powerful and sensuous; tough and gentle. In the cabin, this translates to functionality and a sensuality our competitors might shy away from."

FalconEye

The FalconEye Combined Vision System brings a new dimension of technology and safety to the 6X. It is the first Head-up Display (HUD) that combines images from a synthetic vision system (SVS), derived from database-driven terrain mapping, with images from a thermal and low-light enhanced vision system (EVS). Joined into a single view, FalconEye provides an unprecedented level of situational awareness to flight crews in challenging weather conditions and all phases of flight.

Developed in partnership with Elbit Systems, the heart of FalconEye's EVS system is a fourth-generation camera that integrates six sensors across a large bandwidth of visible and infrared spectrums. One advantage of the new sensors is the ability to pick up "cool" LED airport lighting.

The 30-by-40-degree field of view on the FalconEye HUD that displays the imagery is one of the widest on any HUD, ensuring full viewing coverage with HD-quality 1280-by-1024-pixel resolution.

FalconEye permits approaches to 100-foot minimums, providing a substantial operational benefit.



Also on the flight deck: EASy III, the third-generation of Dassault's Enhanced Avionics System (EASy), powered by Honeywell's Primus Epic platform. Among new features are an integrated controller-pilot data link communication (CPDLC) system and RDR 4000 IntuVue 3D color weather radar that provides predictive lightning and hail detection as well as 60-nautical-mile-range Doppler turbulence detection. Hazardous weather and the vertical definition of thunderstorms can be seen at distances up to 320 nm.





Defining New Performance Benchmarks

With its high lift slats and flaps and a new and brawny Pratt & Whitney Canada PurePower PW812D engines, the 6X continues the Falcon tradition of strong short field/high and hot runway performance. Approach speeds can be as low as 109 knots, allowing operations at short fields under 4,000 feet (1,220 meters).

The 6X also demonstrates the mission flexibility for which Falcons are prized. Thanks to a high maximum landing weight, operators can make a short hop (a positioning flight, for example), pick up passengers and then fly a long intercontinental mission—all with a quick turn and no need to take on fuel. The 6X could fly the short leg from Washington D.C. to New York and then on to London or Geneva.

The 13,000- to 14,000-pound thrust P&W Canada PurePower PW812D turbofan shares the proven, rigorously tested common core technology used in Pratt & Whitney's PurePower® family of geared turbofan commercial engines, Brana notes. They are employed in 16 engine applications with more than 585,000 in-service hours.

The new PW812D delivers a double-digit increase in fuel efficiency, with improvements in fuel burn, environmental emissions, engine noise, and operating costs, setting a new "green" standard for emissions with the advanced TALON™ X combustor.

The improved efficiency also results in quieter operation and low vibration levels, "providing more comfort to passengers," and reducing the cost of ownership, according to Brana: "We estimate a 40 percent reduction in maintenance costs versus other engines in this class." The 6X will also be able to fly with a 50/50 mix of sustainable aviation fuel.

The new-generation Falcon 6X wing incorporates advanced structural architecture and a curved trailing edge with an increased buffet margin

and increased lift/drag ratio that reduces the impact of turbulence. The wing allows for a wide speed envelope bounded by low-speed approaches to short-fields and a top speed of Mach .90.

The 6X will have the longest range in its class, flying 5,100 nm (9,445 km) at high-speed cruise of Mach .85, or its 5,500-nm (10,186 km) maximum at Mach .80. It can fly from Moscow to New York, Paris to Beijing, London to Los Angeles, São Paulo to Chicago, or Shanghai to Melbourne at high-speed cruise. Or Beijing to San Francisco, Los Angeles to Geneva, Moscow to Singapore, or São Paulo to London at long-range cruise.

The New Leader Heads Skyward

Flight testing began in March and now three aircraft are flying in the test campaign, which is expected to wrap up next year.

"A lot of important testing was accomplished before the 6X even began flying," explains Brana. "This is our HALT and HASS testing for Highly Accelerated Life Testing and Highly Accelerated Stress Screen." The tests have proven "very effective for ensuring reliability and durability of components and systems and put us ahead of the curve when we began flying."

Flight tests have also gone "quite smoothly," with the jets showing "a high level of maturity relative to this point in a typical test program," says Brana. By early summer, more than 200 test hours had been flown.

"We've opened up almost the entire flight envelope, including stalls and other tests, and various weights and CG positions," Brana says. "Pilots are reporting that they are delighted with the aircraft's handling characteristics."

Falcon 6X s/n 003 is fitted with the Falcon 6X's award-winning interior, including in-flight entertainment and communications systems, and is being used for cabin design validation.

“With a/c 3, we have begun testing the cabin environment and systems,” Brana reports. “We will map the entire cabin for temperature distribution and for sound, so that we can fine-tune the environmental system and the soundproofing. We’ll also evaluate all the galley, cabin, and lav systems—lighting, water, waste, plus the entertainment systems and communications.”

S/n 004 has been equipped with a full cabin interior—and will join the test fleet shortly, embarking later in the test program on a two-month global endurance flight campaign to ensure all systems are fully mature upon entry into service.

Meanwhile, production of additional Falcon 6Xs is in full swing, with s/n 010 having gone on the final assembly line in early July. Parts are already flowing to the worldwide customer service organization, as Dassault readies itself to introduce an all-new Falcon to the market.

Dassault, which has invested heavily to expand its global service organization, is training technicians now to care for the new aircraft, in part by assigning senior techs from around the Dassault MRO network to participate in maintenance activities on the test fleet.

In recent years the factory service network has added TAG Maintenance Services and ExecuJet MRO Services to expand service coverage in Europe, the Middle East and Asia. It has strengthened spares support, AOG service and many other aspects of its vast service organization. As a result, the company now routinely ranks number one in independent industry surveys.

“Part of this is strategic and part of it is the unique spirit of the worldwide Falcon family, encompassing both our operator community and all of our employees. They go beyond. In fact, our service motto is ‘Whatever it takes.’ And we truly live this,” says Brana.

Speaking of family, the heirs of Marcel Dassault, the founder, still are majority owners of the company and are intensely committed to the long-term health of the enterprise. Because of its unique ownership structure within the aviation world, Dassault believes it is better able



Carlos Brana
Dassault's executive vice president

“Part of this is strategic and part of it is the unique spirit of the worldwide Falcon family, encompassing both our operator community and all of our employees. They go beyond. In fact, our service motto is ‘Whatever it takes.’ And we truly live this...”

to make long-term investment decisions. The contemporaneous development of two new aircraft—the 6X and 10X—bears that out.

The family's other interests sometimes figure into the unique experience of becoming a Falcon owner. Customers visiting the factory in Bordeaux Mérignac may find themselves in a vineyard, for example, sipping on an excellent St Emilion from Chateau Dassault.

As high tech as Dassault Aviation may be, it is also famous for the personal touch.



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obligated not to disclose the details” of the interior design, according to IJI president Eric Roth, but “expect this to be a very special aircraft,” he said.

Like its predecessor, the new Big Bunny exterior will be solid black and feature the company’s rabbit-in-a-bow-tie logo on the vertical stabilizer, and the aircraft will be used for brand marketing and promotions.

Approximately 85 percent of IJI’s clientele are ultra high net worth individuals or private business owners, Roth said, often with ambitious interior ideas, “whereas the average corporate flight department simply wants the aircraft to look new and pristine” after refurbishment. If clients plan to make their aircraft available for charter, IJI can modify the interior elements accordingly, and “identify materials that will please their aesthetic taste, yet hold up well over time and the amount of varied usage,” he said.

Interiors work on Bombardier Globals has kept Canada’s **Flying Colours**

Seletar Airport completed two total refurbishments in the past 12 months, helping support owners in the Asia-Pacific region who have limited interior and maintenance options. Facility expansion, to include a paint shop, remains underway.

Global Aircraft Interiors (GAI) in Long Island, New York, has seen growing refurbishment activity from former charter customers who have moved to full ownership in response to the pandemic and want to ensure their jets are charter-ready. “The charter market has radically changed,” said president Robert Roth. “There are a lot more charter aircraft, and people have to step up [on outfitting and appearance] and explain what separates theirs versus somebody else’s.” GAI recently outfitted a Falcon 50 with new carpeting and seats for a new, first time owner.

Refurb customers also want interiors “that can be cleaned easily and effectively, or with anti-microbial and mold-resistant materials,” Roth said.

A full refurb on a Falcon 900 and a

leather accents on the white leather seats are complemented by a horizontal red stripe running along the cabin sidewalls. A “huge” desk formerly on the right side of the forward cabin (“Something I’ve never seen in an airplane,” Briscoe said); and the wardrobe, and uncertified bed in the aft section, have been removed. In their place, the new interior features club seating; a credenza with a flip-up monitor; and a divan certified for taxi, take-off, and landing, respectively. Bulkheads were removed to create a larger interior space. Such reconfiguration requests are common today said Briscoe, especially for Gulfstreams: “They want more passengers on them, for both Part 91 and Part 135” operations.

The refurbished vintage 2000 GIV also got new paint and had its engines overhauled.

Stevens is also busy with full interior upgrades on executive UC-12s (King Air 200s) and UC-35s (Citation 550s) for the U.S. military. (One dozen King Airs and

the second at the Pilatus headquarters in Stans, Switzerland.

F/List’s new Illuminated Surface System brings controllable LED backlighting to the surfaces of natural materials such as thin stone, opening a host of design and illumination applications.

F/List has placed a priority on integrating sustainable, ecofriendly materials into its collection of surface options, such as rattan surface, a palm tree derivative; sustainable upholstery, such as organic-certified leather made from agricultural by-products; and a biodegradable and non-hazardous, non-graining flame-retardant product developed in-house.

Concurrently, the company’s Futurelab incubator is developing a new product portfolio aimed at expanding the potential to create multifunctional spaces in the cabin. In a joint venture collaboration with Hilitech, the companies aim to create interior components offering a 30 percent weight savings over conventional materials.

Orders for products for refurbishment during the pandemic were robust, as many fleet customers used the downtime to refurbish their aircraft. As sales of new aircraft accelerate, supplying interior components to OEMs offers “a high market potential,” the company said.

Hardly a new name in high-end interiors, the family owned **Catherineau** of France was founded in 1750 and designed its first business aircraft interior in 1960—for the then-in-development Falcon 20. More than 2,500 completions later, Catherineau remains largely “under the radar,” said CEO Anne-Sophie Catherineau, an anonymity the company plans to end. “We were focused on the French markets and we recently decided to open to international markets,” she said.

The company is in contact with business jet manufacturers about potential projects and has done two Global aircraft completions for Bombardier already, Catherineau said.

In addition to luxury interior designs for aircraft, residences, and yachts, Catherineau is known for the precision control mechanisms used in its furniture, with all research, design, and production handled in-house. The company developed the onboard shower introduced on the Falcon 7X and subsequent Falcon models, handling the certification process as well. The onboard beds with tilting mechanisms it makes are approved for use during take-off and landing.

In addition to VIP interiors for business jets and executive airliners, Catherineau provides the interiors for Daher TBM turboprops, Airbus Corporate Helicopters, and for completion centers.

Cabin electronic controls and display

› continues on facing page



Left, F/List has added new interior products such as Syntec flooring for high-traffic areas and the Illuminated Surface System’s LED backlighting. Right, Catherineau’s work on Falcon interior designs includes the challenge of developing showers, including achieving certification. The company designed the shower for the Falcon 7X and also for other Falcon models.

busy over the past year, said executive vice-president Eric Gillespie “Connectivity and avionics are a real priority for customers now,” most recently “midsize jet [owners] requesting Ka-band [satcom] installations.” Flying Colours recently installed one aboard a Challenger 604, the first Challenger so equipped.

Private owners are also expressing more interest in multi-purpose interiors, such as a medevac combined with VIP configuration, Gillespie said. Corporate owners show growing interest in shuttle interior options to fill gaps left by reduced airline schedules.

Air purification “has become part of every conversation” about refurbishments, he added, and the MRO has signed an agreement with Aviation Clean Air to install its ionization system. Meanwhile, requests for decorative items—soft cushions, vases, and the like—have declined. “Whether this is a result of Covid or of a design trend is uncertain,” he said.

The Flying Colours Singapore operation in the Bombardier facility located at

flooring refurbishment on a Challenger 601 are currently underway. The old vinyl flooring in the entryway and lav on the Challenger is being replaced with woven vinyl, a new option that provides more design options—and a less sterile look—than traditional vinyl flooring for high-traffic cabin areas.

