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The FAA's powered-lift announcement drew crowds as NBAA-BACE opened.



# FAA GREENLIGHTS EVTOL

By Charles Alcock and Sarah Rose

The FAA's release of its special federal aviation regulation (SFAR) for "Integration of Powered Lift: Pilot Certification and Operations" coincided with the opening session at NBAA-BACE 2024 on Tuesday, with NBAA president and CEO Ed Bolen and FAA Administrator Michael Whitaker first breaking the news of its arrival to a standing-room audience. "It's here today," Whitaker told the crowd gathered at the opening session. "It is now a final rule."

Much anticipated, the SFAR forms the foundation for the introduction of eVTOL aircraft in the U.S., establishing the necessary operational and training requirements for "powered-lift" aircraft. In announcing the SFAR, the FAA called powered-lift the first new category of civil aircraft since helicopters were introduced in the 1940s.

Whitaker praised the expediency of developing the regulation and its historical significance. "I don't know the last time we went from an idea to a final rule in 16 months. That is lightspeed," Whitaker said. "This is exciting. This is a new category of aircraft. For years, we've only continues on page 53 ›

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BY TEXTRON AVIATION

# Wheels Up refreshes its jet fleet with new $332M credit facility

By Charles Alcock and Sarah Rose

Wheels Up is modernizing its jet fleet through a plan to consolidate the number of different aircraft types it operates to primarily two models: Embraer's Phenom 300 and Bombardier's Challenger 300/350. The private flight provider also announced on Tuesday that it has lined up a $332 million credit facility from Bank of America, backed by the operator's main shareholder, Delta Air Lines.

During a briefing at the NBAA-BACE show, Wheels Up CEO George Mattson told reporters the company has agreed to acquire GrandView Aviation's entire fleet of 17 Phenom 300s and 300Es. The $105 million purchase price includes some related maintenance assets from the U.S. charter operator.

George Mattson, CEO of Wheels Up

While the transaction is closing, GrandView, part of the Global Medical Response group, will operate the Phenoms on Wheels Up's behalf for its membership and charter products. The deal is expected to be finalized before the end of the year, at which point the aircraft will be switched to Wheels Up's air operator certificate. Wheels Up said it expects to employ most of GrandView's pilots and also aims to fulfill service agreements with the company's existing customers.

At the same time, Wheels Up is now looking to acquire a fleet of preowned Challenger 300s and 350s through the secondary market. The transactions for the super-midsize jets will be a mix of outright purchases and long-term leases.

As part of the transition plan, Wheels Up will sell all 13 of its Citation X aircraft to an undisclosed third party. The Atlanta-based company intends to lease back some of these jets from the new owner and will amend existing lease terms for other Citation X aircraft currently leased from the same buyer.

Over the next three years, and subject to market conditions, Wheels Up said it will gradually retire its fleet of light and midsized jets while retaining its Beechcraft King Air twin turboprops—the model that launched and served as the foundation for Wheels Up's operations—for some customers. Once the fleet transition is complete, the operator said it will have reduced the average age of its aircraft by around 10 years.

The first Challenger 300s are set to be introduced to the Wheels Up fleet at the start of next year, and these will be available initially to both charter customers and program members on some routes. By the end of 2025, Wheels Up expects to be able to offer the type across all of its guaranteed service areas.

"Fleet modernization is the next critical step in the journey of Wheels Up," said Mattson. "We believe our flexible, accessible offerings across programmatic membership and global charter, enhanced through our one-of-a-kind strategic partnership with Delta Air Lines, already delivers the most customer-centric global aviation solutions available in the market today."

Speaking to reporters at NBAA-BACE, Mattson explained how his journey from the board of Delta Air Lines to the top of Wheels Up reflects his company's core mission: to connect private flyers to aircraft and one another and to deliver exceptional personalized flying experiences.

"I stepped off the Delta board to create the first strategic partnership in history to combine the separate ecosystems of commercial and private aviation into one seamless, flexible, and accessible offer that allows the customer to choose their optimal mode of travel trip-by-trip, whether it be commercial, private, or a hybrid," he said.

## Better Connectivity, More Cash

Wheels Up has also signed a letter of intent with Gogo Business Aviation to equip its new Phenoms and Challengers with Gogo Galileo HDX low-earth-orbit, satellite-based Wi-Fi service. Under the terms of the agreement, Gogo has committed to complete certification of the system and have the HDX packages approved for use on Challenger and Phenom aircraft by the middle of 2025 as these types enter Wheels Up's fleet.

The five-year senior secured revolving credit facility is expected to be available in time for the GrandView fleet acquisition to close this quarter. It will also fund the redemption of all outstanding notes on aircraft the company owns and general corporate activity.

The new funding is expected to provide up to $115 million of additional cash for the Wheels Up balance sheet. Additional borrowing will be available under specified conditions to support the plan to opportunistically acquire Challengers and Phenoms.

"In the year since we've invested in Wheels Up, their operational performance, financial progress, and the successful revamp of their customer offering have validated our decision to embark on this one-of-a-kind partnership," said Delta Air Lines CEO Ed Bastian.

"Underpinned by those key improvements and further fueled by the forthcoming execution of this modernized fleet strategy, we feel more confident than ever that Wheels Up is on track to be a global leader in private aviation as we work together to build an unrivaled partnership spanning across commercial and private travel."


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IAN WHELAN

Textron Aviation brought a mockup of its Cessna Citation Ascend to NBAA-BACE as the company readies the model for its anticipated service entry next year.

# Citation Ascend preps for service entry in 2025

By Matt Thurber and Amy Wilder

As the Cessna Citation Ascend flight-test program continues, Textron Aviation is once again highlighting the next iteration of the 560XL family at its BACE static display in mockup form so visitors can see what's changed in the cabin and flight deck. Textron Aviation announced the midsize twinjet in May 2023 and expects it to enter service next year.

From the outside, it's hard to tell the difference between the Ascend and its XLS+ predecessor, but the Ascend's cabin windows are 15% larger and its windshields have built-in UVA and UVB protection.

Inside, the jet has major upgrades, with a Garmin G5000 avionics suite replacing the Collins Pro Line 21 avionics. The cabin's trenched aisle is filled in to provide a flat floor (although an option is available to keep the original XL/XLS dropped aisle at no extra charge). The flat-floor height is 60 inches—eight inches less than the dropped-aisle height. One of the benefits of the flat floor is that it is more pet-friendly, a feature that the growing number of business jet travelers with pets will appreciate.

Upgraded seats give passengers more room to move the seat around and find more comfortable positions. Each seat has USB power and there are a total of 19 USB ports and three standard universal outlets in the Ascend, as well as wireless phone charging pads.

Textron Aviation showed P1, one of two flight-test airplanes and the first in production configuration, to media during a pre-BACE visit to company headquarters in Wichita. We didn't get to look inside the airplane; while it had previously been equipped with the planned full interior, that was removed for the flight test campaign and replaced with test equipment.

Improvements in the Ascend include a full-size airstair, an externally serviceable lavatory, single-point refueling, and an upgraded Honeywell RE100 [XL] APU that can be left unattended while running.

Pratt & Whitney Canada PW545D engines deliver better fuel efficiency thanks to a more efficient high-pressure compressor, enhanced single-stage high-pressure turbine module, and upgraded exhaust mixer.

Like the Citation Latitude and Longitude, the Ascend will feature autothrottles, as well as the same avionics—Garmin's G5000 with three 14-inch displays and four touchscreen controllers and the GWX 8000 StormOptix auto-scanning radar.

The avionics suite includes Garmin's Synthetic Vision Technology (SVT), notably a guidance system that provides continuously updating visual depictions of external topography and an augmented runway display, supporting approaches as low as 150 feet. The SVT also includes SafeTaxi technology with 3D depictions and 2D maps, allowing for touchscreen entry for taxi routes and guidance.

Preliminary performance numbers that haven't yet been finalized include a range of 1,900 nm at high-speed cruise with four passengers, up from the XLS+'s 1,750 nm. Maximum cruise speed at 441 knots and range at 2,100 nm are the same, as is time to climb to the maximum altitude of FL450 at 30 minutes.

With an 20,500-pound mtow that is 300 pounds higher than the XLS+, the Ascend's maximum zero fuel weight is up 400 pounds, to 15,500 pounds; maximum payload is 150 pounds higher, to 2,390 pounds; and payload with full fuel is 850 pounds. It's takeoff field length of 3,660 feet is 60 feet longer than the XLS+, while landing distance is 3,220 feet versus the XLS+'s 3,180 feet.

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# SAF to begin flowing to Northeast U.S. FBOs

More Jet Aviation FBOs will carry continuous supplies of sustainable aviation fuel provided by World Fuel Services.

By Curt Epstein

Jet Aviation and Signature Aviation will greatly expand the footprint of sustainable aviation fuel (SAF) in the U.S. next year, including finally bringing the renewable fuel to business aviation hubs in the Northeast

Beginning January 1, Jet Aviation will more than double the number of its FBOs that carry SAF through a partnership with World Fuel Services. The company's facilities at Dallas Love Field (KDAL) and Houston Hobby Airport (KHOU) in Texas, along with Palm Beach International (KPBI) in Florida will all carry continuous supplies of blended SAF. That's in addition to its FBOs at Boston Hanscom Field (KBED) and New Jersey's Teterboro Airport (KTEB).

These five locations will join Jet Aviation's existing SAF distributors: California's Van Nuys Airport (KVNY); Bozeman, Montana (KBZN); and Scottsdale, Arizona (KSDL). The company also plans to stock SAF at its under-construction facility at Miami-Opa Locka Executive Airport (KOPF) once it opens in third-quarter 2025.

"We are incredibly proud of this latest expansion of our SAF network in the U.S.," said Richard Layton, v-p of Jet Aviation's Americas FBO operations. "The U.S. is one of the most dynamic business aviation markets in the world, and we are committed to continuing to grow our offering in line with the requirements of our customers."

He added that the General Dynamics subsidiary is able to offer SAF solutions at any of those locations or via book-and-claim at any of its U.S. FBOs.

Likewise, Signature—through an agreement with fuel supplier Valero Marketing and Supply—will add six new locations to its SAF network in January: KDAL; Washington Dulles International Airport (KIAD); Miami International (KMIA), KOPF, and KPBI in Florida; and KTEB.

Signature recently passed the 40-million-gallon mark of blended SAF pumped since 2020. This expansion will increase the number of Signature locations that carry SAF to 23, including eight of the top 10 largest business aviation markets in the U.S.

"By collaborating with suppliers such as Valero and responding directly to the needs of our guests, we're ensuring more blended SAF availability across our network," explained Derek DeCross, the chain's chief commercial officer. "This expansion is another example of the leadership role we've taken in helping build the most comprehensive SAF supply chain in aviation."

GAMA president and CEO Pete Bunce hailed the announcement of the expansion of SAF into new territories. "I think hopefully [this] will send a message to our operator community that 'OK, there are no impediments, I don't have to go through a process of book and claim. I can actually just give word as I am inbound to the FBO and say we want SAF.'"


MARIANO ROSALES

## NBAA celebrates Bombardier legends

Former Bombardier leaders Laurent Beaudoin (center) and Pierre Beaudoin (right) received the NBAA's Meritorious Service to Aviation Award during the opening session on Tuesday.

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Bombardier installed more than 3,000 solar panels at its London Biggin Hill Service Centre.

**INNOVATION: SUSTAINABILITY**

# Solar, LED lighting spark energy efficiency efforts

By Jessica Reed

Bombardier in July announced the completion of an ambitious solar panel installation project at its London Biggin Hill Service Center. The new photovoltaic system, which includes more than 3,000 solar panels, is expected to generate 1.133 million kilowatt-hours (kWh) of electricity annually. This renewable energy source will meet up to 32% of the service center's energy needs, reducing the facility's carbon emissions by approximately 252 tonnes each year.

Completed in collaboration with Zestec Renewable Energy, the solar project underscores Bombardier's efforts to reduce its carbon footprint. Zestec, which developes and manages renewable energy assets, played a critical role in the project.

Paul Sislian, Bombardier's executive v-p of aftermarket service and strategy, emphasized the significance of this milestone. "At Bombardier, we are actively committed to ensuring that we are making aviation more sustainable," he said, adding that this installation aligns with the company's objective of reducing the environmental impact of aircraft manufacturing and service operations.

The solar panel installation complements the ongoing expansion of Bombardier's London Biggin Hill service center, which now spans nearly 250,000 sq ft. The facility's integration of renewable energy represents a growing trend in the industry toward reducing the environmental impact of maintenance, repair, and overhaul (MRO) facilities.

In recent years, London Biggin Hill Airport upgraded its customer service vehicles to electric models and began using hydrotreated vegetable oil biodiesel to power ground support equipment. These measures have reduced the airport's carbon footprint and are part of its goal to achieve carbon neutrality by 2029.

Airports worldwide are adopting decarbonization roadmaps to reduce emissions and enhance energy efficiency. Some, like Dubai International Airport and Rome-Fiumicino Airport, have also installed extensive solar energy systems to power their operations.

The city of Phoenix Aviation Department has ambitious goals to achieve 100% carbon-free energy by 2030, net-zero carbon by 2040, and zero waste by 2050. The department has implemented a strategic roadmap that includes regular sustainability meetings, data collection, and targeted action items to ensure long-term environmental goals are met.

Miami International Airport recently earned accreditation under Airports Council International's global airport carbon accreditation program. The airport's sustainability initiatives align with Miami-Dade County's commitment to the United Nations' Race to Zero Program and include measures to reduce greenhouse gas emissions by 50% before 2030.

Notable projects at the South Florida airfield include a $45 million investment in energy-efficient lighting, water systems, and HVAC upgrades, which are projected to save the airport $3.2 million annually. Further, the Miami-Dade Aviation Department is advancing a $130 million solar panel installation across the airport's terminal roof, aiming for completion by 2030.

Ontario International Airport in Southern California has also taken steps to reduce its carbon footprint. The airport was recently awarded $2.5 million through the FAA's Voluntary Airport Low Emissions program and will use the funds to replace 22 pre-conditioned air units. These systems help reduce emissions by using airport electrical power rather than jet fuel for parked aircraft, contributing to lower emissions and energy efficiency.

Several smaller U.S. airports are embracing sustainability. The Davidson County Executive Airport, Wayne Executive Jetport, and Hickory Regional Airport—all in North Carolina—have secured FAA grants to implement energy-efficient upgrades.

Davidson County Executive Airport is investing $1 million to replace its taxiway lighting system with energy-efficient LED lights, while Wayne Executive Jetport received a $1 million grant to reconstruct its airfield drainage systems, mitigating flood risks during heavy rain. Hickory Regional Airport is enhancing its runway lighting with an FAA grant of $750,000, replacing existing lights with LED lighting to improve operational safety and reduce energy consumption.

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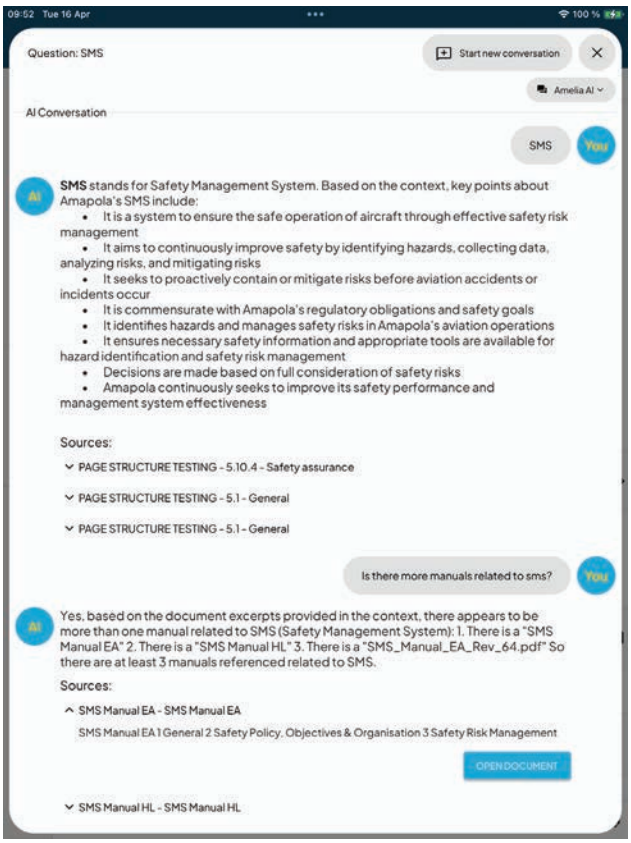
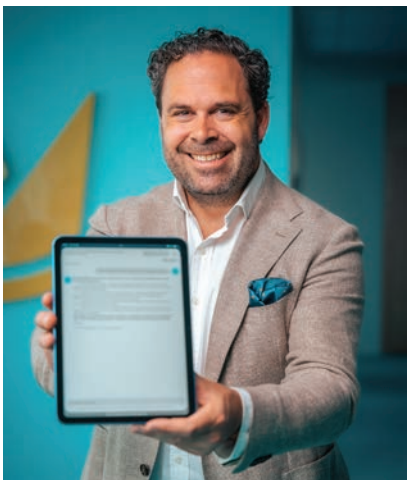
# Tapping AI you can trust to make sense of aviation manuals

By Charles Alcock



The AI-based Amelia platform is designed to speed up searches in operations and maintenance manuals.

The information contained in aircraft operations and maintenance manuals is critical to safety, and it's mandatory that companies manage these documents diligently and remain compliant with their regulators. However, these tasks can also be very burdensome and inefficient, and it's that dilemma that software group Web Manuals is now trying to resolve with artificial intelligence (AI).

"We have found a way to help aircraft operators tie together all the complexities and make them digestible and usable," explained Martin Lidgard, the Swedish company's founder.

Web Manuals is seeking to increase the level of automation both for those writing and curating the manuals, and for those who need to read and apply their contents. This is being rolled out through its new Amelia platform, which provides an AI-driven search function.

"On the authoring side, some people think they don't have a problem managing the regulations and then they realize once they start tying them together that they are not consistent. This isn't something that can be managed in Word or Excel," Lidgard said. "On the reader side, we're trying to provide a simple-to-use tool to find specific points in 10,000 or more pages without getting information overload."

According to Lidgard, Amelia's search function is not restricted to just responding to carefully chosen keywords. "You can have a conversation with it to explain in different ways what you need to find in a manual. It's like having an assistant to search for you," he told **AIN**.

Initially, it was mainly time-poor pilots and mechanics under pressure who Web Manuals had in mind when it started tapping AI. "Then customers were coming back to us saying that the people responsible for authoring and managing the manuals also wanted access," Lidgard explained.

After an initial few months in early operations, between 10 and 20 companies are using Amelia, and Web Manuals expects more to get involved now that the charter sector is entering a quieter part of the year. The company holds three user conferences each year at its Malmo headquarters and also in its San Diego and Singapore locations. Each of these yields a couple hundred ideas, and Lidgard said his team aims to introduce up to 70% of these within 12 months.

He acknowledged that not everyone is completely at ease about AI, based in part on concerns over the reliability of the information sourced. Amelia is essentially only searching in a closed loop—restricted to the manuals that are appropriate to any given user and so, in theory, it should be unable to deliver bogus outputs.

"This technology can seem less transparent than traditional programming, and we need to deliver AI people can trust," Lidgard said. "When I started looking at this, I was concerned about it being too random, but what we do is with a lot of caution and insight. The system gives a summary of the search results and the exact source of each bit of information. There is nothing opaque about its learning engine, and we've carefully looked at the legal and risk side, too."

The company has also continued to improve its standard Web Manuals platform, including the introduction of an iPad-compatible version. With more than 700 systems now in use, Lidgard said it has validated its claim that the technology can deliver time savings of up to 80% of the time taken to use conventional aviation manuals. In Web Manuals' view, used the right way, AI can only improve this while bolstering safety.

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# Book-and-claim is crucial to SAF expansion

Although Signature Aviation has sold more than 35 million gallons of SAF since 2000, most of that fuel is available only on the West Coast.

By Curt Epstein

Sustainable aviation fuel (SAF) is widely considered to be the solution with the greatest potential to help the aviation industry reach decarbonization goals, and the introduction of industry book-and-claim programs is the tool that is going to help advance its production and adoption.

While the global supply of SAF this year is expected to triple 2023's total, reaching 400 million gallons of neat (100%) SAF, it still only accounts for less than half a percent of the amount of jet fuel consumed. In the U.S., the fuel is available primarily on the West Coast due to tax and credit incentives for production and distribution of low life-cycle-carbon emission fuels.

SAF is now available to business aviation customers at approximately 30 FBOs in the U.S., and a similar amount in the rest of the world, mainly in Europe. To airports near the SAF production facilities, the renewable fuel can be easily transported. But, beyond a certain distance, the costs of transport and resulting environmental penalties begin to weigh upon the price and erode the benefits of the fuel.

SAF's carbon emissions savings over conventional jet fuel are calculated on a life-cycle scale, including transportation to the end user. If it is trucked hundreds of miles, those subsequent emissions must also be factored into the equation.

"There are airports where the distribution points are close to the producers that have the right tax incentives or the right subsidies in place…where it just makes sense to put the fuel. You are going to get the cheapest cost per gallon," said Kennedy Ricci, president of industry sustainability solutions provider 4Air. "If we tried to truck it to Teterboro, you are probably going to pay double or triple the amount that you pay for putting that fuel in in California."

With the physical fuel sequestered in a geographic area, and with an industry customer base around the country, book-and-claim programs were instituted. These programs enable operators to pay a "green" surcharge to obtain the environmental benefits and carbon reduction credits anywhere, without the actual fuel being pumped into their aircraft. Instead that fuel is pumped into another aircraft.

"That's how the process needs to work," said Beatrice Batty, Signature Aviation's director of fuel planning and risk. "You have to be able to separate the physical molecules from the carbon attributes and of course the premium for it to be able to create that SAF book-and-claim credit, but the gallon [of SAF] has to be put into the aviation system to be burned."

"We saw the need [for book-and-claim] very early on," Batty explained to **AIN**. "When we started looking at how [to] get SAF to our customers, we realized that because of the very immature production landscape and that it was only focused in California—yet there is so much demand elsewhere—we recognized that book-and-claim was going to be a necessity to help get adoption and a greater flow of product into the marketplace. We will need book-and-claim until we get a more large-scale production landscape throughout the world, but especially in the United States."

Keeping accurate records of SAF usage for reporting purposes is crucial to an operator's environmental, social, and governance plans.

"SAF is different from jet fuel in that where it comes from determines how sustainable it is," said Ricci. "The blend of the fuel [and] the feedstock of the fuel determines what you can actually claim from using it. It's not all created equal. You need robust documentation showing which batch you used, what blend it was, and if you purchased it [so] you can actually claim those benefits."

The backbone of book-and-claim is a ledger system that tracks fuel volumes and prevents double booking of emissions reductions claims.

To provide further confidence, the Council on Sustainable Fuels Accountability (CoSAFA) offers standardization, paving the way for worldwide acceptance of the process. "We are supporting and providing the publicly available, neutral, generally accepted accounting principle…as you see in the financial markets the way public disclosures are done," said CoSAFA executive director Madison Carroll.

Ricci said 4Air has seen growing acceptance for the process. "At the end of the day, people prefer to have physical fuel, but we don't have the availability for that today," he said. "Book-and-claim, hopefully by 2050, is a mechanism we won't need with widespread SAF distribution and the ability to use it at any airport. But until then, it is a key mechanism to help in the early stages."

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# Avoiding RNAV SIDs and STARs gotchas

By Stuart "Kipp" Lau

In 2014, the FAA introduced new and revised air traffic procedures that included "climb via," "descend via," and speed adjustment clearances for pilots flying RNAV departures (SIDs) and arrivals (STARs). Remarkably, in the 10 years since, pilots continue to make mistakes complying with these ATC clearances. As a result, altitude (vertical), course (lateral), and speed deviations are often cited as the most common reasons for a pilot to submit a NASA ASRS or ASAP report.

Recognizing the complexities of these new procedures, NBAA's Domestic Operations Committee has published "Pilot Briefing: Climb Via, Descend Via, Speed Adjustments," which covers the nuances of each procedure and the subtle differences between procedures around the world, including the FAA, ICAO, and Nav Canada.

According to the document, the goal of these updated procedures was to reduce radio frequency congestion, reduce the number of hear-back and read-back errors, and provide worldwide harmonization of ATC clearances. By design, these procedures were intended to provide "simple, intuitive phraseology for issuing a clearance to laterally and vertically navigate a departure or arrival."

At a minimum, pilots must be familiar with the basic application of these types of clearances:

**Climb via** (**to published top altitude**)**:** An abbreviated ATC clearance that requires compliance with a procedure's lateral path, associated speed restrictions, and altitude restrictions along the cleared route or procedure until climbing to the top altitude published on the SID.

**Descend via** (**to published bottom altitude**)**:** An abbreviated ATC clearance that requires compliance with a published procedure's lateral path and associated speed restrictions and provides a pilot-discretion descent to comply with published altitude restrictions until descending to the bottom altitude published on the STAR.

Easy enough, right? A climb via or descend via clearance has the pilot fly the procedure in its entirety (adhering to all published speed and altitude constraints) to its respective top or bottom altitude.

But the next two variations of this procedure often confuse pilots and thus frustrate air traffic controllers:

**Climb/descend via except maintain** (**to an ATC-assigned top/bottom altitude**)**:** Execute a climb via or descend via clearance to an ATC-assigned top altitude or bottom altitude, respectively. A climb/descend via except maintain clearance is no different than a climb via/descend via clearance except ATC provides a new top altitude or bottom altitude. All other published speed and altitude restrictions before the new ATC-assigned top or bottom altitude are still applicable.