London-based interiors and paint specialist **RAS Group** was acquired in March by Lithuania’s Jet MS, a division of Avia Solutions Group, a global aerospace company headquartered in Cyprus. In the upgrades arena, RAS completed in June a total cabin refurbishment on a Falcon 7X at its Biggin Hill facility. The interior features high-gloss dark-grained wood cabinetry and high-quality white leather seats.

Stevens Aerospace and Defense Systems refurbished a Gulfstream IV this year for a first time owner who “wanted a G450 look,” said interior manager Tim Briscoe, the update including a cabin reconfiguration, new cabinetry, total soft goods replacement, and new LED lighting and Alto sound systems. Red

two Citations this year). The Nashville, Tennessee-based MRO has been refurbishing executive lift for the military since 2005, but “this is the first time we’ve seen an onslaught like this,” Briscoe said.

The interiors of each model will be done in identical style and materials, and both have seven-passenger configurations.

Interiors and Cabin Component Specialists

High-end aircraft interiors component specialist **F/List** added this year a pair of cabin surfaces offerings, the latest in the ongoing expansion of its product portfolio: Syntec flooring, a carpet alternative for high-traffic areas; and the Illuminated Surface System.

Syntec flooring consists of individually pre-manufactured tiles, fixed to the aircraft floors by a newly developed mounting system. Installation of its first two Syntec systems—in the entryways of two Pilatus PC24 twinjets—have been completed. The first was done as Pilatus’s U.S. facility in Broomfield, Colorado, and

technology specialist Rosen Aviation has introduced a line of flexible OLED 4K displays, ranging in size from single-digits to 55 inches and larger, providing a vastly improved viewing experience at half the weight of current-generation cabin displays, according to the company. With power units and other components, Rosen's 55-inch OLED display is just 26 pounds. Boasting wider viewing angles, higher resolution, and better colors than LED displays, the super-thin OLED panels can also be adjusted to conform to a variety of shapes and surfaces, opening a host of future applications throughout the cabin.

Created in partnership with Japan OLED, Rosen's 48-inch and 55-inch screens are slated for introduction this summer; the 22-, 27-, and 32-inch displays are expected to follow shortly, available to both manufacturers and, soon after, the aftermarket.

Other size screens will be available on demand. The same components are used in all, so weight growth for larger screens is only "incremental," said Lee Carpenter, the Las Vegas company's senior v-p for strategy.

MSB Design in May debuted its Zero Gravity two-place sideledge table lift system that, when deployed with its four-place hi-lo conference table, can create a six-place setting for onboard dining and meetings. Reflecting "the need for a more flexible table solution in larger-cabin aircraft," the Zero Gravity system can be used as a two-place table or ottoman, said MSB Group v-p Mario Sevigny. The table surface can be finished with either a traditional wood veneer or carbon-fiber material to complement the black anodized aluminum mechanisms, according to the Montreal-based business aviation engineering firm. MSB expects the Zero Gravity table will be available through Gulfstream by year-end.

OEM Completions & Refurbs

Airbus Corporate Jets (ACJ) introduced a new family member last year: the ACJ TwoTwenty, an executive variant of its A220-100 single-aisle airliner. The jet offers three times the interior space of the largest purpose-built business jets, and a lower price (under about \$72 million) and operating costs, according to ACJ. The company calls the category-straddling aircraft an "Xtra Large Bizjet," president Benoit Deforge said at its virtual introduction.

The cabin features six VIP living areas for up to 19 passengers and a comfortable 6,000-foot maximum cabin altitude, with legs long enough (5,650-nm range) to link London and Los Angeles; Moscow and Jakarta; Tokyo and Dubai; or Beijing and Melbourne.

ACJ is partnering with Swiss bizliner

services specialist Comlux Group for the first 15 of the ACJ TwoTwentys, with the latter handling interior design and engineering work and cabin installations. Work will be performed at Comlux Completion, the Group's Indianapolis, Indiana completions and refurb center.

Six orders are in hand, including two from Comlux Group, which will make its TwoTwentys available for charter and sale through Comlux Aviation, its Malta-based operations division. ACJ expects to deliver the first green TwoTwenty airframe, now under assembly in Mirabel, Canada, to Comlux early next year, with service entry slated for early 2023.

ACJ has developed an aircraft configurator application to help customers select interior layouts and styling. This year, ACJ partnered with Latécoère Interconnection Systems to develop by year end an ACJ Smart LiFi (light fidelity) monitor for new and retrofit cabin outfitting.



The largest business jet in the Dassault family, the spacious Falcon 10X gives designers room to replicate the feel of a luxury apartment in the sky.

Bombardier introduced a certified pre-owned aircraft program, with the Canadian manufacturer sourcing, inspecting, and updating the airframe, and delivering a "like-new" aircraft with a one-year warranty. The company is working on its fifth certified preowned jet now, said Chris Debergh, vice-president, OEM parts and services. The buyers tend to be new owners, and the market for such aircraft "has been pretty healthy throughout Covid," he said.

Bombardier also launched a cabin upgrade for the Challenger 350 super-mid, including new cabin design options and Viasat Ka-band satcom connectivity. The upgrade is available for new and in-service Challenger 350s, as well as in-service Challenger 300-series. The CL350 is also getting a refreshed user interface for the cabin management system, taking inspiration from the award-winning design of Bombardier's flagship Global 7500 CMS.

Boeing Business Jets wasn't able to provide information or comment on any BBJ programs for this year's report.

However, a company spokesman told **AIN** the company had sold a BBJ, type unspecified, to the Polish government this year. A representative for the Polish government declined to comment on plans for the BBJ's completion.

Gulfstream Aerospace has enhanced its redesign program to offer multiple options intended to suit a wide range of Gulfstream owner needs and tight timelines, promising the refurbishment turnaround in as few as 30 business days at a Gulfstream facility.

"From a refresh to a floorplan reconfiguration, our team can bring any vision to reality," said Gulfstream Customer Support president Derek Zimmerman.

Three basic redesign programs are available. The Refresh provides recovered seats as well as upper and lower sidewalls, fresh carpeting, and exterior paint in as few as 30 working days. The Premium adds new veneers and countertops; and the Custom

in December. Improvements include a modernized refreshment center, multiple USB charging ports, and LED lighting, including in cupholders and through pinholes along the lower sidewalls. Four standard color palettes—alpaca, buttercream, new pewter, and latte—will be available, along with an optional premium "Lava Saddle" interior. Textron is also committed to offering sustainable interior materials, such as green textiles, carpets, and wood veneers, the company said.

Dassault Aviation categorizes the Falcon 6X, scheduled to enter service in 2022, as an "ultra-widebody." It features the largest cabin cross section of any business jet—8 feet 6 inches wide, and 6 feet 6 inches tall—while retaining the Falcon's famous short field and hot/high operational agility. The three-zone cabin has multiple configuration options, and 30 extra-large windows along with business aviation's first "Skylight," positioned over the entryway.

The Falcon 10X, introduced in May and scheduled for service entry in 2025, will have a cabin 9 feet 1 inch wide, and 6 feet 8 inches high, with 38 large windows. Dassault designers are developing configurations with up to four lounges that can include a full bathroom with shower, private cinema, and VIP master suite with its own bathroom and an optional 60-inch queen-sized bed.

Based on customer feedback from more than 50,000 hours of fleet operations, **Pilatus Aircraft** in July added a host of new features to the PC-24 twinjet. New lie-flat seats in the cabin provide more comfort, more intuitive controls, and lighter weight, in addition to quick-release mechanisms that facilitate fast seating configuration changes. In lieu of the standard forward left-hand coat closet, operators may now opt for a galley with a microwave oven, coffee/espresso maker, work surface, ice storage, and/or capacity for standard catering units.

Many of the new features can be retrofitted on in-service airplanes, the Swiss aircraft manufacturer said.

Aiming for sustainability in its aircraft, **Embraer Executive Jets'** cabin concept for its flagship Praetor line (500/600) features "a multidimensional sustainable interior that merges the digital future with sustainable resources," according to the Brazilian airframer. That concept cabin includes cabinetry and tabletop surfaces made from palm tree wood sourced from commercial cultivation, rather than using wild heart of palm fruit, and luxurious cabinetry and tabletop surfaces made from recycled metals. The recycled surfaces are inspired by Mokume-gane, a Japanese technique that uses mixed-metal laminates from discarded scraps to forge new patterns and exquisite works of art. ■



Opener's Blackfly flies at AirVenture show center

In a rare public display on July 27, Opener's Blackfly single-seat electric vertical take-off and landing (eVTOL) aircraft climbed into the air before thousands of onlookers at the EAA AirVenture show in Oshkosh, Wisconsin. The two BlackFlies that flew at Oshkosh were the first manned flights in a public venue, flown by Opener's Eleanor Li and Marcus Leng.

Blackfly's first manned flight took place in 2011 in Warkworth, Ontario (Canada). In 2014, the company moved to Palo Alto, California, and was reorganized as Opener. Development continued, eventually resulting in the production version of the Blackfly, which flew at AirVenture.

Dubbed a "personal aerial vehicle" by its manufacturer, the Blackfly will require

no FAA certification nor a pilot's license, as it falls under FAA Part 103 regulations for ultralight aircraft. It is designed to operate from land or water, carrying a single pilot who can control the aircraft via fly-by-wire flight controls operated by a joystick.

With an empty weight of 343 pounds, maximum payload is 200 pounds, and the cockpit can fit a six-foot, six-inch person. The airframe is made of epoxy-impregnated carbon-fiber and is fitted with eight electric motors. Maximum cruise speed is 62 mph, climb rate 500 fpm, and range 25 miles with 8 kWh batteries. A ballistic parachute is mounted forward of the cockpit canopy in case of an emergency such as a total power failure. **M.T.**



ROB OLEWINSKI

A most unusual sight at this year's EAA AirVenture Oshkosh show was Opener's Blackfly electric personal air vehicle, making its first public flight and flown by test pilot Eleanor Li.

GAMI gains FAA approval for G100UL high-octane unleaded avgas

The FAA's Wichita, Kansas, Aircraft Certification Office issued a supplemental type certificate (STC) to General Aviation Modifications Inc. (GAMI) in July for use of its high-octane unleaded avgas, initially in all models of the Cessna 172. The STC will be expanded using the approved model list process to cover additional aircraft and engine combinations for GAMI's G100UL avgas.

According to GAMI, "As the approved model list for these STCs expands over the next several quarters, the scope of the aircraft and engines on the AML will provide the functional equivalent of a fleet-wide certification for spark-ignition piston-powered aircraft and engines to operate on G100UL avgas."

G100UL avgas is a drop-in replacement

for the current 100LL avgas, which uses tetraethyl lead to boost octane. General aviation remains the only industry that still uses leaded fuel in high quantities, and there is strong pressure from communities near airports, the Environmental Protection Agency, and others to eliminate lead in avgas. This move is strongly supported by the aviation industry, including major groups such as AOPA, EAA, and GAMA.

The goal for the 100UL fuel was a drop-in replacement that works on all piston-powered aircraft, meets the same octane requirements with the necessary detonation margin, and is fungible (easily mixed with 100LL), reasonably priced, and manufacturable using normal refining techniques. These goals are all met by 100UL, according to GAMI. **M.T.**

Volocopter flies 2X eVTOL prototype at Oshkosh

Volocopter made the first FAA-approved flight of a manned, eVTOL aircraft in a public environment in the U.S. during the EAA AirVenture show in Oshkosh, Wisconsin. The appearance by the German company marked a declaration of its intent to enter the U.S. market with planned air taxi and freight operations using its two-seat VoloCity, and later, the larger, longer-range VoloConnect model.

With test pilot Damian Hischer at the helm, the Volocopter 2X prototype took off at 2.45 p.m. local time on July 27 for a four-minute sortie at around 164

feet and logged speeds of 18 mph as it cruised in front of vast crowds at Wittman Regional Airport, where AirVenture is staged each year. On the ground, visitors were able to take a close look at the VoloCity model and get a first glance at the cabin design.

Volocopter confirmed that it is also working on the four-seat VoloConnect aircraft, which is expected to fly up to around 60 miles and at speeds of 155 mph. This is expected to enter service during 2026, while the VoloCity could start commercial operations by 2024. **M.H.**



ROB OLEWINSKI

Volocopter test pilot Damian Hischer demoed the eVTOL's capabilities during a four-minute flight at Oshkosh.