**Climb and maintain or descend and maintain** (**unrestricted**)**:** Pilot is expected to vacate current altitude and commence an unrestricted climb/descent to comply with clearance. For aircraft already climbing via a SID or descending via a STAR, published altitude restrictions are deleted unless reissued by ATC. Speed restrictions always remain in effect unless the controller explicitly cancels or amends the speed restriction. Likewise, pilots are expected to fly the lateral path of the procedure.

**Speed phraseology:** Absent of any qualifying instructions, issuance of a climb or descend via clearance cancels a previously issued ATC speed adjustment and provides pilot discretion to adjust speed while requiring compliance with upcoming restrictions.

Published speed restrictions (constraints) may be applicable to a specific fix (for example, BRBBQ at 280 knots) or the entire procedure (for example, "Turbojet aircraft descend via Mach number until intercepting 280 knots.

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Maintain 280 knots until slowed by STAR"); the latter restrictions are found boxed in magenta underneath the procedure's title/name on Jeppesen charts. Qualifying instructions may include specific ATC instructions to maintain an assigned speed until passing a defined fix (waypoint) and then complying with the subsequent published speed restrictions.

**Resume normal speed:** Cancels ATC-issued speed restrictions and instructs the pilot to return to normal aircraft speed where no restrictions are published on the procedure/route currently being flown. It does not delete published speed restrictions on upcoming segments of flight.

**Resume published speed:** Cancels ATC-issued speed restrictions; pilot is expected to comply with speeds published on SID/STAR.

**Delete speed restrictions:** Cancels ATC-assigned and all published speed restrictions on charted procedure. This clearance often is conditional, deleting speed restrictions to a named fix (waypoint) and then resuming the published speeds on the remainder of the SID/STAR.

**Lateral or course deviations:** Pilots must use caution and insert the proper SID/STAR transitions into the flight management system. ATC clearances will include specific SID transitions (for example, TBIRD5.MATLK) or STAR transitions (for example, ROKKT.CPTAN3) to include runway transitions.

In addition, an ATC clearance to laterally deviate off a published SID or STAR for weather deletes the speed and altitude restrictions. However, "expect" to be re-cleared direct to a point on the procedure and resume the subsequent airspeed and altitude restrictions on the SID or STAR.

**Pilot/controller phraseology:** Accordingly, pilots shall respond to "climb via" or "descend via" clearances by repeating the clearance verbatim. Phrases such as "climbing on the SID" or "on the arrival" are not acceptable and create additional workload on the controller.

### Acceptable examples include:

"Falcon Five Bravo Sierra leaving two thousand, climbing via the CRNKY Two, expect to maintain one two thousand (12,000)."

"Gulfstream One Two Three Alpha Lima, leaving one six thousand (16,000), descending via the SNRKY One arrival landing south."

The guidance when changing frequencies or on initial contact is to advise ATC of current altitude, "climbing/descending via" procedure name, and runway transitions as assigned. Sounding professional on the radio is part of your or your company's brand (note: cat meowing noises on guard is neither impressive nor professional).

### Avoiding Errors

Pilots can avoid errors (deviations) when flying an RNAV SID or STAR by adhering to company or manufacturer procedures.

In general, these procedures include loading (inserting) the correct runway, procedure (SID or STAR), and transition into the FMS. For the arrival phase, look to see if the RNAV STAR "connects" to an instrument approach procedure.

Thoroughly review the published procedure to include all airspeed and altitude restrictions. These restrictions are nuanced, as an example an airspeed may be preceded by "at," "expect," or max/min." Whereas altitude restrictions may be listed as a hard "at" altitude or a range of altitudes ("at or above," at or below," etc.). Also, as mentioned earlier, look for the magenta box (on Jeppesen charts) underneath the chart title that may have a mandatory speed restriction; this is one of the most overlooked items by pilots.

Next, with your copilot, cross-check and compare each waypoint and restriction on the FMS legs page(s) to the published RNAV SID or STAR. This step seems cumbersome, but it's well worth it!

Once the FMS waypoints (as coded) match the published procedure, brief and discuss the SID or STAR and how you plan to manage the vertical path and any speed restrictions. If there is a speed restriction that is applicable to the whole procedure (the magenta box), can you modify the speed on the PERF/Climb or PERF/Descent page to make that transition easier? Also, be aware of the effects that tailwinds and engine anti-ice (as an example) may have on the descent profile.

High-performing crews accomplish thorough briefings that not only include how the procedure will be flown, but also discuss contingencies such as how to manage the vertical path and speed if the track mileage is reduced when turned off the arrival.

Hopefully, this discussion stimulates some conversations on how best to fly RNAV SIDs and STARs and avoid some of the common "gotchas" that confuse pilots. To gain a mastery level of understanding on this topic, it is highly recommended to read the NBAA's Domestic Operations Committee "briefing" on climb via, descend via, and speed adjustments—it is very well written and should be considered a must-read for any pilot operating in the National Airspace System.

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

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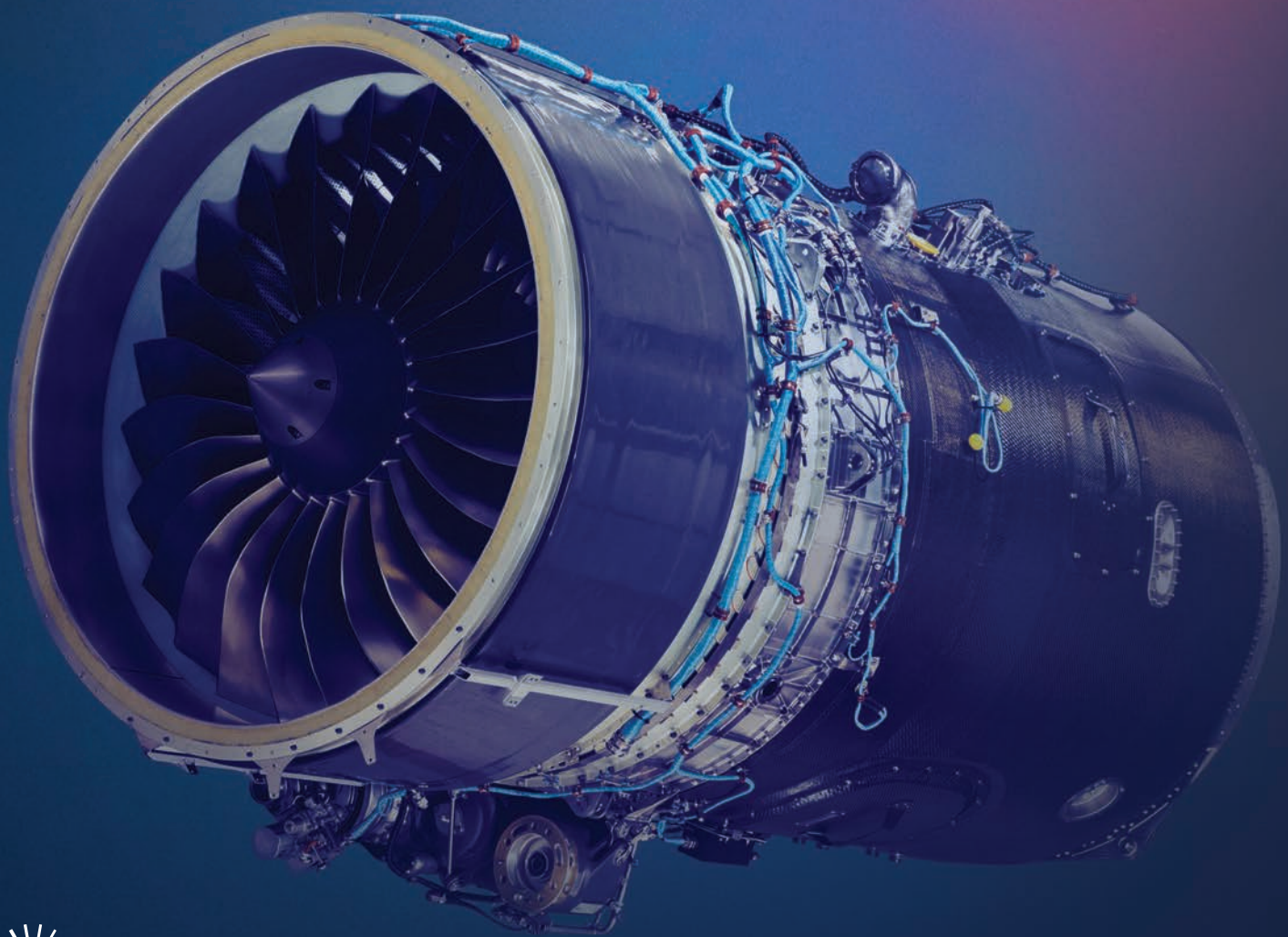

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Austrian Airlines and EVA Air are using the drag-reducing surface film.

**INNOVATION: SUSTAINABILITY**

# Lufthansa Technik expands AeroShark rollout

By Jessica Reed

Lufthansa Technik's fuel-saving AeroShark technology is continuing its global expansion. Developed in partnership with BASF, AeroShark is a surface film designed to mimic shark skin's drag-reducing properties, resulting in fuel savings and lower $CO_2$ emissions. The technology has now been adopted by Austrian Airlines and EVA Air, marking a new phase in its implementation across different Boeing 777 variants.

Starting in December 2024, four of Austrian Airlines' Boeing 777-200ERs will be fitted with the AeroShark surface film. The technology, applied to approximately 830 square meters of the aircraft's fuselage and engine nacelles, is expected to reduce the airline's fuel consumption and $CO_2$ emissions by around 1% per aircraft.

Although this percentage might seem small, Austrian Airlines expects substantial fuel savings—about 2,650 tonnes of jet-A—over the four-year service life of these aircraft. Additionally, the airline estimates that it will avoid more than 8,300 tonnes of $CO_2$ emissions—the equivalent of 46 transatlantic flights between Vienna and New York.

Francesco Sciortino, Austrian Airlines' COO, emphasized the airline's commitment to sustainability. "We take our responsibility seriously and take every possible step to reduce $CO_2$ emissions within our flight operations. Even though our Boeing 777-200ERs are in their final years of service, we take this investment to get one step closer to our $CO_2$ reduction targets."

Austrian Airlines is not the only carrier investing in AeroShark technology. In August, EVA Air became the first Asian airline to adopt the drag-reducing film, modifying its entire fleet of nine Boeing 777F freighters. The first aircraft, B-16786, was fitted with the riblet film at Taipei Taoyuan International Airport, and the rest of the fleet will follow. EVA Air anticipates annual fuel savings of more than 2,500 tonnes of jet-A, alongside a reduction of 7,800 tonnes of $CO_2$ emissions.

"EVA Air is continually progressing towards its goal of achieving net-zero carbon emissions by 2050, constantly seeking the latest technologies to reduce our carbon footprint," said Albert Liao, executive v-p of EVA Air's corporate planning division. "This innovation not only reduces fuel consumption but also lowers $CO_2$ emissions. EVA Air will continuously monitor the actual fuel-saving benefits and further evaluate additional aircraft to be equipped with this technology."

Lufthansa Technik holds supplemental type certificates for the AeroShark modification of two Boeing 777 variants, and the technology is now in full swing across multiple airlines. A total of 17 aircraft have already been equipped, including 12 Boeing 777-300ERs operated by Swiss International Air Lines and four Boeing 777Fs by Lufthansa Cargo.

The growing adoption of AeroShark is a testament to its effectiveness in reducing frictional resistance, fuel consumption, and emissions. As Wassef Ayadi, senior director of customer relations at Lufthansa Technik, highlighted, "EVA Air is well known for both its pioneering spirit and its technical expertise. We are proud that with AeroShark, we can provide international pioneers like EVA Air with a real quick-win measure to reduce the environmental footprint of their operations."

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# NBAA honors 'Mr. APU' Bill Reavis at BACE

By Kerry Lynch

In a nod to the recent passing of veteran aerospace communications stalwart Bill Reavis, NBAA has dedicated the media headquarters at NBAA-BACE 2024 to his legacy. Reavis, who left his mark for his almost dogmatic representation of Honeywell Aerospace over his nearly 25-year career with the company, died in his home outside Phoenix on March 14 after a battle with cancer.

Bill Reavis

In honoring him, NBAA called Reavis "an aviation communications leader revered as both a friend and foremost subject matter expert by those in his many personal and professional circles."

While with Honeywell and its predecessor companies Bendix/King and AlliedSignal Aerospace, he was involved with press relations, crisis communications, and the promotion and launch of new technologies such as terrain awareness warning systems and enhanced ground proximity warning systems. He is often credited with putting the auxiliary power unit "on the map" through his promotion of the technology that otherwise would have received little attention.

"Reavis displayed a natural ability to simplify the often-complicated technical concepts behind aviation technologies," NBAA added in its announcement.

"Today's business aviation industry stands on the shoulders of giants, and Bill Reavis is one of those giants," said NBAA senior v-p of communications Dan Hubbard. "Bill was one of a kind—his profession was media relations, but his passion was in helping others feel welcome in the aviation community. This year, we're honored to welcome the journalists who knew and admired Bill to the NBAA-BACE Media Headquarters, named after him in tribute to his legacy."

The media headquarters is incorporating special signage that highlights his inspiring life story, NBAA added, which included a tour in Vietnam with the U.S. Army's 199th Infantry Brigade and then studying at the University of Missouri Columbia School of Journalism, where he earned his degree in 1973. He spent 15 years working in broadcast journalism for television stations in Missouri and Oklahoma.

# Honeywell offers real-time engine monitoring with Ensemble

By Jessica Reed

Honeywell Aerospace on Tuesday introduced Honeywell Ensemble, the first end-to-end digital maintenance solution for its business jet turbofan engines. This new offering is integrated within Honeywell's propulsion maintenance service plan (MSP) for engines, aligning with industry trends such as automation.

Honeywell Ensemble aims to streamline engine maintenance by providing near-real-time engine monitoring and analysis, helping operators identify and address potential issues before they disrupt flight operations.

The technology automates data collection, transmitting engine information via a Wi-Fi-enabled gateway to Honeywell Forge, a cloud-based analytics platform. This data is then analyzed to assess engine performance, with insights and alerts delivered to operators through the Forge Engine Data Viewer and the Honeywell Ensemble mobile application.

## Data Insights

The solution reduces the need for manual reporting and administrative tasks by automating data reporting requirements and improving access to engine maintenance records.

"Honeywell Ensemble allows operators to benefit from timely and unique insights about how engines are performing," said Dave Marinick, president of engines and power systems at Honeywell Aerospace Technologies.

"The real-time insight provided by Honeywell Ensemble will not only increase aircraft uptime and availability, but it will also give operators enhanced mission assurance and will ultimately provide a better passenger experience."

Further enhancements are in the works, including auto-billing, online contract renewal, and the introduction of a digital engine logbook. This logbook will ensure maintenance records are accurate and up to date, providing an organized system for flight departments to manage and retrieve engine records.

Additionally, data collected by Honeywell Ensemble will be used to calculate monthly rebates for customers enrolled in the MSP program, allowing operators to reduce maintenance costs based on engine usage.

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# Bizav embraces the AI revolution

By Jessica Reed

(Left to right) Matt George, Pervinder Johar, Trung Pham, and Todd Giles hold a panel discussion on artificial intelligence at BACE.

Artificial intelligence is no longer just a buzzword in aviation—it's rapidly reshaping the skies above us. From streamlining aircraft maintenance to pushing the boundaries of flight automation, AI is becoming a cornerstone of modern aviation. But the question remains: how can the industry harness AI's power while navigating challenges like safety, trust, and the sheer complexity of flight?

During a panel discussion on the eve of NBAA-BACE 2024, Honeywell Aerospace chief technology officer Todd Giles set the stage by highlighting AI's important role within the aviation industry. "Artificial intelligence has transformed from the realm of science fiction to becoming an integral part of our daily lives and industries," Giles said. AI is now an integral part of aircraft design, manufacturing, and maintenance, driving advancements like predictive maintenance and improved operational efficiency.

From enhancing pilot decision-making to increasing productivity across business functions, AI's influence is growing rapidly. However, Giles also cautioned that AI is often discussed out of context, creating confusion about its real potential and applications.

Pervinder Johar, CEO of Avathon, expanded on the various ways AI is shaping aviation: "Think of three different buckets: [...] managing aging infrastructure, improving safety and quality in manufacturing, and supporting future autonomy." He pointed out the significant challenges posed by aging aviation infrastructure—assets that AI can help preserve through prescriptive maintenance.

AI technologies such as computer vision are also enhancing the ability to inspect aircraft components that are otherwise difficult for humans to assess, thus improving safety and efficiency.

Johar envisions AI playing a crucial role in managing the anticipated surge in urban air traffic with air taxis and drones in the future. By 2030, AI will be essential for scaling operations to meet the demands of a growing aviation market.

AI's role in assisting pilots during flight is also coming into focus. Trung Pham, chief scientist for AI and machine learning at the FAA, noted that while AI hasn't yet reached the point of fully operating aircraft, it is already making strides in augmented intelligence. "With an AI system, the system can see more than what we can focus on and inform us in a role of monitoring what's going on—and inform us of certain precursors that can lead to accidents or incidents," he said.

Pham stressed that AI's strength lies in its ability to process and analyze vast amounts of information, improving situational awareness during flights. He highlighted AI's post-flight capabilities, such as analyzing flight data to identify patterns that could enhance safety and efficiency in future operations. Pham underscored that human pilots remain essential for the foreseeable future, with AI playing a supportive role.

Matt George, CEO of Merlin, took a bolder stance on AI's future in aviation, particularly regarding autonomy. He acknowledged that even the best pilots make mistakes and that automation could reduce human error.

George traced the history of flight deck crew reductions—from five members after World War II to today's two-person crews—and argued that recent technological advancements could further reduce this number.

Merlin, backed by Google, is developing a nonhuman pilot system to serve as an autonomous third "pilot" in the cockpit, with the goal of eventually enabling single-pilot operations. George emphasized the need for a gradual, responsible transition to autonomy, noting that Merlin is already working with the U.S. military to reduce crew size on aircraft like the C-130J and KC-135R.

Pham reiterated that aviation's regulatory framework is built on decades of safety improvements, and AI must meet these high standards. He pointed out that AI, unlike traditional systems, is trained rather than engineered, and it requires additional testing to build public trust. Balancing innovation with safety is a major challenge, especially as public perception often demands perfection.

Data is another critical challenge in AI's aviation journey. Johar emphasized that high-quality data is essential for AI development, but accessing and sharing data across the industry is often difficult due to privacy and regulatory concerns.

AI systems, particularly those focused on perception, require vast amounts of data for training—data that isn't always available in the real world. To overcome this, companies are increasingly turning to synthetic data to simulate various scenarios for AI systems.

Johar also highlighted the potential for AI to collect new types of data, such as sound and vibration, which could help identify issues before they become safety risks.

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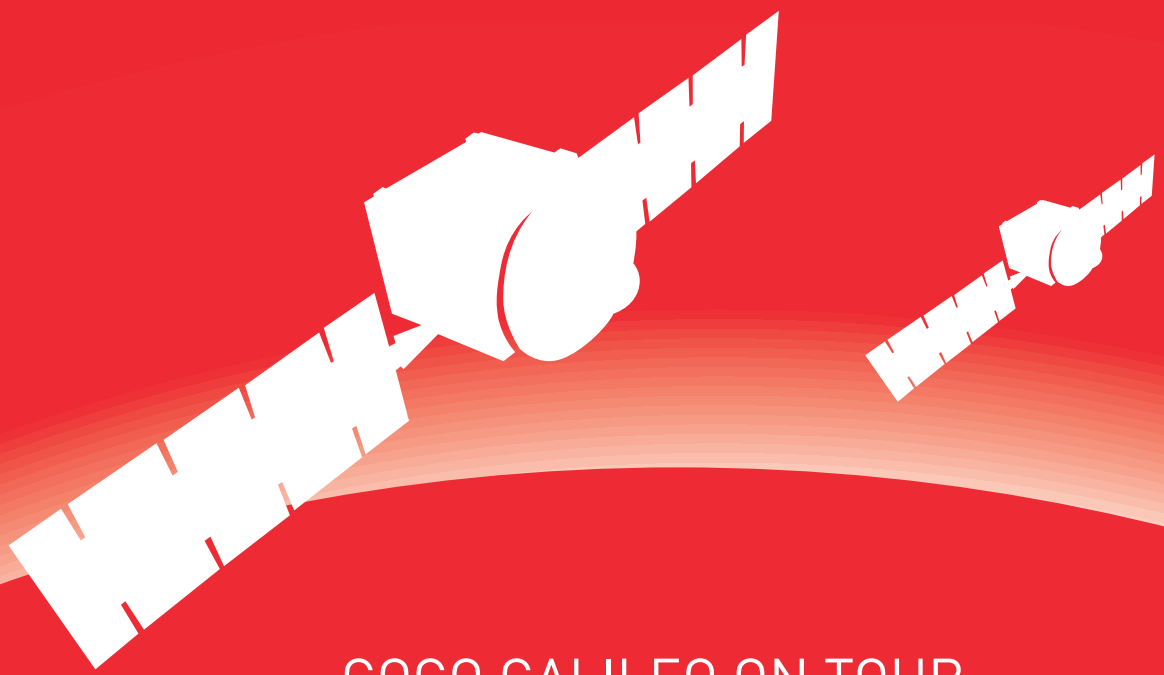

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# Comlux books more ACJ work, keeps pace on trends


Comlux has picked up nine more Airbus ACJ completions jobs as it seeks to stay ahead of design trends and customer tastes. The company is showcasing some of its latest work this week at NBAA-BACE.

By Sarah Rose

Comlux is seeing its order book swell with nine new contracts for major completion projects in the past 12 months alone. These projects involve three interiors for the new Airbus ACJ TwoTwenty, three ACJ320neo VIP interiors, and three maintenance and cabin upgrades, the company announced during the 2024 edition of NBAA-BACE

The Swiss company will complete the projects at its Comlux Completion facility in Indianapolis. Comlux CEO Adam White called the growth a testament to its long-term expansion strategy.

"We are very excited that the customer base is responding so positively to our strategy," Whitesaid."Sales happen quickly after years are spent developing the infrastructure, tools, and most importantly the people to ensure we keep customer satisfaction at the forefront. This reflects the hard work done by everyone to execute the vision needed to take Comlux to the next level."

Comlux continues to keep an eye on the future, including what futuristic tech modern customers are craving in their aircraft.

"Open and airy layouts with multifunction use areas are still a frequent request," Zuzana Pindurova, director of public relations at Comlux, told **AIN**. "We are seeing a lot more requests for advanced technology, including inductive charges, electrochromic windows, [and] enhanced streaming capabilities."

There's also an increase for sustainable green products in completions work, a trend that has gained popularity within the market over the last several years—with increasing buzz around sustainable products coming into the spotlight this year.

"We are seeing more and more requests for reconstituted veneers. A lot of materials we already use are green/sustainable, including natural fibers in fabrics and carpets," she said. "The majority of our aviation vendors are incorporating sustainable options into their standard offerings. This will make it much easier to incorporate sustainability into our interiors."

Customers are also invested in getting more creative with their interiors.

"One of the most unique things we've been asked to do is hologram artwork to make it look like items were floating in space," she said. "This plays into the advanced technology and futurist requests we have been seeing."

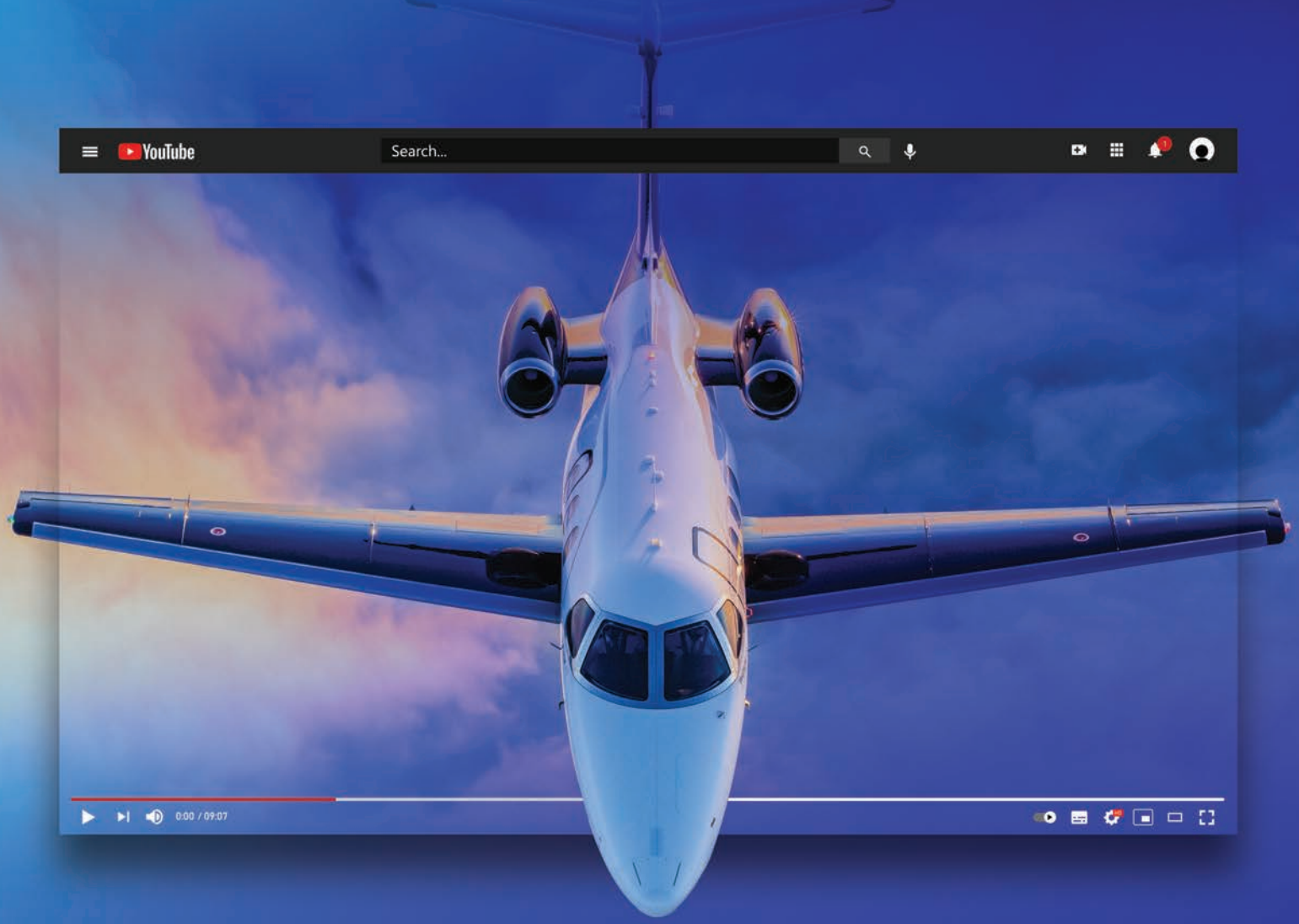
## Global Jet Capital celebrates decade in business jet financing

Global Jet Capital (GJC) is celebrating its 10th anniversary at NBAA-BACE in Las Vegas this week. Founded in 2014, the company has established itself in the business aircraft financing space, offering tailored financial solutions for clients across the globe.