Dickson: FAA won't back down on flight training letter of deviation authorization

The ongoing controversy about new FAA policy concerning flight training in certain aircraft loomed large at the July 29 "Meet The Administrator" forum at EAA AirVenture. FAA chief Steve Dickson expressed sympathy regarding the confusion and the odious mountains of additional paperwork the policy has created for aircraft owners and instructors but failed to explain the need for the change to the satisfaction of most in attendance, including EAA chairman and CEO Jack Pelton.

Effective July 12, the FAA is requiring owners and instructors for hire in certain primary, limited, and experimental category aircraft to obtain a letter of deviation authorization (LODA) before performing compensated instruction in such aircraft.

Pelton and other aviation industry leaders blasted the directive as unnecessary and burdensome, he told Dickson, adding that although the FAA allows owners and instructors to apply for the LODA online, when the EAA accessed the appropriate web portal, the exercise took two days.

Dickson, in a video of the EAA event posted by Aero-News Network, told the audience: "The bottom line is that we have got a rule on this topic that does not say what we want it to say...We need a solution in the near term. So that [LODA] was to set up a way...we could have all the documentation up to snuff. I told my people... we needed to make it as painless as we possibly could."

LODAs would be valid for 48 months. **M.H.**

SkyCourier flies to Oshkosh for first public appearance

On the opening day of EAA AirVenture on July 26, the Cessna SkyCourier arrived for its first public appearance.

Powered by two 1,100-shp Pratt & Whitney PT6A-65SC turboprop engines, this SkyCourier is serial number one, and it took a brief time off from flight testing to participate in the AirVenture Innovation Showcase before departing on July 27. After taking off, flight-test pilot Todd Daforn flew two passes along Runway 18-36 before departing the area.

A clean-sheet design, the SkyCourier resulted from discussions with FedEx Express. "In 2017 we knew the feeder fleet [of Cessna Caravan single-engine turboprops] needed updating," said Bill West, FedEx v-p of supplemental air operations. FedEx Express operates nearly 300 aircraft in 250 locations globally, and it has

ordered 50 SkyCouriers. Certification and first delivery are expected later this year.

The design's 87- by 69-inch rear cargo door and fuselage are designed to accommodate three standard LD3-size containers, giving the SkyCourier twice the capacity of a Caravan and allowing FedEx to deliver oversize cargo to smaller markets.

With a maximum ramp weight of 19,070 pounds and a maximum takeoff weight of 19,000 pounds, the SkyCourier can carry a 6,000-pound freighter payload or 5,000-pound passenger payload. The airplane is also available in a passenger configuration or in a convertible passenger/freighter version.

In addition to the SkyCourier, Textron Aviation marked the debut of the King Air 260 and CJ4 Gen2 at Oshkosh. **M.T.**



Textron Aviation's SkyCourier, which marked a brief debut at AirVenture this year, flew two passes along Runway 18-36 before departing the area.

Icon bringing certified A5 to general aviation market

Icon Aircraft plans to obtain FAA certification of its A5 amphibious airplane in the Part 23 primary category, the company announced July 26 at the EAA AirVenture show in Oshkosh, Wisconsin.

The move is intended to expand the market for the light sport aircraft (LSA) A5, especially in international markets where LSA regulations are not recognized. The certification will also make it easier for A5 pilots to fly in Caribbean countries and also to operate from yachts anchored in foreign waters. Icon Aircraft will continue to manufacture and sell the LSA version, which is available with the Garmin aera 796 portable GPS navigator or an optional Garmin G3X Touch and autopilot configuration.

Certification of the A5 is expected in the fourth quarter, and this version will have the Garmin 796 package. A new "signature series" of paint schemes designed by Scheme Designers will also be available, in electric green and blue and a gray livery. The price of the certified version will be \$399,000 including one of those paint schemes and seaplane transition pilot training. Later, Icon Aircraft will offer the G3X Touch/autopilot avionics as an option.

Activity is picking up at Icon Aircraft, according to Warren Curry, v-p of sales, marketing, flight ops, and service. "We're growing," he said. This year, Icon Aircraft will deliver 31 A5s, with 24 of those taking place in the second half. **M.T.**



Following its U.S. debut at EAA AirVenture Oshkosh, Diamond Aircraft plans to show the high-performance diesel-powered DA50 RG to prospective buyers during a tour of the U.S.

Diamond debuts DA50 RG single at AirVenture

Diamond Aircraft brought its DA50 RG high-performance, five-seat retractable piston-engine single to this year's EAA AirVenture in Oshkosh and has begun taking orders for the all-composite aircraft. Diamond will begin a nationwide U.S. demonstration tour of the DA50 RG in September.

The DA50 RG is powered by a turbo-charged, faDEC-controlled, 300-hp Continental CD-300 diesel engine that runs on jet-A. The airplane can use runways shorter than 2,500 feet, and has a 44-foot wingspan, top speed of 181 knots, range of 750 nm (with reserves), and ceiling of 20,000 feet. Fuel consumption at long-range cruise power is 9 gph and fuel capacity is 51.5 U.S. gallons. It has a useful load of 1,232 pounds and an mtow of 4,407 pounds.

Deliveries are expected to begin in the second quarter of 2022 following FAA certification validation. Base price is expected to start at \$1.15 million with well-optioned models in the \$1.3 to \$1.4 million range, according to a company spokesman. **M.H.**

Stratos 716X is a kit-built single-engine jet

Stratos Aircraft brought its new \$2.5 million 716X jet single to EAA AirVenture Oshkosh. The numbers in the model name reflect its Mach 0.70 cruise speed, single turbofan engine, and six-seat cabin.

Initially offered as an experimental, kit-built aircraft, the 716X is designed to have a range of 1,500 nm and a ceiling of 41,000 feet. It is powered by an overhauled, 3,600-hour TBO Pratt & Whitney JT15D5 turbofan and features Garmin 3X avionics. Redmond, Oregon-based Stratos said it can be assembled "in as little as nine months," using builder-assist affiliate firms. The company plans to offer 10 to 12

kits next year and considers the 716X a "stepping stone" toward eventually offering a certified version of the aircraft, the 716, that would sell for \$1 million more.

"At Stratos, our goal is to lower the cost of owning and operating a jet to turboprop levels," said Carsten Sundin, Stratos Aircraft's president and chief technology officer.

Stratos said it is continuing to make major investments in its manufacturing facility, including a computer design center, production-grade composites molds, a high-temperature curing oven, a full-service machine shop, static test fixtures, and new flight-test hangars. **M.H.**



Stratos Aircraft's 716X single-engine jet will initially be offered as a \$2.5 million kit that can be assembled with assistance from build-assist affiliate firms.

Alaska crashes

briefly leveled off. When he realized he was wrong, he initiated a steep climb; the aircraft stalled as it hit rising terrain.

As the investigation unfolded, the NTSB discovered that Taquan’s director of operations (DO), George Curtis, held a second position as DO for Grant Aviation, a larger, scheduled Part 135 based in Anchorage. He was also a contract instructor with Alaska Airlines in Seattle, traveling there about once a month.

Curtis recalled visiting Taquan four or five times in 2018. In his absence, many of the responsibilities of his position fell to the chief pilot, significantly increasing his workload. That job was further exacerbated by conflicts with staff, some of whom, the chief pilot told the NTSB, did not accept him in a supervisory capacity.

The DO managed several departments, the chief pilot explained, and “not being here to do that is—it gets frustrating. There’s a lack of oversight.”

Brian Frederick was Taquan’s POI for about two years before leaving the FAA four months before the Jumbo Mountain accident. He told investigators he knew that Curtis was chief pilot for Grant Aviation (he took that position on Oct. 1, 2017), but was unaware of his promotion there to DO.

Frederick was worried about Taquan finding the right replacement for Curtis. “The one thing I was concerned about,” he said, “was them finding somebody who just met the letter of the FARs and putting them in that position. Taquan was a big enough company I wanted there to be somebody like George who was really a professional director of operations. He’s not a guy that was flying the line. He was somebody that was actually running the company.” Frederick did not know that Curtis moved to Anchorage soon after taking the chief pilot job at Grant.

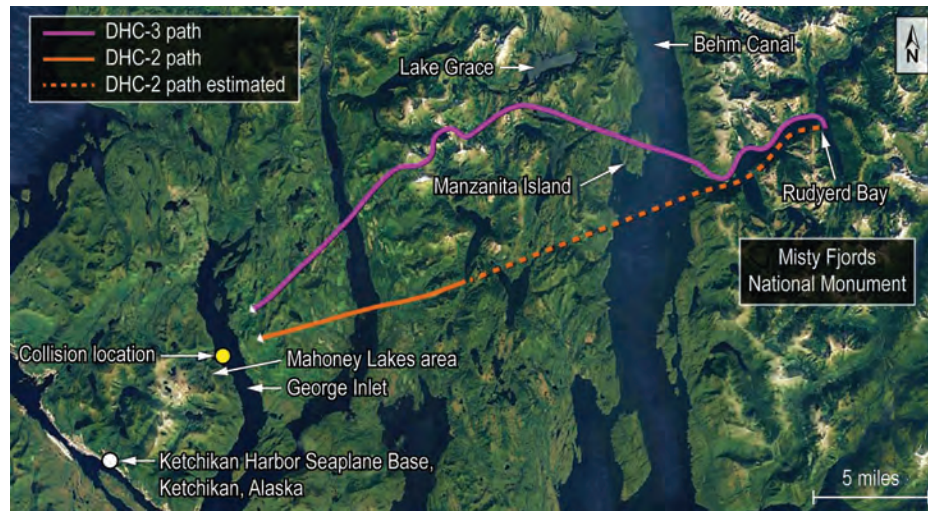
Frederick, as POI, was responsible for anywhere from 25 to more than 30 other operators while overseeing Taquan. When asked specifically how many certificates he oversaw, Frederick told investigators, “...sometimes I didn’t know...all the operators I had, it was changing so rapidly.” When prompted that the latest revision to Taquan Air’s training program—Revision #13—was given initial approval in 2016 and expired in February 2018, he did not recall giving final approval for the program. He did not recall if he visited Taquan at all in 2018.

Frederick’s replacement, Jon Percy, took over as POI in April 2018. He told investigators Taquan was one of about 40 operators he was responsible for. His workload meant oversight of Taquan was limited; he visited the company only for three check airman observations before the July 2018 crash and did not observe any training.

He spoke with DO Curtis only once, was unaware that he did not live in Ketchikan, and did not recall learning of his position with Grant Aviation until after the accident. He was unaware that Taquan was still

operating under an initial approval for its training manual.

In Anchorage, Grant Aviation POI Hugh Youngers told investigators he was part of the approval process when Curtis became chief pilot. Youngers also later approved Curtis to be DO of Grant in March 2018. He insisted, however, that he was unaware until a month after that, when a colleague informed him, of the concurrent employment with Taquan. Youngers said he spoke with Curtis about his multiple jobs at that time, but “...didn’t have a lot of concerns... because he’s here every day, you know, working at Grant.” Later in the interview, he reiterated that point stating, “...he’s



The flightpaths of the de Havilland DHC-2 and de Havilland DHC-3 involved in the May 13, 2019, midair collision eight miles northeast of Ketchikan, Alaska.

overseeing the operation that I oversee, so it wasn’t an issue for me.”

Curtis told investigators he was interviewed directly by the FAA when he was applying for the chief pilot position at Grant and, further, that they “absolutely, yes” knew at that time he was still with Taquan. The disparity between his recollection of events versus that of Youngers’ was never resolved by the NTSB.

All of the POIs made clear, though, that none of them discussed Curtis’s multiple positions, or their potential negative impact, with each other before the aircraft was flown into Jumbo Mountain.

Distance Oversight

In September 2018, both Taquan’s DO and chief pilot were replaced. A month earlier, a new POI, Todd Clamp, from Columbia, South Carolina, had been assigned to oversee Taquan Air.

In his interview with investigators in October 2019, the Juneau FSDO office manager, Joseph Pocher, explained the office was responsible for about 160 certificates but had only two POIs despite approval for eight. This explained the need for assistance from outside the region.

At the same time, FAA front line manager Richard Peabody described the shift of some responsibilities to South Carolina as “uncharted territory.” He said, “Right now what we’re doing is every Monday morning meeting that we have, we stress CMT [certificate management team] communication.” When asked who participated in those meetings, he

replied, “Everybody.” But investigators knew Clamp—based 2,800 miles away—did not. “Is that something he should be doing?” Peabody was asked. “Speculation,” he responded, “but yes.”

Clamp was not interviewed as part of the Jumbo Mountain accident investigation. The NTSB spoke to him the following year, in November 2020, as part of the midair collision investigation. At that time, he stated the Juneau FSDO reached out to South Carolina “for our assistance to come up and do some inspections because they [were] behind.” This was also why he was assigned as POI to Taquan.