"NBAA-BACE has always provided our industry a unique opportunity to interact with a broad spectrum of clients, intermediaries, and influencers. I can't think of a better place to celebrate our 10th anniversary this year than at NBAA-BACE in Las Vegas," said Vivek Kaushal, the company's CEO.

Since it was founded, GJC has exceeded $4 billion in aircraft financing originations, facilitating transactions for both new and preowned aircraft. The company's growth has been marked by milestones such as the acquisition of GE Capital's business aircraft portfolio in 2015 and the issuance of the first asset-backed securitization (ABS) backed solely by business jet operating leases and loans in 2018. GJC completed its eighth ABS offering in September, bringing total securitized assets to approximately $5.8 billion.

Kaushal expressed gratitude for the company's success over the past decade, stating, "We remain steadfast in our determination to deliver structures and solutions that satisfy the exacting standards of our sophisticated client base." Looking ahead, GJC aims to continue its leadership in aircraft financing and is optimistic about future growth. **J.R.**

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# Leaders assess bizav's flight path to net-zero

By Jessica Reed

A panel of aviation leaders shared insights into the industry's progress and challenges as it pushes toward a net-zero future yesterday at the NBAA-BACE media breakfast. They highlighted how business aviation continues to navigate uncertain political landscapes while advancing technological innovations.

NBAA president and CEO Ed Bolen opened the discussion by emphasizing the importance of defining the industry's identity during a time of political and economic unpredictability. "It was a year ago today that we launched 'Climbing Fast' to tell the world the societal benefits of business aviation," he said.

Bolen emphasized that the industry's commitment to net-zero carbon emissions by 2050 remains paramount, particularly given the potential policy shifts that may arise following the 2024 U.S. elections. "Our ability to define ourselves, who we are, where we are, and where we are going is going to be fundamental," he added.

Meanwhile, GAMA president and CEO Pete Bunce addressed the parallel changes occurring in Europe. With a new European Commission and leadership shifts at EASA, he stressed the importance of refreshing the industry's economic impact study in both the U.S. and Europe.

"We've said, 'What can we do in both continents to look at what our industry brings to society?'" Bunce said. He also noted the global nature of this collaboration, with a united effort across groups to present a cohesive message.

Jean-Christophe Gallagher, executive v-p of aircraft sales at Bombardier Defense, provided context on the industry's sustainability journey by recounting how the business aviation community set aggressive carbon reduction targets in 2009. "We came together, beyond all competitive pressures, to set targets for the future of sustainability," he said, highlighting Bombardier's role in pushing those targets even further by 2021.

Gallagher also touched on the technological advancements driving sustainability, particularly the development of Bombardier's EcoJet blended wing body program, which aims to significantly reduce emissions through next-generation aerodynamics and engines.

Joby Aviation CEO JoeBen Bevirt shifted the conversation to electric propulsion and advanced air mobility. He spoke about the promise of eVTOL aircraft, which can provide more sustainable transportation within cities.

"With battery electric propulsion, we can move people around cities, bringing aviation into people's daily lives," Bevirt remarked, noting the potential for hydrogen-electric propulsion to deliver further gains in efficiency and climate impact.

"With hydrogen-electric propulsion, that pathway starts with hydrogen, which has three times the specific energy of jet fuel," he said. "And then we convert it into propulsion twice as efficiently as a small turbine can convert jet fuel and propulsion....[so] you get a six-time gain. That means we can build smaller, more affordable aircraft that can fly further and faster and do it all with 99% reduction in climate impact."

Michael Amalfitano, president and CEO at Embraer Executive Jets, underscored the importance of disruptive innovation in driving sustainability. He discussed how Embraer's advancements in fly-by-wire technology and sustainable aviation fuels (SAF) are shaping the future of their operations. Its goal is that by 2030, "everything's off the grid, 100% renewable."

"These technologies and advancements are bringing the safety first," he added. "That is the most important driver, and we then have to start thinking about how to advance those technologies to more sustainable solutions."

Jeff Marootian, head of the Office of Energy Efficiency and Renewable Energy at the U.S. Department of Energy, meanwhile, outlined the U.S. government's strategic approach to decarbonizing transportation, praising public-private collaborative efforts.

"We know this is an effort that requires collaboration," he said, highlighting the importance of SAF, hydrogen, and other enabling technologies. "There's not one approach, there's not one strategy that's going to work. It's got to be a combination of all of those."

"Our level of collaboration with the FAA, with NASA, with the Department of Agriculture when it comes to SAF in particular, has been higher than ever before," he added. "Another core component of our strategy is a shift in thinking about commercialization. We now realize that that commercialization strategy has to be baked into R&D at the outset."

The panelists echoed a clear message: despite the uncertainties ahead, the business aviation industry is united in its efforts to achieve net-zero emissions.


MARIANO ROSALES

Industry leaders shared insights into how business aviation will meet net-zero goals by 2050.

# FreeFlight update boosts navigation with KASS and SouthPAN support

By Matt Thurber

A software upgrade for FreeFlight Systems 1203C SBAS/GNSS receivers adds support for two additional satellite positioning systems. The upgrade supports the Korea Augmentation Satellite System (KASS) and the Southern Positioning Augmentation Network (SouthPAN).

According to FreeFlight, "The 1203C software upgrade also addresses evolving requirements, and pilots can anticipate substantial improvements in accuracy and reliability during aviation operations, leading to an overall increase in efficiency."

In addition to the KASS and SouthPAN capability, the 1203C upgrade helps pilots mitigate GNSS spoofing incidents with a "cutting-edge recovery mechanism."

FreeFlight Systems' 1203 receiver gains new support for KASS and SouthPAN satellites.

The software update is available now from FreeFlight dealers. The 1203C is certified to Technical Standard Order C145cc and approved to DO-160F and DO-178B Level C testing standards. Supplemental type certificates are available for installation of the 1203C in a variety of aircraft.

"By incorporating support for KASS and SouthPAN, we are significantly enhancing the navigation capabilities of our GNSS/SBAS Receiver," said Shane LaPlante, v-p of sales and marketing at FreeFlight Systems. "These advanced satellite systems empower pilots with enhanced situational awareness and precision, allowing for safer and more efficient navigation in today's complex airspace."


MARIANO ROSALES

Bombardier continues to add and expand service centers around the world.

# Bombardier's booming aftermarket segment keeps expanding

By Kerry Lynch

After years of expansion, innovative approaches, and the addition of more support products, Bombardier is well on its way toward achieving its targeted $2 billion in annual revenues from its aftermarket segment by 2025. But it reached that cadence a year earlier than planned, already topping $500 million for the first time in quarterly results in the second quarter. This number is poised to keep growing.

For Bombardier, the overarching drive is "making sure that we are the first choice to our customers when it comes to products and services and maintenance," said Paul Sislian, executive v-p for aftermarket services and strategy at Bombardier. "We want to offer the best value proposition. It's got to be fast, reliable, convenient, and easy. That's the most important thing."

Growing the aftermarket segment has been a major focus for the Canadian airframer as it strives to "bring our airplanes home." Over the past decade, the company has embarked on numerous expansion projects that culminated in 1 million sq ft coming online over the past two and a half years. It has also meant concentrating on an inventory to have the right parts in the right places, building on AOG support, and enhancing mobile response teams (MRT).

Further, this has resulted in proactive new support programs such as the Smart Link Plus health management service. "We've shown the market that we are fully focused on our customer experience, and we continue to grow on that momentum."

Bombardier is accomplishing this by "making sure that we're in the right places around the world with our global footprint. We keep expanding our footprint whether it's brick and mortar, or if it's MRT trucks, or it's land stations."

Sislian cited as an example the recent commissioning of a line station in Perth, Australia, with another coming to Sydney in December. The company expects to open its next full-service center in Abu Dhabi by mid-2026. This follows the openings of centers in Miami and Melbourne, Australia, and major expansions of operations in London and Singapore in recent years.

"We just keep expanding our footprint as our customers need because we need to make sure that we have the right capacity in terms of our population," he added, noting that this evolution will continue into the future. "As the fleet continues to grow, we need to make sure we can service all of those aircraft," Sislian added. "We still see a huge amount of growth in front of us."

To support its growth, Bombardier also needs to hire the right technicians with the appropriate skill sets so the company can "actually have the capacity to serve our customers when they need us," he added. This involves a lot of recruiting events and job fairs around the world to ensure that the company can hire within the local region.

"It's also working with local schools and universities and technical colleges to make sure that we can have the right people coming through the schools, and when they finish their education as aircraft technicians, they come to Bombardier," he said. "It's not just looking at who's in the industry, but how do we make sure that we keep the pipeline full of schools coming to Bombardier?"

This is critical not only for staffing the new and expanded centers, along with MRT teams, but also for ensuring that the company's call centers are accessible around the clock throughout the year. Bombardier plans to hire another 150 to 200 technicians and engineers on the support side this year alone, he noted.

## Steering a Global Supply Chain

Sislian also pointed to the company's efforts to keep its parts properly stocked, which is not an easy feat for any of the manufacturers given the ongoing issues throughout the supply chain. He took pride in the fact that Bombardier, which topped the ratings in **AIN**'s annual Product Support Survey, led the category of parts availability.

To support its global reach, Bombardier operates major hubs in Chicago, Frankfurt, and Singapore. "We want to make sure that we have the right parts in the right place so that when our customers have an emergency, they can count on us. It's all about the continued presence—and expansion of the presence—of

Bombardier so that we will always be the first choice to our customers."

He added that Bombardier has done a lot of work to tackle issues involving parts availability and distribution. "It's not perfect," he conceded, but the company has taken many steps to address those issues. "That's working very, very closely with our suppliers...whether it's for the OEM side or the aftermarket side."

Bombardier views its suppliers as partners, he noted. "With that in mind, we work very closely with our partners to ensure that we can have the right relationship and the right supply coming to us."

The company also is "investing heavily" in inventory management technologies, including artificial intelligence (AI), to better manage inventory replenishment and distribution. Working with local universities to develop the right algorithms over the past two years, Bombardier is "learning every day how this AI technology is helping us," he said.

"What we're focusing on is all about how do we create intelligent, predictive algorithms that will help us with our replenishment strategies globally, because there are multiple locations. You have to make sure you have the right part in the right place at the right time all the time. There's still a lot to do, but we have seen the fruits of that."

This has resulted in an improvement in off-the-shelf inventory performance, so "we're not overstocking or understocking." In addition, the AI technology with inventory management helps ensure that Bombardier has more predictability on service times.

He called the technology embryonic and said as an industry, there will be much to learn about optimization of material flow and inventory management.

## Predictive Maintenance Pays Off

Along those lines of having better predictability is Bombardier's Smart Link Plus, a health monitoring service. Introduced in 2020, Bombardier—teaming with GE Aerospace—offered the boxes for free, not including the installation or service costs. Sislian called the program one of the most important technological changes the company has undertaken. "It's all about moving from a reactive maintenance to a predictive maintenance."

Bombardier has certified the boxes on most of the Global and contemporary Challenger models, with the last ones—the Global 5500 and 6500—nearing approval in upcoming weeks, he said. "Then all of our fleet of aircraft will have the possibility [and] the availability of adding a Smart Link Plus box. What that really does is it adds substantial value to the customer and adds substantial value to us."

Having a Smart Link Plus box boosts aircraft value, he pointed out, and it enables customers to see the trends of their aircraft so they can predict their support tools. "With the Smart Link Box, the aircraft is self-diagnosing itself and sending information real-time to the home base."

About 13% of the fleet is equipped already "and we're just starting to roll this out," Sislian said. "Over the next two or three years, there's going to be a massive influx of aircraft," either coming out of the factory with it or undergoing retrofits.

CAE's virtual-reality training helps to give technicians a better understanding of spatial navigation of aircraft systems, the company said.

# Virtual-reality training programs excel at CAE

By Kerry Lynch

CAE is eyeing the expansion of its virtual reality (VR) maintenance training programs as it dives into new technologies that it believes will foster greater competency, adaptability, and safety. The training specialist has already rolled out its latest VR technology and simulation via the cloud for its Gulfstream G500/600 and G650 as well as its Dassault Falcon 6X maintenance training programs.

Shaun Kuldip, global leader of CAE's Maintenance Training Centre of Excellence, noted that the company has used VR for about a year now, and based on feedback from Gulfstream and Falcon customers, intends to deploy the technology across other aircraft curriculums.

Under the VR program, technicians can experience the entire aircraft in a virtual environment, Kuldip said. The technology enables CAE to create detailed digital twins, providing insight into the aircraft systems, components, and procedures in an immersive simulation.

CAE believes this helps build technician skills and confidence in a safe setting before touching an aircraft. They do not have to fear damaging expensive parts or putting wear and tear on sensitive components. "Maintenance tasks that are safety-sensitive or cost-prohibitive are now available for technicians to practice as much as they require," Kuldip said.

CAE's program introduces VR through various teaching modes, he said, including an evaluation mode for students to independently measure their skills and an instructor-led mode to guide students through various tasks.

Calling the training "a high-value solution," CAE said VR offers numerous benefits such as reducing the need for equipment, minimizing aircraft downtime, and providing a means for cost-effective practice. In addition, VR can be adapted to new aircraft and maintenance programs.

"VR can transport maintenance technicians to places on an aircraft that were not possible before," Kuldip said. "During a theoretical portion of a course, we can now bring an entire aircraft 'into' the classroom and show details that prior to VR were difficult to achieve."

This helps provide a better understanding of spatial navigation on aircraft and how aircraft components and systems interact. Combining this with other simulation products, CAE can not only show how the aircraft works under "normal conditions" but also specific situations or malfunctions.

Response from customers has been positive thus far. "Customers love being able to bring an aircraft inside of the classroom environment," he said.

Regulators also are seeing the benefits of VR, and many authorities are permitting its use in limited capacity, he added. "As we gather more data that show an effective way to transfer information to students other than being in an actual aircraft environment, we will work with the regulators to make changes to the guidance materials they use for us to follow," he said.

Kuldip sees the potential for VR to universally expand. "As aviation organizations increasingly recognize the potential of VR in accelerating learning, the technology is poised to play a pivotal role in shaping the future of learning and training methodologies," he said. "The future convergence of AI and VR represents a transformative synergy that will revolutionize how we build immersive training and skills-development solutions within the aviation industry."

He added aviation is one of the industries where the adoption of emerging technologies such as VR and AI is accelerating. He cited as an example CAE's Rise technology, which uses metrics-based insights and telemetry data to provide instructors with objective data during training. CAE Rise is used for pilot training but could potentially support maintenance and other training programs in the future, he said.

These technologies are particularly important as the industry seeks to attract new talent. CAE's 2023 Aviation Talent Forecast predicts a need for 402,000 new maintenance technicians throughout aviation by 2032, including 74,000 in business aviation.

"I think the industry is unfortunately seen as less attractive for new job seekers," Kuldip said. "Since Covid, the graduation rates at aviation maintenance technical schools are not keeping pace with the numbers retiring." With incoming technicians lagging the wave of retirements, a "perfect storm" is brewing, he said.

However, new technologies can make training more accessible around the globe and is part of CAE's efforts to accelerate students' ramp-up time.

"How do we cram four years of training experience into two years? The answer includes our modular training, which we will be announcing very soon, and leveraging new technologies like VR that resonate with the youth of today to better retain knowledge."

# Apcela acquires SmartSky ATG connectivity network

SmartSky's Lite ATG connectivity system includes a base radio and one belly-mounted antenna.

By Chad Trautvetter

Specialized communications company Apcela yesterday inked a definitive agreement to acquire the SmartSky air-to-ground (ATG) network by year-end. SmartSky ceased operations on August 16 after spending years and hundreds of millions of dollars to build an ATG airborne connectivity network to compete with Gogo.

Those with SmartSky systems installed on their aircraft will be able to reconnect to the ATG network when Apcela "turns on the switch." Apcela founder and CEO Mark Casey told **AIN** this should happen in the next 60 days.

Apcela said it plans to combine SmartSky's inflight technology with its advanced networking platforms in both the business and commercial aviation markets. Without specifying investments in technology, it indicated that other as-yet-undisclosed partners involved in advanced networking, mission-critical security, and avionics will be involved in the relaunched company to "bring new levels of innovation to inflight connectivity solutions."

The company has 20 years of experience in the telecommunications industry and built and managed SmartSky's terrestrial network. While the U.S.-based group is new to the airborne connectivity consumer market, it does have a two-aircraft flight department and thus understands the end-user experience, Casey said.

"By integrating SmartSky's capabilities and Apcela's advanced networking platforms, Apcela will launch a new aviation-centric business that will provide unmatched performance and security, ensuring that airlines, corporate jet fleets, and other operators have access to fast, secure, and scalable solutions in real-time, anywhere," the company said.

Casey added that the SmartSky service will relaunch with some upgrades, including faster speeds and more security. He also intends to "reduce friction" for SmartSky installations by shipping kits that can be fitted on airplanes via field approvals instead of more costly supplemental type certificates.

The acquisition of SmartSky, slated for completion by year-end, will mark the launch of Apcela' aviation business unit. It would appear that the company will retain at least some of its leadership team, but financial terms for the transaction have not been disclosed.

"We are thrilled to join with Apcela to take the SmartSky network to the next level," said Mike Dodson, SmartSky's former chief network officer. "Apcela's global reach and networking expertise are the perfect complements to our cutting-edge inflight connectivity solutions. This partnership will accelerate innovation in inflight connectivity and offer customers an unparalleled connected experience."

Beyond the business aviation sector, Apcela is looking to introduce secure ACARS messaging for airlines. In the longer term, it intends to develop command-and-control applications for remotely piloted aircraft through its SmartSky division.

The deal was announced less than a month after Gogo Business Aviation's surprise move to acquire satellite communications rival Satcom Direct. Under the agreement, Satcom Direct will receive $375 million in cash and five million shares of Gogo stock at closing, and up to $225 million in payments tied to realizing certain performance thresholds over the next four years. The transaction, announced on September 30, is expected to close by year-end.

Like this one at Miami-Opa Locka Executive Airport, Sky Harbour has 14 hangar locations in operation or construction around the U.S. and plans to add more.

# Sky Harbour rides a wave of expansion

By Curt Epstein

Sky Harbour is rapidly expanding its footprint in the U.S., delivering high-end, boutique private hangar space for aircraft owners at key airports across the country. Since launching in 2020, the company has opened four locations, including in Houston, Nashville, Miami, and San Jose, with three more slated to open in Denver, Phoenix, and Dallas by early 2025. Each campus represents a significant investment, costing between $30 million and $50 million to build, and includes more than 100,000 sq ft of hangars staffed by a dedicated ground handling team available 24/7.

CEO Tal Keinan emphasized the company's commitment to reliability: "There's no such thing as waiting—we will always be there on time," he said."It's got to be bulletproof from end to end, and that means we need to control it. The fact that we can make a hard commitment to our residents says you can be as spontaneous as you want to be; those call-out times are just not a thing with us."

Aside from the first location in Houston, all Sky Harbour campuses offer their own fueling services to tenants. In addition to private aircraft shelter, the hangars offer private entries to fully customizable office space depending on the individual needs or desires of the tenant. Some use the hangars simply as a base of operations for their flight department and aircraft, while others fully furnish the personal space for business offices or entertainment.

Presently, the company has more than 400,000 sq ft of space generating revenue, and that total will double in the first quarter of 2025 as locations come online in Denver (KAPA), Phoenix (KDVT), and Dallas (KADS).

It also expects to break ground imminently on Phase 2 of development of its Miami-Opa Locka campus, which is expected to be completed by the end of 2025, adding another 120,000 sq ft of turnkey hangar space into a sizzling Florida aviation real estate market.

Waiting for approval are another seven locations: Windsor Locks, Connecticut (KBDL); Poughkeepsie (KPOU) and Newburgh (KSWF) in New York; Chicago (KPWK); Orlando, Florida (KORL); Washington, D.C. (KIAD); and Salt Lake City (KSLC).

"We have the lands, and we are in the permitting process," explained Keinan. "For us, once it's permitted, we're in the ground." He expects all those projects to reach completion in the 2027 timeframe, bringing the company to approximately 1.8 million sq ft of hangar space.

Even with all those developments in the works, Sky Harbour is not letting up on the accelerator. "Quite the opposite, we're pushing down harder and I don't think the pedal has reached the metal yet," Keinan told **AIN**. "We've been giving guidance to the market of 50 airports. Internally, I'm talking about a lot more than that. There's a big opportunity in front of us; there's no reason to stop."

The company has engineered its hangar design to meet the most rigorous standards, whether it is California seismic requirements, Florida wind, or Illinois snow loading. With dozens of hangars under construction or in planning, last year Sky Harbour decided to vertically integrate with the purchase of a building manufacturer in Weatherford, Texas. It expects the move will reduce its dependency on outside contractors and give it more control over the construction process, as well as offer economies of scale.

As of this summer, the new subsidiary had completed all of its contractual obligations to other customers and is fully engaged in the hangar-making business. "We spent millions of dollars in retooling the factory so it's optimized to do one thing and one thing only, and that's building Sky Harbour hangars," Keinan said. "There's no setup time between projects, it's all exactly the same thing, so our welders are experts now in exactly the Sky Harbour weld on each piece."

With the tempo of locations expected to increase, the factory will be increasing to a three-shift workday to meet demand.

"We're spending a lot of time, a lot of money, and a lot of human resources right now on refining a service offering that is absolutely unique to us," said Keinan. "It's not just measured in the time to wheels up, but it's also specific offerings that you just can't offer [customers] if you are not configured like this."

He plans to expand the company's portfolio beyond aviation support, rolling out products in other areas that appeal to its upscale clientele.

**INNOVATION:** TRAINING AND WORKFORCE

# FlightSafety taps AI and AR/VR tech to enhance training

By Charles Alcock

FlightSafety International is implementing novel technologies to modernize training processes.

FlightSafety International (FSI) is investing in several avenues of new technology to enhance its delivery of simulated training for flight crew. The initiatives involve data management, increased use of augmented and virtual reality (AR/VR) technology, as well as artificial intelligence (AI).

Among its most recent initiatives is a partnership with GE Digital to make better use of the data generated by its flight simulators. Based on GE's Flight Analytics platform, the partners are developing an app that will provide a platform for comparing data between actual flights and simulator sessions to help mitigate real-world operational risks.

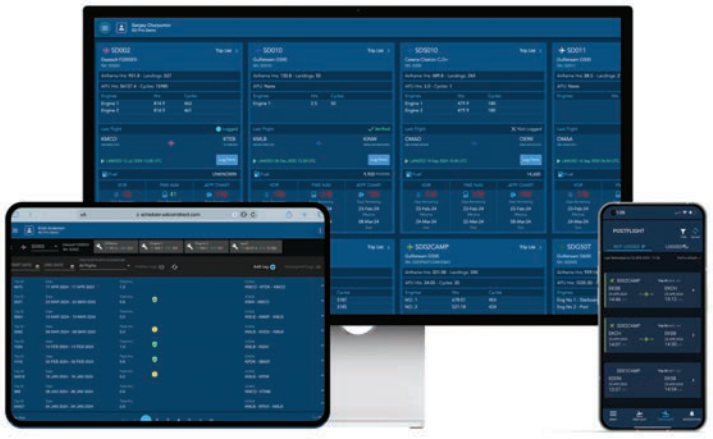
FSI recently announced further innovations with the Simulated Air Traffic Control Environment visual system, which is part of the Vital portfolio it introduced in 2023. This platform features improvements in high-fidelity satellite imagery for airport databases and biometric capabilities.

The aviation training group is now investing further in AR/VR technology applied to smaller devices that can benefit from Level D full flight capabilities, including visual systems, motion cueing, satellite imagery, and biometrics. According to FSI, these AR/VR devices can be useful in supplementing training conducted in aircraft and helicopters at off-site locations.