Clamp traveled with a colleague to Ket-

chikan once, where they conducted inspections or visits of 12 Part 135 operators. He thought he saw Taquan twice on that trip. However, Clamp did not observe any training or conduct any check rides, nor was he seaplane-rated. He did extend Taquan’s long-expired training program, explaining in a letter to the chief pilot that “the reason for the extension is due to understaffing circumstances of the certificate holding district office.”

Lana Boler, Taquan’s principal maintenance inspector, was based in Ketchikan. She exhibited a degree of frustration to investigators when discussing communication with the revolving number of POIs assigned to the company and recalled voicing concerns with Curtis’s job in Anchorage to her superiors as early as December 2017 or early 2018. When asked if she met with Clamp on his visit from South Carolina, she responded that she gave him a ride, “which was about five minutes.” They did not discuss Taquan Air.

Clamp was replaced as POI after about six months by another South Carolina-based inspector, Billy Marlowe. He never traveled to Alaska.

A Freedom of Information Act (FOIA) request was submitted to the FAA’s Alaska Region seeking correspondence between Taquan’s assigned POIs and the company to determine if particular concerns about oversight were passed from one inspector to the next. In denying AIN’s request due to “vagueness,” the Juneau FSDO specifically noted that, “as he was no longer employed with the FAA”,

no records at all existed for Frederick.

A separate FOIA request for records associated with the formal assignments of Taquan’s out-of-state POIs—Clamp and Marlowe—was denied as “no records found.” A third request, to the FAA’s Southern Region, on Clamp’s and Marlowe’s Taquan assignments and associated correspondence, has yet to be acknowledged.

Midair Confusion

When the midair collision occurred on May 13, 2019, the NTSB sent a “go team” that soon focused on the ADS-B units used by both pilots in the high-density tourist season traffic environment. Investigators found that the Otter’s Garmin GSL 71 control panel—which controlled the airplane’s transponder—was recovered from the wreckage with its switch in the “OFF” position.

The NTSB team speculated the unit was turned off a couple of weeks prior, while the aircraft was in for maintenance, although there was no hard proof of this. Without the GSL 71 switched on, the NTSB said the aircraft’s pressure altitude was not broadcast—a conclusion that was affirmed when recovered data from an FAA ground station showed both aircraft ADS-B units were transmitting at the time of the accident, but the Otter’s pressure altitude was missing and it “indicated an invalid squawk code.”

The Garmin unit was installed in September 2015 as part of an upgrade to the aircraft’s Capstone systems. (Capstone was a long-running FAA program in Alaska to test and promote ADS-B, providing cockpit display of the pilot’s location relative to other equipped aircraft, terrain, and weather.) At the time of the upgrade, the aircraft was owned by Promech Air. Taquan purchased it a year later, along with all of the company’s Alaskan assets, after Promech was involved in a multiple-fatality crash.

The Otter pilot had received training in the aircraft just before the accident with the Taquan chief pilot and another senior pilot—both of whom worked for Promech—but none of them noted the GSL 71 or seemed aware of its significance to the broadcast of pressure altitude. Verifying the GSL’s operational status was not part of the aircraft checklist, which still bore the Promech name.

At the time of the midair, Taquan had yet another POI, Matt Dahl, who was assigned to the Juneau FSDO but based on the Kenai Peninsula. Dahl had 31 other certificates assigned to him but noted to investigators that “movement within the FAA for inspectors” caused the number to fluctuate.

He still managed to make two separate week-long visits to Taquan and observe training in the two months he oversaw the company before the accident. The NTSB spoke with Dahl, Clamp, Percy, and Frederick during the course of the midair investigation. None of them were familiar with the GSL 71, nor had they been in contact with anyone about the equipment changes that occurred back in 2015.

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Vertiport Chicago envisions eVTOLS as future tenants

by Mark Huber

Vertiport Chicago (43IL) is poised for an eVTOL future. So says Daniel Mojica, the 10-acre facility's executive director. "Almost all organizations entering the eVTOL space have visited us. They realize that there is so much to consider when building and designing infrastructure," said Mojica, who added that Vertiport Chicago was designed with expansion in mind. "While we would have to make additions to the facility for eVTOL, we certainly have the space."

Real estate developer Paul Beitler first proposed a Chicago vertiport in 1993. The FAA began funding vertiport studies in 1988. The privately-owned vertiport officially opened for business in 2015. Prior landing permission is required, however.

"Our founders were paradigm shifters when they thought about this space 15 years ago," Mojica said. "There was always an understanding for an addition to the infrastructure. We are pre-approved to build a second hangar. It would be 25,000 sq ft, roughly the same size as the 30,000-sq-ft hangar we have now. And we can add a second office building to our site. We knew that power could be added in the future and there is certainly enough space to build that."

The vertiport, which borders Union Pacific's 100-acre intermodal facility, is located at 1339 S. Wood Street, between Chicago's downtown South Loop and the near west side, 2.5 miles west of Lake Michigan and adjacent to the Illinois Medical District. "We're situated nearly a mile and a half from everything, including the United Center, major highways, and the booming West Loop where major corporations such as Google and McDonald's University are locating. I can see McCormick Place [Chicago's lakefront convention center] out my office window" he said.

Chicago's vertiport has the capacity to park eight helicopters on the ramp and up to 17 overall. It is open 24/7 and has an 11,700-sq-ft passenger terminal with VIP entrance and a 22,000-gallon fuel farm. Several tenants have their own aircraft maintenance technicians on site. Current regular clients include Helicopters Inc., Elite Rotorcraft, Breeze Helicopters, and the helicopter programs associated with the adjacent hospitals which include Jesse Brown VA, Rush Chicago, University of Illinois Chicago, and Stroger Cook County Hospital. Lurie Children's Hospital also uses the vertiport in bad weather, as opposed to attempting landings on the hospital's elevated helipad.

While all customers are important, Mojica said he was particularly proud of the vertiport's ability to service helicopter air ambulances and that he occasionally

receives letters of appreciation from patients and their families. Mojica said the vertiport is working with at least one medical tenant to explore the development of an instrument approach. Other regular users of the facility include the U.S. Coast Guard, Department of Homeland Security, FBI, and Canadian Air Force.

Helicopters Inc. will soon begin regular per-seat operations for Blade from the vertiport, it was announced earlier this year. Most of that traffic is expected to be service to O'Hare International Airport (ORD), which, while a comparatively short distance, can otherwise be a ground livery ride that can take several hours, depending on the traffic. Charter operators already provide service from the vertiport to O'Hare, landing at the helipad there and then providing a short four-minute car ride to O'Hare Terminal 5.

Other popular charter destinations



Traffic at Vertiport Chicago shifted during the pandemic to more medevac flights.

from the vertiport include customer summer homes in southern Wisconsin and southwest Michigan. Customers even use the vertiport for links to close-by Midway Airport, due to Chicago's ubiquitous ground snarl. "They will take that four-minute flight, especially if they need to be back in New York or London the same day," Mojica said.

He noted that the vertiport also regularly arranges VIP transportation to DuPage (KDPA) and Chicago Executive (KPWK) airports and added that the vertiport's ability to handle regular charter traffic to a variety of destinations would segue well into any future eVTOL operations. Mojica declined to say if any prospective eVTOL customers had approached the vertiport with regard to managing any potential satellite locations. "We're already landing folks at different locations, resorts, and destinations," he said. "It is something we are already doing without having an actual eVTOL operator."

While adding additional acreage to the site is not currently anticipated, Mojica said several adjacent lots could be incorporated, should the need arise, and bringing in additional electrical power via the intermodal lot next door would not be problematic.

Noise isn't much of an issue, due to the vertiport's location. "When they built this place they had to run a decibel test and found out that the Chicago Transit Authority's elevated, passenger trains are actually louder than most helicopters that come in and out of here." Mojica handles any noise complaints that come in personally. The vertiport has noise-abatement procedures, and in general, unlike facilities in New York and Los Angeles, receives good political support, he said. "Our aldermen have been fantastic" and have encouraged the utilization of the vertiport, he said.

The vertiport is considered critical infrastructure and remained open 24/7 during the pandemic, handling relief supplies and medevac aircraft, even as overall flight activity rapidly plummeted, shifting primarily from air tourism to helicopter air ambulance. "In 2019, we had 10,400 movements, a 21 percent

increase over 2018," Mojica said. "The pandemic came and things shifted a bit, obviously."

Not only did the pandemic cut regular flight operations, but it fundamentally shifted the customer mix. Before the pandemic, air tourism accounted for 70 percent of all vertiport movements. Now, helicopter air ambulance accounts for 60 percent, with private aircraft and charter accounting for 25 percent, and the remainder split between parapublic and what little air tourism remains.

"The good news is that overall traffic is coming back, and we get several air tour requests every day," Mojica said, adding it is conceivable that total flight operations could be back up to 2019 levels by the end of the year. "I am very confident we will beat the 2020 numbers and it is not impossible to get close to the 2019 numbers once Blade service begins. It's just a matter of properly educating all the potential users in the area and finding the right partners." ■

News Update

Kit Helicopter Company Enters eVTOL Market

Kit helicopter company Rotor X (RX) is entering the eVTOL market. In partnership with Advanced Tactics of Torrance, California, RX is now developing the quadrotor, six-seat RX eTransporter for passenger, medevac, search and rescue, and cargo operations. The eTransporter uses a small wing to enhance lift, can fly more than 1.5 hours or hover for up to 45 minutes on a single charge, and can safely fly with one engine out. RX is targeting this fall to begin flight testing and 2022 for FAA certification for a cargo variant, with the passenger version to be approved by 2024. In January, Rotor X acquired the assets of Chandler, Arizona-based Rotorway International, the long-time manufacturer of two-seat kit helicopters, including the A600 Talon Turbo.

Russian Helicopters Upgrades Popular Models

Russian Helicopters is introducing new variants of several of its popular legacy models. The 24-passenger Mi-171A3, which will make its first flight next year, is the first Russian Helicopters aircraft designed for offshore energy operations. It has hourly operating costs that are 20 percent less than those of comparable Western helicopters, according to the company. The Ka-32A11M features new higher-output VK-2500PS-02 turbine engines with digital electronic controls and the new KBO-32 digital avionics that give the helicopter night and IFR capability. It can be fitted with the new SP-32 fire-suppression system, which delivers up to 1,056 gallons per application. The Ansat-M is an upgraded version of the light twin with improvements including larger standard and auxiliary fuel tanks, an IFR cockpit, air conditioning, and new main and tail rotor blades that increase mtow performance to 8,378 pounds.

Bell Gets Bump From Canada's Green Aviation Funding

Three aviation OEMs will benefit from a C\$2 billion aviation initiative finalized by the governments of Canada and its Quebec province. The initiative pumps direct grants and loans into the country's aerospace sector, with Bell, Pratt & Whitney, and CAE collectively primed to receive up to \$685 million. Canadian Prime Minister Justin Trudeau said the aid was part of the country's "strategic investments" to promote a green economy and assist in the "profound transformation" of the nation's aerospace industry. Funding includes nearly \$70 million to Pratt & Whitney Canada to support work for a \$163 million hybrid-electric aircraft engine propulsion project; \$275 million for Bell Textron Canada for the Viridis hybrid-electric helicopter technology; and \$340 million for CAE to acquire electric training aircraft and implement a global R&D program encompassing digital technology, electric aviation, and health care over the next five years.



Powerline construction is just one of the many jobs facilitated by Erickson's S-64F helicopter.

Erickson puts itself into play

by Mark Huber

MRO, OEM, and helicopter services company Erickson—best known for its fleet of brightly-painted orange Air Cranes—has hired financial consulting firm Houlihan Lokey to help it explore “strategic alternatives.” Houlihan most recently guided Bristow Group through bankruptcy reorganization and its subsequent merger with Era.

In a statement issued in early August, Erickson CEO Doug Kitani said the company is “seeking a strategic partner who shares our vision” and, via implication, could provide needed capital. “Our aim is to upgrade Erickson’s great assets, including technology advances in the S-64 Super Air Crane, and expand our capabilities in MRO,” Kitani said. “A new strategic partner will complement our strengths, propel Erickson to the next level, and position the company, with its legacy and expertise, as the first-choice leader in the most demanding air operations and OEM-level MRO support.”