Earlier this month, FSI sponsored the Flight Simulation Engineering and Maintenance Conference at its facility in Broken Arrow, Oklahoma, where it showcased some of the latest technology, including eye tracking, biometrics, and mixed-reality systems. The company said these applications could all benefit from increased use of AI and machine-learning technologies. In the longer term, it is making investments in brainwave technologies that are still several years away from maturity.

More immediately, FSI is stepping up its use of competency-based training and evaluations, which it says allow instructors to take a more holistic approach to ensuring pilots have the competency required to operate in a wide range of scenarios and conditions. The company said it is in the process of updating its curriculum and instructor training materials in accordance with FAA's task-based requirements.

# MySky extends scheduling software to Part 91 operators



Originally developed by SatCom Direct, MySky's Scheduler software will integrate with multiple avionics suites to gather post-flight data from flight management systems.

By Charles Alcock

MySky is introducing a new version of its aircraft scheduling software specifically developed for Part 91 business aircraft operators. The spend management specialist already offers the platform for Part 135 commercial operators and has adapted it for those flying for purely private and corporate purposes.

"Scheduler" was originally developed by Satcom Direct (SD), which is partnered with MySky. With Gogo set to acquire SD, MySky has acquired its scheduling platform.

According to MySky, it will now integrate the Scheduler software with multiple avionics suites to gather post-flight data from flight management systems. It said this improves operational efficiency and avoids inaccurate information being used due to errors with manual data entry.

Scheduler is intended to be used in tandem with MySky's financial services software, including Spend, Quote, Budget, Tax, and Procure. These are collectively intended to help operators have more control of expenditures with greater visibility of costs and revenue opportunities. For instance, the company said that its Quote system can forecast the exact operating costs for a requested flight with an accuracy of 95%.

"Currently [in business aviation], operations and accounting are siloed from each other and they have to be reconciled, in part because often data entry doesn't get validated," Jean-Sebastien de Looz, MySky's head of Americas, told **AIN**. "You wouldn't do your accounting using scheduling software, so why would you manage your operations in QuickBooks?"

Since the Scheduler program was originally developed to a high specification for mainly Fortune 500 companies and using open architecture, de Looz maintained that it will deliver much higher levels of performance than lower-priced options available now.

"Aircraft owners now expect much more [cost] data instantly because they want to know exactly what you are charging them and why," de Looz said. "With charter flying, there are lots of alternatives. Some clients got into this during Covid, and their expectations have not been met so they are leaving. Costs keep going up but charter rates haven't changed and current rates don't relate to actual costs."

Europe-based charter group Comlux has adopted the MySky platform, and a company spokeswoman told **AIN** it has simplified budget, forecasting, and financial reporting processes by providing real-time insights into operational costs.


MARIANO ROSALES

## The Pink Jet raises breast cancer awareness

The Pink Jet, an L-39 Albatros military trainer jet flown by Aerial Angels, is on display at Henderson Executive Airport during NBAA-BACE in honor of National Breast Cancer Awareness Month.

# AIN Product Support Survey: Airframers

by Gregory Polek


**AIN**'s product support survey for 2024 saw Bombardier rise to the top of all manufacturers with a full point improvement from 2023, when it ranked last in the business jet sector with a score of 7.6. The company's 8.6 rating this year resulted from a strong showing in several categories, including a tie for first place with Dassault in warranty fulfillment with a score of 9.0.

Also seeing gains in support rankings in 2024 were Embraer and Dassault, with each improving by 0.4 points in the overall average from 2023. Both had strong service center ratings, reflecting their concerted effort to grow support capacity.

Atop the turboprop ratings, Pilatus continued to score among the highest overall in the survey. However, its 8.4 rating tied Embraer's in the overall average, 0.2 behind Bombardier.

While virtually every company surveyed last year reported negative effects of supply chain constraints, several reported some improvement in that area in 2024. Efforts to relieve the pressure took the form of better communication and hands-on help for suppliers, increasing inventory levels, and maintaining closer ties with teardown agencies to help supplement their parts inventories. Finally, continued pressure from increased demand for MRO services saw companies add still more square footage for MRO operations and parts warehousing.

However, cost of parts continued to be a sticking point for many of the OEMs in the survey. As with last year, that category brought in the lowest scores.

Rolland Vincent of Texas-based Rolland Vincent Associates—the data provider for the **AIN** survey—noted that improved competitive conditions and easing of supply chain constraints accounted for much of the overall improvement in scores.

Finally, while staffing shortages broadly accounted for adverse effects, some of the OEMs reported more success in recruiting technicians than others.

First-place finisher Bombardier, for example, benefitted from apprenticeship programs at facilities in London, Singapore, and Melbourne, Australia, to ensure a flow of new hires trained to address any workforce shortages. A new program in Wichita supported with grants by the state of Kansas promises further capacity, as has its direct development of needed infrastructure.

| Combined Overall Average Ratings of Newer and Older Aircraft | Overall Average 2024 | Overall Average 2023 | Rating Change from 2023 to 2024 | Factory Owned Service Centers | Authorized Service Centers | Cost per Hour Programs | Parts Availability | Cost of Parts | AOG Response | Warranty Fulfillment | Technical Manuals | Technical Reps | Overall Aircraft Reliability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Business Jets** | | | | | | | | | | | | | |
| Bombardier (Learjet, Challenger, Global) | **8.6** | 7.6 | 1.0 | 8.6 | 8.7 | **8.3** | **8.2** | **7.6** | **8.7** | **9.0** | 8.7 | 9.1 | 9.0 |
| Embraer (Phenom, Legacy, Praetor) | 8.4 | 8.0 | 0.4 | **8.8** | **8.9** | 7.6 | 7.2 | 7.3 | 8.4 | 8.7 | **9.1** | 9.2 | **9.1** |
| Dassault (Falcon) | 8.3 | 7.9 | 0.4 | 8.6 | 8.7 | 7.1 | 7.5 | 6.8 | 7.7 | **9.0** | 8.7 | **9.3** | 9.0 |
| Gulfstream (Mid- and Large-Cabin) | 8.0 | **8.1** | (0.1) | 7.8 | 8.6 | 7.7 | 7.4 | 5.9 | 8.0 | 8.4 | 8.4 | 8.8 | 8.7 |
| Textron Aviation (Citation, Beechcraft, Hawker) | 7.9 | **8.1** | (0.2) | 7.8 | 8.4 | 7.5 | 7.1 | 6.5 | 7.5 | 8.4 | 8.3 | 8.5 | 8.8 |
| **Turboprops** | | | | | | | | | | | | | |
| Pilatus (PC-12) | **8.4** | **8.6** | (0.2) | **9.3** | 8.5 | **8.0** | **7.4** | **6.2** | **8.4** | **9.1** | 8.2 | **9.1** | **9.3** |
| Textron Aviation (King Air) | 7.9 | 7.9 | 0.0 | 8.6 | **8.7** | 7.6 | 7.1 | 6.1 | 7.9 | 7.8 | **8.6** | 8.3 | 8.6 |
| **Turboprops (out-of-production)** | | | | | | | | | | | | | |
| Mitsubishi (MU-2) | **9.0** | **8.8** | 0.2 | **9.6** | **9.5** | **8.7** | **8.4** | **7.2** | **9.1** | **10.0** | **9.2** | **9.7** | **9.4** |
| **Rotorcraft** | | | | | | | | | | | | | |
| Leonardo | **8.4** | **8.7** | (0.3) | **8.7** | **8.5** | **8.2** | **7.8** | **7.3** | **8.0** | **8.8** | **8.8** | **9.2** | **8.9** |

# Thales aims for quantum computing advantage with 'Aerocat' project

By Hanneke Weitering

Thales is testing simulation results by comparing quantum computing against real-world data.

Thales is teaming up with quantum computing company Alice & Bob and the French research institute Inria to develop quantum algorithms that could drastically speed up simulations of aerospace equipment such as radar or telecommunications antennas.

Funding for the €2.6 million ($2.9 million) technology demonstration project comes from the i-Démo Régionalisé program, which is part of the €54 billion France 2030 investment plan that the French government launched in 2021 to spur innovation and economic growth. Quantum computing is one example of a budding industry in which France hopes to gain a competitive edge.

"The pursuit of this project demonstrates that our organizations are committed to being world leaders in quantum computing and understand how to do it," said Alice & Bob CEO Théau Peronnin. "By sponsoring the development of fault-tolerant quantum computers with high-quality qubits, France will position itself to reap the first fruits of quantum tech."

Quantum computers have the potential to perform complex calculations exponentially faster than conventional or "classical" computers. For the aerospace industry, that means product developers can use quantum computing to perform significantly more robust and complicated simulations that would take a classical computer an unreasonable amount of processing time.

"An exponential speed-up means not just that simulations can be run faster, but that simulations that would have taken more than the age of universe become feasible," Elie Gouzien, lead scientist for quantum algorithms at Alice & Bob, told **AIN**. "Massively speeding up the development process, especially when the simulations are precise enough to make prototypes irrelevant, allows [product developers] to test way more designs and hence achieve a better one."

Although some small-scale quantum computers already exist, the technology is still very much in its infancy and is mainly limited to experimental use at laboratories and research institutions. With some technical challenges left to overcome, quantum computers have yet to scale into a practical and commercially viable product—something Thales and Alice & Bob hope to change.

To evaluate whether quantum computing can effectively accelerate electromagnetic simulations for aerospace telecommunications equipment, the Thales-led team will compare simulation results with real-world data from actual airborne equipment.

Inria, the French national institute for research in digital science and technology, is developing the programming language and compilation tools for the quantum algorithms that will govern the simulations. Alice & Bob will design the quantum processing unit (QPU) architecture necessary to run those algorithms on a fault-tolerant quantum computer. Thales will be responsible for defining use cases for the quantum algorithms, testing their performance, and benchmarking the results against real-world test data.

## Correcting Quantum Errors

Fault-tolerant quantum computers represent "the new generation of error-resilient quantum computers," according to Alice & Bob, because they offer a solution to what is perhaps the biggest problem in quantum computing today: it is susceptible to errors. This is due to the inherent fragility of quantum states and the sensitivity of qubits to environmental disturbances like noise, light, or temperature fluctuations.

Whereas conventional computers process data in the form of binary digits (bits) that can only exist in one of two states (0 or 1), quantum computers use quantum bits (qubits) that exist in both states simultaneously, thanks to the quantum physics principle of superposition. Environmental interactions can cause qubits to randomly change states, thereby losing encoded information in a process called decoherence.

One way to deal with decoherence is to implement quantum error correction coding into the program software to track errors as they happen and retrieve the missing information via redundant qubits. At Alice & Bob, computer scientists have discovered a way to correct errors before they happen, thereby

reducing the need for redundant hardware. The company refers to the solution as "cat qubits"—a tribute to Schrödinger's cat.

"Achieving the first error-corrected processor, known as a logical qubit, is the most important step toward building a fault-tolerant quantum computer," a company spokesman told **AIN**. He said Alice & Bob expects to produce a logical qubit with its Helium 1 quantum processor by the end of 2025.

Based in Paris and Boston, Alice & Bob is one of several tech start-ups vying to create the world's first universal fault-tolerant quantum computers, which it hopes to make commercially available in the mid-2030s. The company already has several quantum computers in its laboratory, and it is currently testing quantum error correction techniques on its largest quantum processor, Helium 1.

Because fault-tolerant quantum computers do not exist yet, "there is no plan to execute the algorithm at scale during the Aerocat project," Gouzien said. "Our focus will be on developing the algorithm, designing the QPU architecture capable of running it, and estimating the necessary resources (e.g., the number of qubits, runtime) required to achieve a clear quantum advantage. However, we will eventually reach a point where such algorithms can be executed. The question of how to verify results from a quantum computer is crucial and represents a research field in itself."

## Quantum Sensors

At Thales, computer scientists and engineers are looking into just about every facet of quantum technology and its potential applications. Quantum sensors and communications systems are two examples of applications that could most benefit the aviation industry.

Quantum sensors can theoretically measure physical qualities with more precision and sensitivity than traditional types of sensors while requiring less power, and the equipment can be miniaturized to reduce weight.

Thales is developing a variety of quantum sensors and the core technologies that make them possible. For example, it is studying superconducting quantum interference devices that could be used to build tiny communications antennas.

"Low-frequency antennas that take up several square meters today will fit in the palm of your hand," said Marko Erman, senior v-p and chief scientific officer at Thales. "Quantum inertial navigation systems will be 100 times more accurate than today's laser gyro system, offering high precision navigation in any situation even without a GPS signal."

As a defense contractor, Thales is exploring military applications for quantum computers. For example, a quantum computer could remotely operate a large fleet of reconnaissance drones across numerous sites.

For telecommunications systems, quantum cryptography can offer unparalleled data security. "Ultra-secure quantum communication will be the ultimate defense against cybercrime," said Erman, "but the holy grail of quantum communication will be the ability to interconnect quantum objects like quantum computers and quantum sensors." ▮

The World Fuel Services and DHL Express agreement will bring one of the first regular SAF deliveries to Florida.