In February, Erickson said it planned to make the first flight of its optionally-piloted S-64F+ Air Crane next year, with customer deliveries of the new helicopter variant to begin as early as 2024. The aircraft will be equipped with all-composite main rotor blades that Erickson certified late last year, as well as Sikorsky’s Matrix optional pilot technology and new turboshaft engines with Fadedec. A HUD might also be available for the F+ in concert with Erickson’s new aerial water cannon.

Erickson said high/hot performance of the F+ will be improved over the current-production model. The new composite main rotor blades alone will increase the payload at 25 degrees C and 8,000 feet by 88 percent—offering an additional 755

pounds—while climb rate at max gross weight and 2,000 feet will rise 69.2 percent, from 1,300 fpm to 2,200 fpm. Those numbers will improve further with the new engine.

In September, Erickson acquired the type certificate for the Bell 214ST and B/B1 helicopters. An estimated forty 214Bs remain in service. The B was produced between 1976 and 1981 and is powered by a 2,930-shp Lycoming T5508D. Bell produced ninety-six 214STs between 1979 and 1993. The 18-passenger 214ST features a 30-inch fuselage stretch and is powered by two 1,625-shp General Electric T700 engines. Erickson noted that it is one of the largest fleet operators of the Bell 214.

Erickson emerged from bankruptcy in 2017 after listing debts of \$561 million, largely resulting from its 2013 acquisitions of Evergreen Helicopters and Air Amazonia, as well as government and oil services contracts that either folded or never materialized. As part of the reorganization, Erickson divested itself of Air Amazonia and most of the mixed fleet of helicopters that came with the Evergreen acquisition. ■

NEWS note

Bell has released an image depicting design concepts that employ the company’s High-Speed Vertical Take-Off and Landing (HSVTOL) technology, blending helicopter and fixed-wing technology into concepts that aim to deliver cruising speeds above 400 knots. The concept is scalable across a range of aircraft sizes—from 4,000 to over 100,000 pounds—and missions, from small, unmanned vehicles that could be used for personnel recovery to larger tactical mobility “assault” craft. The common configuration is similar to a tiltrotor, with short-span wings mounting three-bladed tilting nacelles at the tips. However, in wing-borne flight, the blades fold to reduce drag, with the main engines providing direct thrust. ■

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Honeywell

The Results

Honeywell was one of two OEMs whose support was rated by **AIN** readers in all three segments of this year's Product Support Survey. It was the top finisher in the CMS segment with an Overall Average rating of 8.3 while grabbing second in Airborne Connectivity Overall Average (8.3) and third in Flight Deck Avionics Overall Average (8.1). In all three segments Honeywell improved its Overall Average ratings by 0.2. Its strongest showing by categories was in CMS, where it recorded ratings of 8.3 for Cost per Hour Programs, 8.2 for Parts Availability, 7.6 for Cost of Parts, 8.4 for AOG Response, 8.9 for Warranty Fulfillment, 8.4 for Technical Manuals, 8.5 for Technical Reps, and 8.5 for Overall Avionics Reliability.

The Improvements

If there was an upside to the global pandemic for Honeywell Aerospace in the past 12 months, it was

a temporary shift to a more virtual environment. "Some really good things came out of that," said Todd Owens, v-p of customer support. "We stepped back and we looked at what was working well and what, just due to the environment changing on us, did we learn from that and what do we take forward as just business as usual now."

At the beginning of this year Honeywell Inc. CEO Darius Adamczyk kicked off a "customer centricity" initiative to look at everything the company does from a customer viewpoint. That has led to an examination of all processes such as order management, AOG order fulfillment, and its customer-facing portal to determine if those are customer centric. "It's a very eye-opening experience we're going through," Owens said, "because in a lot of cases a lot of the ways we have traditionally done business is not customer-centric. So, this has been a great exercise." As a result, the company is laying plans to enhance its self-serve portal that will allow customers to see every service bulletin that's connected to a Honeywell product on their aircraft

and how resolving it would affect measures such as reliability and cost of ownership.

In the past year, Honeywell has also created a support hub in Phoenix where it has merged its technical support teams—such as global field service engineering, AOG, and connectivity.

"What we've done is simplified the customer experience," Owens said. "Instead of going to the portal and trying to figure out which product do I need, do I call Atlanta, do I call Phoenix? Now it's just one-stop shopping for any support need. So if a customer is having connectivity issues with their JetWave high-speed internet service, they call the same area and that team is sitting right next to [the field service engineering] team because maybe it's a software issue or maybe it's a hardware issue."

Another outgrowth of that initiative is the creation of a customer events coordinator, "one person who is navigating the big red Honeywell machine to take care of my need and get me back in the air," he explained.



Above & Beyond: Reader Comments

Juan Bachmann (Collins)

Always ready to help customers.

Bill Stone (Garmin)

Bill is incredibly responsive and committed to providing the highest level of support. With his 30+ years of experience, he understands operators need quick answers.

Raget Taleh (Honeywell)

Outstanding Product support for avionics modifications.

Jiri Humi (Honeywell)

Jiri has time and time again helped bring the operator, the OEM (Honeywell), and the service center (channel partner) together and find a mutually acceptable solution in a reasonable timeframe. Great job, Jiri! Thank you!

Tom Olmstead (Honeywell)

Excellent Honeywell technical support.

John Braidich (Honeywell)

He is exceptionally knowledgeable and extremely helpful!

Len Liotta (Satcom Direct)

Extremely responsive and finds solutions for our needs.

Frederic Bertrand (Satcom Direct)

Smart tech for trouble shooting.

W. Wilson (Universal Avionics)

Great support for Universal Avionics equipment in Falcon 900.

Mike Marie (Universal Avionics)

Helped us tremendously with our first FANS 1/A install.

Eric Carlson (Universal Avionics)

He responds 24/7 and knows his company's products.

Gogo Business Aviation

The Results

Gogo led Airborne Connectivity with an Overall Average rating of 8.5, the same as last year. It received high marks for Parts Availability (8.7), Cost of Parts (7.7), AOG Response (8.7), Warranty Fulfillment (8.8), Technical Manuals (8.2), Technical Reps (8.9), and Overall Avionics Reliability (8.6).

The Improvements

Within Gogo's Colorado support center, the company has focused on improving infrastructure, said senior v-p of customer operations Dave Glenn. One example is the upgrade of the five-year-old phone system. The previous phone system couldn't integrate with the Salesforce platform, including its case management tool, where the replacement phone system can.

"So now a call comes in and if somebody has a trouble ticket open it pops up on the representative's screen," he said. "There's not a lot of back and forth of us asking, 'Who are you and what can we do for you?' We know why they are calling. It's very powerful and it saves the customer a lot of time having to re-explain themselves." What's more, the new system will automatically

attempt to contact the Gogo representative they were previously working with on that issue, provided they are available, Glenn added.

Gogo has also secured its own FAA repair station certificate, which allows its seven field service engineers in the U.S.—at business aviation airports including Teterboro, Van Nuys, and Palm Beach—not only to troubleshoot problems for Gogo customers but now to fix them on the spot in partnership with flight departments and authorized dealers/MROs. "We resolve 98 percent of [issues] remotely but the 2 percent that need hands on boxes, they go do it," Glenn said.

More recently, Gogo has added a new capability to proactively identify issues with its Avance platform even when customers aren't aware of an issue. Glenn explained the company's development team has designed an algorithm to identify when an Avance L3 or L5 system is operating sub-optimally, rolling out that capability in July. "When...you can pick up the phone and tell the customer that we found your issue and we fixed it, and you didn't even know you had it, that's a powerful place to be," Glenn said.

Satcom Direct

The Results

After a first-place tie with Gogo in Cabin Electronics Overall Average last year with a rating of 8.5, Satcom Direct edged lower this year with an Airborne Connectivity Overall Average rating of 8.2 in this year's survey.

The Improvements

Over the past 12 months, Satcom Direct has made product support improvements that include upgrades to its network operations center (NOC) and terrestrial network as well as progress on the MySky AI-powered spend management program.

The NOC upgrade at its Melbourne headquarters allows Satcom Direct to aggregate, collate, and analyze the increasing amounts of data generated by business aircraft activity. Featuring a 72- by 10-foot digital wall displaying real-time global customer connectivity activity, the NOC upgrade helps Satcom Direct identify any connectivity outage, degradation, or systemic issues. From the NOC, Satcom Direct personnel can resolve issues including during flight.

Cybersecurity management has also been enhanced with abnormal patterns of data behavior highlighted to stimulate mitigative action. In addition, Satcom Direct can also alert crewmembers to advise passengers of any necessary action needed to prevent potential cyber events.

"As recent events have highlighted, and as our own cybersecurity experts have observed, there has been a notable rise in malicious cyber events in the last 12 months," Satcom Direct founder and CEO Jim Jensen wrote in a June 2021 letter about company activities. "Our investments in infrastructure and cybersecurity solutions ensure [customers] stay ahead of these dynamic threats."

An expansion of its terrestrial network with enhanced individual Points of Presence (PoPs) and network upgrades is also helping Satcom Direct support customers' growing need for connectivity. Those enhancements include more connectivity options, in part from expansion in the Asia-Pacific region. Satcom Direct also upgraded antennas at its Comsat teleports, the company said, adding capacity throughout its network.

In August, Satcom Direct completed the first phase of integration of the MySky AI-powered spend management program into its flight operations platform. Subscribers can access and optimize their expense and operational data directly from the SD Pro dashboard through the strategic partnership with MySky. Graphics generated from MySky around spend efficiency are displayed alongside operations data on the dashboard interface, allowing users to easily switch between the two as they make decisions surrounding efficiency, budgeting, and asset management. The MySky Budget program that offers predictive budgeting analysis is expected to be integrated in the spend management program in the future.

Collins Aerospace

The Results

Collins is the only other OEM whose support was rated by **AIN** readers in all three segments of this year's Product Support Survey. It placed second in Flight Deck Avionics Overall Average (8.3) and Cabin Management Systems (CMS) Overall Average (7.9) and scored an 8.3 in Airborne Connectivity, recording year-over-year ratings gains ranging from 0.1 to 0.5. The Charlotte, North Carolina-based company also received high marks for Cost per Hour Programs (8.3) in the Cabin Management Systems segment. In the Airborne Connectivity segment, Collins Aerospace received a smaller number of respondents.

The Improvements

Lisa Steffen, Collins v-p and general manager of avionics service and support, said taking a cue from the lessons learned during Covid-19, Collins placed greater emphasis on adaptability in customer support in the past year.

For one, the company was able to continue the rapid deployment of technology that enabled remote work for its employees, particularly those in round-the-clock technical and repair support as well as spares availability, to avoid interruption. She said it was also key that Collins customers were able to access the resources that they needed, prompting a rebuild of the Collins authorized dealer portal to simplify the process of accessing frequently used resources. Lastly, the company implemented an option to electronically sign service contracts, which resulted in a significantly reduced turnaround time from signature to contract effectiveness.

"Our customers have come to expect a dedicated, experienced, and global team of customer support professionals, and we worked hard to provide that every day, despite many of the challenges we have experienced this year," said Steffen. "Collins Aerospace continued to deliver quality products, on-schedule, and provide timely and effortless problem resolution."

Universal Avionics

The Results

Universal Avionics received a rating in Flight Deck Avionics Overall Average of 8.2, which was down from the 8.3 rating from last year. The company did receive high marks for Technical Reps at 8.5, but it should be noted that this year's respondent sample for Universal was small.

The Improvements

After Universal Avionics v-p of business development and marketing Marc Bouliane added services to his title and responsibilities in the spring of 2020, he set out to create a singular service and support organization within the avionics OEM. Previously, areas including field service, warranty, and repair were under their own management and reported to different directors or vice presidents, he said. "I wanted to specifically emphasize all of the activities that are related to how we interact with our customers once an initial new transaction has occurred," Bouliane added. "I think it's just one example of how we are increasing our attention on services."

Another example of how the Tucson, Arizona-based company has sought to improve its services is through training and specifically the launch of what it calls UA Academy, an online learning center aimed at offering on-demand courses to its customer base of pilots, technicians, and authorized dealers and integrators. Despite the timing of the launch of UA Academy during the pandemic, it was a service planned before anyone had heard of Covid-19, Bouliane said.

Previously, UA had provided face-to-face training with PowerPoint presentations and

hands-on products. This allows customers to train at their own pace and when it is most convenient for them, he said.

"We've had hundreds of customers using it since then and we've continued to invest into it," he said. Initial training offerings were on topics that he said customers needed the most—such as SBAS Flight Management System Operations, Vertical Navigation Made Easy, and Data Link Fundamentals—to more recently, "items that take more time and are a lot more comprehensive" such as Enhanced Flight Vision Systems 101.

The online training mixes interactive elements with short instructional videos. Also, online courses can be paired with desktop training software and devices as well as scenario-based instructor-led classroom training.

Another example of Universal's product support improvements over the past year is a diagnostic and maintenance solution for its InSight Display System that enables Universal to remotely sync, troubleshoot, diagnose, and configure core software for its EFI-1040 Displays, Touch EFIS Control Display Units, and Alphanumeric Keyboards that are already installed in an aircraft. In one instance the company successfully updated its equipment on a Hawker 800XP located thousands of miles away from Tucson, saving at least 10 days of downtime and eliminating the need to ship the InSight equipment to Universal for repair. "We've done it on many aircraft to assist customers getting aircraft back to service, particularly in the context where we could not travel to these international destinations because of travel restrictions," Bouliane said.



GateOne Adds Third Location

Western FBO operator GateOne has increased its FBO count to three with the addition of Chandler Air Service, the sole service provider at Arizona's Chandler Municipal Airport. The facility, which will be renamed GateOne Chandler, includes an 8,000-sq-ft terminal with passenger and pilot lounges, showers, pilot shop, 12-seat A/V-equipped conference room, break room, crew car, flight instructor offices, flight training classroom, and study areas. It has two hangars, one at 14,000 sq ft to shelter aircraft up to midsize business jets and an 8,000-sq-ft hangar housing the company's aircraft maintenance operation that was included in the deal along with the Part 141 flight school and 21 rental aircraft.

GateOne plans to update the interior of the terminal to the level of its other FBOs at Stinson Municipal Airport in San Antonio, Texas, and at Utah's Cedar City Regional Airport, and will retain the existing staff of the Avfuel-branded facility. GateOne has also entered discussions with the airport authority to construct larger hangars capable of handling the latest ultra-long-range business jets.

Airplane Builder Waco Opens New Michigan FBO

Waco Aircraft recently opened its new FBO at Battle Creek Executive Airport at Kellogg Field in Michigan. Part of an overall expansion of the airframer's facility, the two-story, 9,400-sq-ft terminal is four times the size of the previous one. On the first floor are an open passenger seating area, business center, pilot lounge with a snooze room, shower facilities, four private offices, and café bar. Upstairs is the Waco Kitchen restaurant, featuring locally sourced farm-to-table ingredients. The restaurant's large windows provide views onto the ramp and into the company's biplane production facility.

The FBO is open every day from 7 a.m. until 8 p.m., except Sunday when it closes at 2 p.m. With advance notice, the FBO can provide overnight hangar space capable of sheltering aircraft up to the size of a Gulfstream G650. It is co-located with Centennial Aircraft Services, Waco's Part 145 repair station.



The former FlyBy Air FBO at West Michigan Regional Airport is one of two locations acquired by FlightLevel Aviation.

New FBO Opens at Virginia Airport

Richmond Executive Aviation (REA), a new aviation service provider at Virginia's Richmond Executive-Chesterfield County Airport, debuted its facility by hosting an open house event.

With a price tag of \$2.3 million, the FBO's terminal features a passenger lounge with complimentary refreshments and floor-to-ceiling windows overlooking the ramp, a 15-seat conference room, pilot lounge with snooze room, flight-planning area, flight-training classrooms, crew car, and concierge service. Also included in the construction was a pair of 10,000-sq-ft hangars that can accommodate aircraft up to a Gulfstream G450.

Located northwest of the airport's main terminal, the full-service FBO provides aircraft charter, management, maintenance, and sales, along with flight instruction. Aircraft and auto detailing are also available and, as an Avfuel-branded location, the FBO participates in the Avtrip customer loyalty program and offers contract fueling.

FlightLevel Aviation Expands Westward

New England-based aviation services provider FlightLevel Aviation has moved into the Midwest with the addition of two of FlyBy Air's three FBOs in Michigan. The deal, which brings FlightLevel to 11 locations, includes the lone FBOs at West Michigan Regional Airport (KBIV) and at Muskegon County Airport. At both locations, which will be rebranded over the coming year, FlightLevel negotiated multi-decade lease extensions.

At KBIV, the FBO includes a modern 7,000-sq-ft terminal with 20-foot-high vaulted ceilings, passenger lounge with refreshment bar, two conference rooms, pilot lounge with shower facilities, and crew car. Its 12,000 sq ft of hangar space can shelter up to midsize jets. The company will also take on management and maintenance of the airport. In Muskegon, the FBO offers a 2,000-sq-ft terminal and 40,000 sq ft of hangar space capable of accommodating large-cabin business jets.

FlyBy will retain its FBO at Traverse City, along with its aircraft



Avflight operates 23 FBOs in the U.S. and Europe. The Falcon Field location in Mesa, Arizona, is both the most recent addition and the company's newest facility.

charter, management, maintenance, and flight school operations.

"We weren't necessarily looking to expand westward but when we took a closer look at the FBOs and their surrounding demographics, it seemed to make sense from a growth perspective, especially in the post-pandemic landscape for general aviation," FlightLevel founder and CEO Peter Eichleay told *AIN*. "We definitely have improvements planned at both locations and I'm optimistic that the overall investment will pan out according to our vision."

Charter Provider Buys Mississippi FBO

Aircraft charter, management, maintenance, and sales company Southern Sky Aviation has entered the FBO arena with its purchase of Sky Warrior Flight Support, the lone service provider at Trent Lott International Airport in Pascagoula, Mississippi.

The facility includes a 4,300-sq-ft private terminal with a pilot lounge and snooze room, 10-seat conference room, and flight planning area, along with more than 20,000 sq ft of hangar space that can accommodate aircraft up to the size of a Cessna Citation Latitude. Amenities include a concierge and crew car. The FBO provides full-service fueling during normal operating hours, with self-serve avgas and call out available for jet-A after hours.

The airport is currently closed due to a resurfacing project on its 6,500-foot Runway 17/35. Southern Sky will take advantage of that pause to refurbish the terminal and install a new 20,000-gallon jet-A tank as it joins the Avfuel-branded dealer network. A grand re-opening event is planned to coincide with the completion of the runway project in October.

Avflight Moves Into New FBO Digs in Mesa

FBO operator Avflight has opened its facility at Arizona's Falcon Field Airport, which is situated midway between Scottsdale and Phoenix. The Avfuel-affiliated chain recently purchased the

ground-handling operation of Falcon Executive Aviation, the lone full-service FBO at the Mesa gateway, and built a terminal on the northern side of the field across from the existing 2,000-sq-ft facility, which will be retained and operated as a satellite location.

The 5,000-sq-ft modern terminal includes a passenger lounge, concierge station, pilot lounge with snooze rooms and shower facilities, kitchen, flight-planning room, and eight-seat conference room, as well as more than 500 sq ft of tenant office space. Amenities include a crew car and car rentals. Avflight also built an 11,000-sq-ft hangar, bringing aircraft storage space to 38,000 sq ft and allowing for the sheltering of jets as large as a Gulfstream G650.

"The Avflight team is honored to serve as a gateway to Mesa and the greater Phoenix area," said Garrett Hain, the company's v-p of finance. "Our goal was, and continues to be, to build on the foundation of Falcon Field Airport's offerings with new facilities and a dedication to customer care."

Norwood FBO Up and Running after 11-year Battle

After an 11-year struggle, Boston Executive Helicopter (BEH) pumped its first fuel into an aircraft as an FBO at Norwood Memorial Airport, Massachusetts, making BEH the second FBO on the airport, in addition to FlightLevel Aviation.

The effort to establish the FBO started in 2010 when the charter operator first submitted its proposal to the city of Norwood and the Norwood Airport Commission (NAC). Since that time, BEH, the NAC, and FlightLevel Aviation have traded insults, accusations, lawsuits, and broken agreements. Also, as the result of FAA investigations, the agency concluded the airport was in violation of federal grant regulations on the grounds of discrimination against BEH.

"Eleven years later we finally pumped our first gallon of fuel," said BEH president Christopher Donovan. "There are many people to thank. You know who you are. Without the support of our founder and owner, and so many others, we would have been long gone." ■



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Pilatus Constructing First U.S. Paint Facility

Twenty-five years after establishing a completions center at Rocky Mountain Metropolitan Airport in Broomfield, Colorado, Pilatus Business Aircraft is constructing its first paint facility there. The 28,455-sq-ft facility will include a down-draft paint bay, a cross-draft paint bay, and a dedicated preparation bay.

Pilatus v-p of marketing Tom Aniello told *AIN* that while the completions center does interior fabrication and installation for the Swiss airframer's aircraft destined for North and South American markets, the company didn't have a facility to apply a base coat of paint over primer nor add the final customer-specified striping scheme. Instead, the base coat of paint was generally applied at Pilatus's Stans, Switzerland factory, and third-party contractors in the U.S. applied the final striping. Operations at the U.S. paint facility are expected to begin in June 2022.

Straight Flight Adds Third Mx Facility at Centennial

Straight Flight, an FAA- and EASA-certified repair station based at Centennial Airport (KAPA) in Colorado for commercial, business, and military aircraft, has acquired a 25,000-sq-ft hangar there on three acres of land and is currently adding 4,000 sq ft of office and operations space scheduled for completion in March 2022. The new hangar features 28-ft-high by 10-ft-wide doors and will accommodate midsize to heavy aircraft.

Embraer Improves Legacy 600/650 Mx Intervals

Embraer Legacy 600 and 650 owners and operators will now have fewer routine maintenance tasks to perform in less than 12-month intervals because of analysis of fleet data, as well as a review of original MSG-3 analysis and application of optimization process, the Brazilian airframer told *AIN*. Among the maintenance tasks that can now be done at 12 months are the operational checks of the nose-wheel steering system disengage and air-ground system. Not included are "out-of-phase tasks" such as a general visual inspection of the first-aid kit and operational check of anti-icing system messages, which still need to be accomplished at their specific intervals.

Oklahoma College Plans To Add A&P Program

Southern Oklahoma Technology Center in Ardmore is developing an airframe and powerplant technician program, partly with the assistance of Dallas-based King Aerospace, whose



Southern Oklahoma Technology Center plans to build an 18,775-sq-ft training facility with a shop area, classrooms, and lab spaces for its new airframe and powerplant technician program.

MRO operations in Ardmore comprise 200,000 sq ft of hangars as well as an FBO. King Aerospace Commercial Corp. v-p of operations Roy Lischinsky will serve on Southern Tech's advisory board for the program. Using a \$4 million grant from the Economic Development Administration CARES Act, the school plans to build an 18,775-sq-ft training facility with a shop area, classrooms, and lab spaces for hands-on training. Program details and curriculum are being finalized, the program is expected to take a year to complete and graduate 16 students a year, who will then be able to sit for the FAA exams.

Epic Appoints More Authorized Service Centers

Epic Aircraft continues to build out a service support network for its all-composite E1000 turboprop single with the appointment of Lone Mountain Aviation as an authorized service center for the Southwest U.S. Lone Mountain is an FAA Part 145 repair station operating from a total of 50,000 sq ft of hangar space between sites at North Las Vegas Airport and Henderson Executive Airport in Nevada. Epic also tapped Broadie's Aircraft at Fort

Worth Meacham International Airport in Texas as its authorized service center for the central southwest region of the U.S. Founded in 1946, Broadie's Aircraft is a Part 145 shop that offers turboprop, turboprop, and piston aircraft maintenance and avionics services and repair. Under the authorizations with the Bend, Oregon-based airframer, Lone Mountain and Broadie's Aircraft will be able to support the Epic E1000, E1000 GX, and legacy experimental Epic LT with inspection, maintenance, and repair services.

StandardAero Wraps Up Signature's ERO Buy

StandardAero has completed its \$230 million acquisition of the engine repair and overhaul (ERO) business of Signature Aviation. Announced in February, the deal includes Dallas Airmotive, H&S Aviation, W.H. Barrett Turbine Engine Co., International Governor Services, and International Turbine Service. With the acquisition, Standard Aero picks up engine overhaul facilities in Dallas and Portsmouth, England, 10 regional turbine centers, a component MRO site, and two parts/distribution facilities.



StandardAero's acquisition of Signature's engine MRO business includes overhaul facilities in Dallas and England, 10 regional turbine centers, a component MRO site, and parts distribution.

Stevens Aerospace Adds PMA Capabilities to Services

Stevens Aerospace and Defense Systems has obtained Parts Manufacturer Approval (PMA) authority, allowing the Greenville, South Carolina-based MRO and AOG provider to manufacture and sell parts for type certified aircraft. As a result, Stevens will offer on- or off-site installation of parts, and its new capability could lessen long lead times for customers and reduce their costs.

Under the PMA, the company can produce universal parts such as avionics component blanking panels or one-off parts such as custom contoured antenna mounting plates. Its parts-making capabilities are made possible by in-house CNC machining, 3D printing, and metalworking.

Pratt & Whitney Opens Tech Engine Parts Facility

Pratt & Whitney has opened a 60,000-sq-ft ceramic matrix composites (CMC) engineering and development facility in Carlsbad, California. In addition to engineering and development, the facility will be capable of low-rate production of CMC materials for aerospace applications. The facility opening includes the addition of more than 60 jobs, the company added.

CMCs are made of ceramic fibers embedded within a ceramic matrix that can be used to manufacture engine parts that are one-third the weight of metallic parts. They also have a temperature capability that is several hundred degrees higher than superalloy parts, allowing for improved turbine engine fuel efficiency and weight savings, as well as reduced emissions and a smaller carbon footprint.

Nextant Joins Constant Aviation at Orlando Facility

Aircraft structural modification and remanufacturing specialist Nextant Aerospace is opening an office on the campus of its MRO parent Constant Aviation at Orlando Sanford International Airport in Florida. The move expands the Directional Aviation companies' presence in the Orlando area and comes in response to increased demand for specialized engineering, design, drafting, and analysis for aircraft modifications and upgrades in the Southeast U.S., Nextant said.

Jet East Opens Las Vegas Mx Facility

Jet East has opened a service hub at Las Vegas Harry Reid International Airport (KLAS). At KLAS, Jet East is operating from an existing 30,000-sq-ft facility, a spokesman told *AIN*. The company plans to eventually have more than 100 people working at that location.

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PRELIMINARY REPORTS**Alberta Firefighting Accident Triggers Emergency AD****BELL 212, JUNE 28, 2021,
EVANSBURG, ALBERTA, CANADA**

Investigators probing the crash of a firefighting helicopter near Evansburg, Alberta, found that a main rotor hub strap pin had sheared off in flight, causing a main rotor blade to separate from the aircraft. The solo pilot was killed when the helicopter crashed into the woods en route to pick up a group of forest firefighters, igniting an additional fire. The failed pin was reported to have been installed only 20 flight hours earlier.

Inspection of another Canadian Bell 212 helicopter found that a main rotor hub strap pin from the same manufacturer had deformed after approximately 29 hours in service. Transport Canada issued an emergency airworthiness directive on July 5 requiring immediate replacement of all pins with the same part number and serial number prefix of "FNFS," applicable to specific serial numbers of Bell 212, 204B, 205A-1, and 205B helicopters. The FAA issued its own emergency AD the following day, extending it to the model 205A. About 400 helicopters worldwide are believed to be affected.

Nine Deaths in Swedish Skydiving Accident**DEHAVILLAND DHC-2 TURBO BEAVER,
JULY 8, 2021, OREBRO, SWEDEN**

Eight parachutists and the pilot were killed in the crash of their jump plane. Initial reports, including a statement by the head of the civil aviation division of the Swedish Accident Aviation Authority (SHK), suggested that it went down in an open field to the left of the runway immediately after takeoff.

This was Sweden's second skydiving accident involving nine fatalities in just over two years. On July 14, 2019, a GippsAero GA8 Airvan crashed onto an island in the Ume River shortly after takeoff from the Umea Airport. There were no survivors.

On July 13, the SHK reported that the on-site phase of the investigation had been concluded and the wreckage recovered to the SHK's facilities in Strängnäs. They cautioned, however, that "The investigation is expected to continue for a long period."

Two Perish in Apparent King Air Breakup**BEECH C90, JULY 10, 2021,
WIKIEUP, ARIZONA**

The pilot and Air Tactical Group supervisor were killed when the twin-engine turboprop crashed onto the side of a ridgeline while conducting aerial reconnaissance and supervision in the vicinity of the Cedar

Basin fire. The airplane had been on station for approximately 45 minutes, making multiple orbits of the scene, before disappearing from radar contact while descending through 2,300 feet agl at 151 knots. A witness saw it "in a steep dive towards the ground." No distress calls were received.

The main wreckage was consumed by a post-crash fire, but debris was scattered over several acres. The left wing was found 0.79 miles northeast of the main wreckage and showed no thermal damage, suggesting it separated prior to impact.

FINAL REPORTS**Forced Landing Exposes Maintenance Discrepancies****HUGHES 369D, AUG. 1, 2019,
FOLLEBU, GAUSDAL MUNICIPALITY,
INNLANDET COUNTY, NORWAY**

The two crewmembers escaped without injury but the helicopter was severely damaged after losing engine power at an altitude of three meters (10 feet) while setting up for a precautionary landing. About 52 minutes into the powerline inspection flight, the pilot noticed unusual vibrations, which were not initially apparent to the imaging systems operator but gradually increased in intensity. "A metallic sound" began about 30 seconds later and likewise intensified. All engine instruments remained in their normal ranges, but the pilot decided to land in order to inspect the helicopter.

After reconnoitering the area, he set up a slow approach to a grassy field, then began repositioning closer to the adjoining road. The noise and vibration abruptly increased and the torque meter readings became unstable, so the pilot decided to land immediately. As he brought the helicopter to a hover, there was a loud bang from somewhere behind the cockpit. The helicopter rotated 60-70 degrees left while falling to the ground, collapsing the right skid and striking the tail stinger and main rotor blades. The pilot shut down the engine before the crew evacuated.

Teardown inspection at the manufacturer's headquarters in Arizona found that the main transmission input pinion had fractured. While the fracture itself was traced to fatigue, other anomalies were found within the gearbox, which had previously been opened to comply with AD 87-18-12. Among the irregularities were loose main bearings attributed to excessively thick adjustment shims; a bushing around the pinion's bearings that had been installed rotated 90 degrees from its correct position, obstructing oil flow; and blockage of the pinion's internal bore by two cylinders of "cork-like material" that investigators compared to "wine corks," adding that they were "not installed as part of any approved maintenance procedure" but were "a very creative, but highly irregular way of stopping a leak"

from the main gearbox into the pinion's inner bore that might have propagated through the incipient fatigue fracture.

Investigators also determined that the gearbox had been in service 1,000 hours longer than the operator's records indicated, putting it 749 hours beyond the manufacturer's recommended overhaul interval. While the precise cause of the fatigue fracture could not be determined, it had most likely begun more than 749 hours before the accident and could have been detected had the overhaul been performed on schedule.

Weather, Regulatory Ambiguity Contribute To Runway Excursion**BEECH A100, APRIL 28, 2020,
KUGAARUK AIRPORT, NUNAVUT, CANADA**

Stiff crosswinds, optical illusions created by blowing snow in low visibility, plowing delays, and potential confusion between the minimum visibilities required for approach versus landing at airports above 60 degrees north latitude all contributed to the runway excursion that damaged a Buffalo Airways freighter on a charter flight from Cambridge Bay to Kugaaruk, Nunavut (CYBB). The airplane veered off the right side of the runway into a snowbank after the right main landing gear hit accumulated snow during the landing roll, causing damage to "the aircraft's fuselage, nose, engines, propellers, nacelles, flaps, wing centre section, and right wing spar... The right wing was bent up and aft." The nose gear collapsed and the rim of the right main wheel fractured in overload during the excursion. The pilot and first officer evacuated the airplane without injury.

The crew flew the RNAV approach to Runway 23, which follows a true course of 244 degrees, offset 15 degrees from runway heading. Prevailing weather included visibility of one-quarter mile in blowing snow, 400 feet vertical visibility, and 24- to 33-knot winds from 200 degrees creating a 12- to 16-knot crosswind component. The TSB's report notes that "To a pilot conducting an approach and landing into drifting snow, the aircraft may appear to be drifting sideways in a direction opposite to the blowing snow. To correct this apparent drift, the pilot might make control inputs that result in undue drift correction...In crosswind conditions, the illusion can be described as a 'moving runway.'" The crew was able to see the runway but not its centerline, the runway lights, or the precision approach path indicator (PAPI) lights, and the captain landed the airplane at or beyond the right edge of the runway.

For much of the preceding two months, runway maintenance at CYBB had been impeded by the combination of equipment outages and blizzard conditions that made local travel to and from the field

unduly hazardous. This was the case the day of the accident, when no snow removal was undertaken. Despite rentals of heavy equipment from the neighboring village, snowbanks eight feet high remained within five feet of the runway lights. A photograph taken during clearing operations the morning after the accident shows the 27-inch-high runway edge lights almost buried in accumulated snow.

The TSB also noted that while airports north of 60 degrees latitude are exempt from minimum visibility requirements for instrument approaches, landing visibility minimums still apply. With no specific listing in the Canada Flight Supplement, the minimum landing visibility at CYBB is the default of ½ statute mile, so while the approach was authorized, the landing was not. The TSB commented that "The application of these two independent requirements can lead to confusion and give some pilots the impression that, if the approach ban is not in effect, landings are authorized without the need to take into account the aerodrome operating visibility requirements."

Vortex Ring State Claims N.C. Police Helicopter**BELL 206A, NOV. 8, 2020,
RALEIGH, NORTH CAROLINA**

While attempting to land at the North Carolina Highway Patrol's training facility, the pilot successfully recovered from two encounters with vortex ring state, also known as "settling with power." Vortex ring state is a condition in which the combination of high power demand and low airspeed leaves the main rotor operating in its own downwash, significantly reducing its ability to produce lift. Increasing power only aggravates the problem, so recovery depends on regaining forward or sideways motion into undisturbed air.

After the second attempt, the pilot landed at the Highway Patrol's driver training facility. To reduce power demands, the copilot disembarked before the pilot returned to the ready hangar. During the third landing attempt the helicopter again entered vortex ring state, this time 100 feet lower than in the previous approaches, and the pilot was unable to escape before it descended into treetops, causing a main rotor blade to strike the tail boom. The pilot, who also holds commercial, instructor, and instrument instructor certification in airplanes, made a successful autorotation onto Tryon Road and escaped without injury. He reported 1,878 hours of career flight time, including 101 in type.

This was the second helicopter accident at the training facility in three years. On June 19, 2018, a Bell OH-58A was destroyed by dynamic rollover after the pilot forgot to unhook its left skid from the electric transporter used to move it out of the hangar. ■

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» continued from page 40

Alaska crashes

One week after the midair, Taquan experienced another crash, in Metlakatla. In that investigation, attention turned to the company's risk-assessment procedures.

In his NTSB interview, the chief pilot acknowledged that Metlakatla could be "challenging" and did not know why a pilot who had completed training only nine days earlier was scheduled for the flight. Pressed on specific hazards, he stated, "It's rising terrain, open water. There can be ocean swells in there...There can be different wind directions in there." New hires, he explained, were assigned to "easy" flights, such as tours. After about six weeks, new pilots might incur lodge work before moving on to certain commuter flights.

A flight follower had filled out the risk-assessment form for Flight 20 as part of regular dispatch procedures; she expressed no knowledge of the chief pilot's concerns about the new pilot's inexperience. This breakdown in operations management prompted the NTSB to include "the company's inadequate operational control of flight release procedures" as a contributing factor in the accident. There are no interviews with the FAA on the docket for the Metlakatla accident.

Disfunction and Neglect

In each of the three accident investigations, NTSB investigators found themselves repeatedly analyzing existing safety programs. The disfunction in risk-assessment procedures, training programs, checklists, and the entire operations department made it impossible to ignore the fallout from the FAA's diminished oversight capacity.

While the probable causes focused on the actions of the individual pilots and Taquan Air's deficiencies, the more than 1,300 pages of company and FAA interviews in the accident dockets reveal a pattern of consistent neglect on the part of the agency tasked with enforcing safety standards.

This is perhaps best summed up in a paragraph from the Jumbo Mountain NTSB final report: "Based on [sic] the FAA's inappropriate approval of the DO, the insufficient company on-site management, the inadequate operational control procedures, and the exercise of operational control by unapproved persons likely resulted in a lack of oversight of flight operations, inattentive and distracted management personnel, and a loss of operational control within the air carrier."

In an attempt to gain perspective on the history of Taquan's POI assignments, AIN filed a series of FOIA requests to the FAA. In response to an initial request for the certificate management team members between 2017 and 2020, the FAA responded with a list that did not include Marlowe, the second South Carolina-based POI tasked to oversee an Alaska operator. A subsequent request for all the inspectors assigned

between the years 2000 and 2020 did not include Clamp, Marlowe, or Percy.

This inconsistent and incomplete information is not unusual. When responding to FOIA requests for POI assignments to other small commuter and charter operators in Alaska, the FAA has responded with limited information ranging from no more than five years to less than three years. For the state's largest Part 135 operator, which was involved in 15 accidents between 2008 and 2020, the FAA provided no records for POI assignments before 2015, except for the name of one inspector who served from May to August 2013.

Assessing the workload for Taquan Air's POIs as compared to other Alaskan Part 135 operators is also difficult. Reading through accident dockets over the past several years gleans mentions of workload assignments that varied from 20 to 70 operators. Some inspectors said they were also responsible for multiple large and/or "high risk" operators, or further tasked with providing check rides for other companies, supervising designated examiners, or often required to travel outside their region and provide assistance elsewhere, all while managing their own responsibilities.

While investigating a 2018 accident that resulted in a pilot fatality, the FAA POI overseeing that company told the NTSB he had oversight for 50 certificates. One year later, the same company was involved in two more accidents, resulting in two additional deaths and three serious injuries.

The NTSB did not even interview the POI during either of those investigations and it remains unclear how often that company's POI changed during this period.

In its final report on the midair released earlier this year, the NTSB noted that Taquan did not have a safety management system (SMS). (It has, however, voluntarily established one since that crash.)

The agency considered lack of an SMS a "safety issue" for Taquan at the time of the accident and asserted that if it had been required for Part 135 operators to have an SMS, there would have been better opportunity to "discover and mitigate the increased risk" caused by issues with the Capstone equipment.

Like the Jumbo Mountain and Metlakatla accidents, there were no recommendations in the midair final report concerning FAA oversight, nor was the agency cited in the probable cause findings for any of the Taquan accidents.

Taquan Air did not respond to a request for comment concerning the multiple POI assignments made to the company during 2018 and 2019. The FAA, in its response to a question regarding staffing and oversight of Alaskan Part 135 operators, said it "has increased inspector staffing in all of the Alaska safety offices as we have elsewhere in the country. The number of operators per inspector is in line with agency standards."

At the end of 2019, FAA inspector Dahl was responsible for 67 certificates. He was replaced as Taquan Air's POI late last year. There are currently three POIs listed as assigned to the Juneau FSDO. ■

**Within 6 Months**

Nov. 4, 2021

ICAO: Runway Surface Format

In response to the Covid-19 pandemic, ICAO has delayed the applicability date of the new global reporting format (GRF) for assessing runway conditions to Nov. 4, 2021. ICAO will continue to provide support to member states and stakeholders as they emerge from the current crisis and revise their implementation plans. Note, some countries are electing to apply earlier applicability dates.

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 406 and 121.5 MHz. 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.

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.

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 (UAS) can be produced without FAA-approved remote identification capability. After Sept. 16, 2023, no unmanned aircraft can be operated unless it is equipped with remote ID capability 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, including developing an airport operations manual.

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.

June 7, 2023

European ADS-B Out Mandate

Aircraft that obtained their certificate of airworthiness (C of A) between June 6, 1995 and Dec. 7, 2020 must meet the ADS-B Out mandate by June 7, 2023. The deadline applies to aircraft with a maximum takeoff weight exceeding 12,500 pounds or having a maximum cruising true airspeed capability greater than 250 knots. Aircraft receiving their C of A on or after Dec. 7, 2020 are currently required to be in compliance. Aircraft with C of A's dated before June 6, 1995 are exempt from ADS-B requirements.

Jan. 1, 2023 and Jan. 1, 2028

U.S.: Aircraft CO₂ Standards

The first U.S. standards for CO₂ aircraft emissions have been enacted by the EPA and initially apply to large subsonic jets that weigh more than 132,277 pounds mtow for which the application for a new type certificate is made on or after Jan. 11, 2021. The standards apply to all other new jet design applications made on or after Jan. 1, 2023 and to new deliveries of in-production large jets starting Jan. 1, 2028. Jets with an mtow under 12,566 pounds, turboprops below 19,000 pounds mtow, and piston-engine airplanes are exempt.

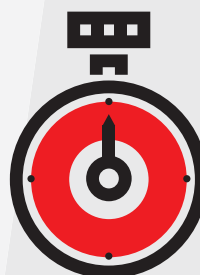
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VIVEK KAUSHAL



JESSICA NAOR



LINDSEY OLIVER



DAVID HAYES



PERRY BRIDGES

The U.S. Senate confirmed the nomination of **Jennifer Homendy** as chairman of the NTSB. Homendy succeeds **Robert Sumwalt**, who stepped down at the end of June after serving as chairman since 2017 and on the board for 15 years. Homendy, who joined the board in August 2018, has more than 25 years of transportation safety experience, including spending 14 years as the Democratic staff director for the House railroads, pipelines, and hazardous materials subcommittee.

Global Jet Capital appointed **Vivek Kaushal** as CEO, replacing Shawn Vick, who will now serve as executive chairman. Kaushal, who has 30 years of business financing experience, was most recently Global Jet's COO, a position he was appointed to in 2019 after joining the company in 2015 following its acquisition of GE Capital's business aircraft portfolio.

The *Air Charter Safety Foundation* board of governors elected **Jessica Naor** and Tom Huff to its executive board. Naor is COO of the Maryland-based GrandView Aviation and a member of FAA's Duty & Rest Aviation Rulemaking Committee, as well as vice-chair of the National Air Transportation Association Part 135 Committee. Huff, the aviation safety officer for Gulfstream Aerospace, recently chaired both the Flight Test Safety and NBAA Safety Committees and is now the chair of the Flight Safety Foundation Business Advisory Committee.

Lindsey Oliver was named director-general for the *British Business and General Aviation Association (BBGA)*. Previously operations and development manager, Oliver worked alongside CEO **Marc Bailey** since 2009 and before that served with the National Farmers Union and Buckinghamshire Agricultural Association.

Mente Group named **David Hayes** as managing director for the Southeast, based in Orlando, Florida. Hayes, who has served with FlightSafety International and was a corporate and airline pilot, joins Mente Group from Textron, where he held national sales leadership posts at Textron Specialized Vehicles, TRU Simulation + Training, and Textron Aviation. Mente also named **Cole White** managing director for the U.S. South. A former U.S. Army armor officer, White most recently was v-p of transactions for Mente.

Duncan Aviation added **Kramer Lyons** to its senior management team as director and associate general counsel. Lyons previously was an attorney with the Lincoln, Nebraska-based law firm O'Neil Heinrich, where he focused on general corporate law, business and commercial transactions, mergers and acquisitions, and construction law.

Heather Sermo joined *Pentastar Aviation*

as v-p of human resources. She previously was human resource director for RoboVent.

JethQ appointed **David Coppock** as v-p of sales, based in the U.S. A U.S. Air Force combat veteran, Coppock, most recently was managing director for the Mente Group and has worked with Gulfstream, Hawker Beechcraft, and Bombardier.

ACC Aviation appointed **Viktor Berta** as v-p of its newly created Aviation Finance Practice. Berta has a background in working with lessors, airlines, and MROs and previously worked with ACC Aviation's consulting team on an aircraft financing deal.

Partners In Aviation hired **Perry Bridges** as v-p of operations. Bridges previously spent 20 years with Cessna Aircraft, including 11 at Cessna Finance Corp., and also has served as v-p of aviation for Bank OZK in Chicago.

Raisbeck Engineering brought **Tim Morgan** on board as v-p of engineering. Morgan brings more than 35 years of aerospace engineering, product development, and certification experience to his new role, including spending 20 years with TTF Aerospace and serving with AIM Aerospace.

Pentastar Aviation named **Mark Schenkel** v-p of finance. Schenkel, who joined Pentastar in 2015 as controller, is now responsible for all strategic financial initiatives and financial operations and information technology activities of Pentastar Aviation and Pentastar Aviation Charter.

Maria Willis joined *Blackhawk Aerospace's* group in Alabama as capture manager. Willis brings eight years of experience as a program manager of equipment and information technology at Contractor Service & Fabrication.

Western Aircraft hired **Patrick "Brody" McKenna** to serve as avionics manager. McKenna, a former avionics specialist with the U.S. Marine Corps, has more than 15 years of aviation experience, including with Gulfstream Aerospace in Long Beach, California.

Lancaster Airport in Pennsylvania named **Ed Foster** airport director. Foster has nearly 40 years of aviation industry experience, most recently as airport associate director for University Park Airport at Penn State University.

Summit Aviation hired **Bradley Card** to serve as director of program management. A U.S. Air Force veteran, Card has 30 years of aviation experience, most recently as program manager for Aloft AeroArchitects.

Phillip Cantu was promoted to line services manager for *Air 7*. Cantu will be responsible for coordinating Air 7's aircraft fuel, refueling services, aircraft operator communications, ramp facilities, fuel testing, aircraft hangar

facilities ground support equipment, and line service team.

Nicole O'Connor was appointed commercial director for *Weston Aviation*. O'Connor, who brings 20 years of travel and tourism sales and business development experience to her new role, joined Weston last year and has supported local awareness of the company and its services at Gloucestershire Airport in the UK.

ACASS hired **Andrew Pethen** to serve as client services director for its Ireland branch office. Pethen has more than 27 years of aviation experience, previously holding roles with Air France, UK NATS, Flexjet Europe, and TAG Aviation (UK).

Gustavo Botura was promoted to the newly created position of director of client services for *Elite Jet Charters*. Botura was part of the Elite Jets launch team in 2015 and previously served as executive charter consultant.

Jeffery Potter joined *King Aerospace* as director of interiors. Potter has a 30-year career that has included management roles with Aeria Luxury Interiors, Gore Design Completions, and Associated Air Center.

Air Charter Service (ACS) appointed **Ben Stevenson** to lead the company's Travel & Concierge team, primarily working with the company's Private Jets division. Stevenson previously spent 15 years with Flight Centre Travel Group, where he was head of specialist retail.

West Star Aviation promoted **Scott Debrie** to interior senior team lead at its Grand Junction, Colorado location. Debrie joined West Star in 2002 and previously worked with Pfizer in Lincoln, Nebraska.

Elliott Aviation hired **Rafael Garcia** to serve as international parts sales representative. Garcia has more than 20 years of aviation experience, including with Southeast Aerospace, Aero-Marine Technologies, Global Parts, and Newco Aviation.

Vince Kellestine returned to *Mid-Canada Mod Center* to lead the company's service department. Kellestine, who has 30 years of experience supporting aircraft, previously managed the company's service department from 1997 to 2011 and subsequently held positions at Air Georgian and Onex Partners Group.

Western Aircraft's aircraft sales and charter management division named **Ronald Smith** to regional director of Pilatus jet sales and **Pat Belokas** regional director of Pilatus turbo-prop sales. Smith has served with the Western Aircraft sales team for the past 13 years and previously was Pilatus regional sales director. Belokas had served as the Piper regional sales director since 2016.

Tim Lowther joined *Get Heli* as sales and marketing manager. Lowther has worked in the aviation and leisure travel industries for the past 30 years, including the last 15 years with Emirates at the Dubai headquarters as a global head of sales.

Duncan Aviation named **Dustin Johnson** component shop supervisor. Johnson joined Duncan in 2003, initially as a bench tech assistant, and since has held positions of increasing responsibility, holding team leader roles since 2010.

Summit Aviation promoted **Dennis Hurst** to regional sales manager. A U.S. Marine Corps veteran, Hurst initially began working with Summit Aviation in 2011 as a contract flight test mechanic for Strom Aviation and came on board full time in 2013, holding the roles of flight-test team lead and program lead.

Dwayne Chandler joined *Stevens Aerospace and Defense Systems* as director of avionics sales. Chandler has more than 30 years of avionics experience, holding roles with Timco, Landmark Aviation, and most recently Constant Aviation. ■



AWARDS and HONORS

Two of *AIN*'s editors recently received industry accolades. Editor-in-chief **Matt Thurber** received the coveted Bill Gunston Technology Writer of the Year Award at the 2021 Aerospace Media Awards, which were presented online once again due to the cancellation of this year's edition of the Paris Air Show as a result of the continuing Covid pandemic. Thurber's winning entry was "Keeping the Pilot in the Loop on Flight

to Autonomy." Senior editor **Curt Epstein** was presented with a Sapphire Pegasus Business Aviation Award for outstanding journalism at this year's Caribavia conference held on St. Maarten in June. Epstein, who has handled the airport and FBO beat at *AIN* for more than a dozen years, was honored for his consistent achievements and his dedication to professional aviation journalism. ■



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