**INNOVATION:** SUSTAINABILITY

# World Fuel Services, DHL bringing sustainable aviation fuel to Miami

By Jessica Reed

World Fuel Services and DHL Express have entered into a commercial agreement to supply blended sustainable aviation fuel (SAF) to Miami International Airport (KMIA). This agreement will bring one of the first regular SAF deliveries to Florida. Under the agreement, approximately 60 million gallons of blended SAF will be delivered over two years, including 18 million gallons of neat SAF.

Diamond Green Diesel, a joint venture between Darling Ingredients and Valero Marketing and Supply, will produce the neat SAF from used cooking oil and food waste, a process approved by International Sustainability & Carbon Certification. Valero will blend the fuel and deliver it to KMIA.

"Besides efficiency improvements, SAF is currently the most important way to reduce greenhouse gas emissions in air transport," said Travis Cobb, executive v-p of global network operations and aviation at DHL Express.

According to World Fuel, the neat fuel will have at least 80% lower life cycle greenhouse gas emissions compared with conventional jet-A. DHL Express will use the SAF to provide reduced-emissions air transport services through its GoGreenPlus program, allowing customers to offset their carbon emissions via the book-and-claim system.

Brad Hurwitz, senior v-p of supply and trading at World Fuel, said, "Our company has been headquartered in Miami for all its 40-year history. Our global footprint has expanded over the years to include offices throughout Europe, Asia, Africa, and the Americas, and while we have been actively working to increase the availability of lower-carbon fuels across the globe, bringing SAF to customers in our hometown makes it much more special."

KMIA director and CEO Ralph Cutié added, "This announcement is especially rewarding because it follows MIA's airport carbon accreditation by Airports Council International in July because of our verified dedication to reducing greenhouse gas emissions and our commitment to expanding our climate goals and reduction targets."

In the broader landscape of SAF development, companies like CleanJoule are developing solutions such as CycloSAF, a fuel derived from biomass with the potential to be used as 100% SAF without blending with fossil-based fuels. Unlike traditional SAFs, which are capped at a 50% blend due to density limitations, CycloSAF's composition of cyclo-paraffinic hydrocarbons allows it to match the density of conventional jet-A/A-1 fuel, making full adoption feasible. With a higher energy content and the ability to replace essential aromatic hydrocarbons, CycloSAF not only improves energy efficiency but also addresses key operational requirements for jet engines.

CleanJoule's ongoing efforts to scale production, coupled with advancements from companies like World Fuel Services and DHL Express, signal a growing momentum in the shift toward low-carbon aviation, as the

industry aims to meet ambitious decarbonization targets by 2050.

Efforts to integrate SAF are gaining momentum this year, with countries like China also exploring the potential of the fuel to reduce emissions. China recently launched a pilot project involving 12 flights using SAF in 2024, operated by major airlines such as Air China and China Eastern Airlines. Although SAF is typically blended with kerosene, full use of SAF in aircraft is certainly possible, and the project marks a significant step towards larger-scale adoption. However, China's SAF development still faces challenges, particularly due to high costs and limited government policies to incentivize production.

Despite these hurdles, China's civil aviation plan aims for increased SAF consumption, with future projections indicating significant growth in demand, potentially reaching 86 million tonnes by 2050. Han Jun, deputy director of the country's Civil Aviation Administration, explained that in order to achieve "large-scale application, it is necessary to promote various pilot projects and strive to build a SAF development path that conforms to national conditions."

Initiatives like the Minnesota SAF Hub are also contributing to the SAF landscape in 2024. Recently, the hub delivered its first 7,000-gallon shipment of SAF, produced from winter camelina, to Minneapolis-St. Paul International Airport. This feedstock, known for its low carbon intensity, is cultivated locally and processed into SAF through collaborations with stakeholders such as Cargill and Montana Renewables. Delta Air Lines marked this milestone with flight DL 2732 from Minneapolis to New York, the first to be partially fueled by this particular SAF.

The Minnesota SAF Hub's ongoing efforts include establishing a local blending facility by 2025. By leveraging local agricultural resources and policies such as the state's SAF tax credit, Minnesota is positioning itself as a leader in SAF production, contributing to global efforts to decarbonize air travel and create economic opportunities for the region's farmers. Peter Frosch, president and CEO of the Greater MSP Partnership, commented, "This first batch of camelina SAF is a demonstration of how we plan to decarbonize air travel and improve water quality on agricultural lands."

Other important players in the industry are expanding their SAF commitments. TotalEnergies recently signed a memorandum of understanding with Air France-KLM to supply an additional 1.5 million tonnes of SAF over the next decade, building on a previous 2022 agreement. Benjamin Smith, CEO of Air France-KLM Group, said, "Securing the volumes of more sustainable aviation fuel needed to decarbonize our activity is a major challenge."

This deal, which will deliver nearly 1.9 billion liters of SAF in total, aims to reduce $CO_2$ emissions by up to 90% compared to jet-A. Primarily fueling Air France-KLM flights from France and the Netherlands, the agreement aligns with European legislative goals mandating increased SAF use, starting at 2% by 2025 and rising to 70% by 2050. TotalEnergies will produce the SAF from waste and residue feedstocks, ensuring compliance with strict sustainability standards.

# AIN Product Support Survey: Avionics

by Gregory Polek


Garmin

The MRO business appears to have rallied from the problems wrought by the Covid pandemic and subsequent supply chain constraints, according to assessments among the companies that participated in this year's avionics support survey. Although still not completely recovered, members of the industry expressed far more optimism about the pace of growth and the gradual improvement in parts supply since last year.

Efforts to relieve the pressure took several forms among the respondents, including more communication and hands-on help for suppliers, increasing inventory levels, and maintaining closer ties with teardown agencies to help supplement parts inventory.

However, the storm clouds that gathered over the industry in the form of a short supply of qualified mechanics appear no less threatening and continue to affect timely access to MRO services. Stepped up recruitment efforts have helped, but an answer to the need for a more enduring solution has proved elusive.

Maintenance shops continue to work toward clearing backlogs within the limitations of the mechanics' shortage, all the while improving the quality of their support offerings, as evidenced by sector leaders such as Garmin.

The Olathe, Kansas-based supplier took the top slot among flight deck suppliers and airborne connectivity providers with a 9.0 and 9.1 score, respectively. The company secured at least a 9.0 rating in five of the eight categories measured both in the flight deck avionics and airborne connectivity categories, including a 9.3 in overall reliability in both.

Among cabin management systems suppliers, the starkest change involved Lufthansa Technik and its Nice system, which vaulted to the top with an 8.2 average, tying for the top spot with Honeywell, which climbed significantly from a 6.9 rating last year.

| Category & Overall Average Ratings for Avionics Systems | Overall Average 2024 | Overall Average 2023 | Rating Change from 2023 to 2024 | Cost per Hour Programs | Parts Availability | Cost of Parts | AOG Response | Warranty Fulfillment | Technical Manuals | Technical Reps | Overall Avionics Reliability |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Flight Deck Avionics** | | | | | | | | | | | |
| Garmin | **9.0** | **8.7** | 0.3 | **9.1** | **9.1** | **8.2** | **8.9** | **9.2** | **8.9** | **9.0** | **9.3** |
| Collins Aerospace | 8.6 | 8.1 | 0.5 | 8.5 | 8.6 | 7.8 | 8.4 | 9.0 | 8.4 | 8.6 | 9.0 |
| Honeywell | 7.5 | 7.7 | (0.2) | 7.5 | 7.2 | 6.3 | 7.1 | 7.9 | 8.0 | 7.6 | 8.1 |
| **Cabin Management Systems** | | | | | | | | | | | |
| Lufthansa Technik | **8.2** | N/A* | N/A* | **8.5** | **8.6** | 7.6 | 8.0 | **8.7** | 8.0 | 8.1 | **8.5** |
| Honeywell | **8.2** | 6.9 | 1.3 | **8.5** | 7.6 | **7.8** | 7.9 | **8.7** | 8.2 | 8.4 | 8.4 |
| Collins Aerospace | 8.1 | 8.0 | 0.1 | 8.1 | 7.9 | 7.3 | 7.8 | 8.6 | **8.3** | 8.4 | 8.2 |
| Gulfstream Cabin Management | 7.9 | **8.1** | (0.2) | 7.3 | 7.6 | 6.2 | **8.1** | 8.6 | 8.0 | **8.9** | 8.2 |
| **Airborne Connectivity** | | | | | | | | | | | |
| Garmin | **9.1** | N/A* | N/A* | **8.9** | **8.9** | **8.7** | **9.3** | **9.5** | **9.0** | **9.5** | **9.3** |
| Satcom Direct Plane Simple | 8.6 | **8.6** | 0.0 | 8.1 | 8.5 | 7.9 | 8.8 | 8.9 | 8.7 | 9.0 | 8.8 |
| Gogo Business Aviation | 8.5 | 8.3 | 0.2 | 7.5 | 8.7 | 7.8 | 8.8 | 9.1 | 8.6 | 9.0 | 8.5 |
| Honeywell | 8.4 | 7.9 | 0.5 | 8.4 | 8.2 | 7.4 | 8.4 | 8.8 | 8.7 | 8.8 | 8.6 |

N/A*: Did not draw enough responses for inclusion in results.

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# AIN Product Support Survey: Engines

by Matt Thurber


DAVID MCINTOSH

**AIN** overall average reader ratings for turbofan engine product support during the past year climbed for three engine manufacturers, with GE Aerospace topping the chart at a 9.1 rating, up the most—by 0.4—from last year. Rolls-Royce's 8.6 rating remained the same as last year, putting it in second place, while Williams International, with a rating of 8.5, climbed 0.1 and came in third. Pratt & Whitney Canada (P&WC) declined by 0.1 to 8.3, while Honeywell saw the second-largest gain of 0.3 to a 7.9 rating.

In the turboprop category, Honeywell topped the chart with a 9.1 overall average, followed by P&WC, which climbed 0.3 points to an also very strong 8.9. Pratt & Whitney's overall average dropped to 8.6 from 9.1 for turboshaft engines. Rolls-Royce and Safran weren't included because they received insufficient ratings.

As for the individual engine ratings, most of the turbofan models saw increases in support scores even as it was more of a mixed bag on the turboshaft front. GE Aerospace's Passport and CF34 turbofans came in with 9.2 and 9.0 overall averages this year, leading the pack. Honeywell's TPE331 led in the turboprop/turboshaft category with its 9.1 rating.

Overall engine reliability generally drew the strongest ratings with nearly all scores edging above 9.0, while predictably, cost of parts was among the lower scores for both the company and individual models.

Supply chain has continued to plague some of the engine manufacturers, with conflicts including that involving Russia and Ukraine vexing areas such as access to titanium. However, in parts availability, some manufacturers have had more success than others—reflected in the range of scores from 7.4 to 9.1.

That spread was even greater for individual models, reaching 9.2 for GE's Passport, a relatively new model that is still expanding in the marketplace, and 6.9 for the venerable Honeywell TFE731, a more legacy model that has been in production since the early 1970s with more than 13,000 produced.

Despite the challenges of supply—in material, parts, and labor—the high scores for engine reliability across the board are particularly notable in light of the uptick in flying over the past several years. While first-half activity is generally down in North America and Europe, it has been up in other parts of the world and largely still surpasses 2019 activity, according to analysts such as WingX and Argus.

| Category & Overall Average Ratings for Aircraft Engines | Overall Average 2024 | Overall Average 2023 | Rating Change from 2023 to 2024 | Factory Owned Service Centers | Authorized Service Centers | Cost per Hour Programs | Parts Availability | Cost of Parts | AOG Response | Warranty Fulfillment | Technical Manuals | Technical Reps | Overall Engine Reliability |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Turbofan Engines** | | | | | | | | | | | | | |
| GE Aerospace | **9.1** | **8.7** | 0.4 | **9.4** | 9.2 | **8.6** | **9.1** | **8.6** | **9.3** | 9.4 | **8.9** | **9.2** | **9.5** |
| Rolls-Royce | 8.6 | 8.6 | 0.0 | 9.0 | 8.8 | 7.8 | 8.6 | 7.6 | 8.6 | 8.9 | 8.4 | 8.9 | **9.5** |
| Williams International | 8.5 | 8.4 | 0.1 | 8.9 | **9.3** | 7.4 | 8.3 | 7.0 | 8.3 | **9.7** | 8.8 | 9.0 | 8.8 |
| Pratt & Whitney | 8.3 | 8.4 | (0.1) | 8.5 | 9.0 | 7.9 | 7.6 | 7.0 | 8.0 | 8.7 | 8.6 | 8.5 | 9.2 |
| Honeywell | 7.9 | 7.6 | 0.3 | 8.5 | 9.0 | 7.5 | 7.4 | 6.7 | 7.7 | 8.5 | 7.7 | 7.7 | 9.1 |
| **Turboprop Engines** | | | | | | | | | | | | | |
| Honeywell | **9.1** | **9.1** | (0.0) | **9.7** | **9.7** | 7.9 | 8.7 | **7.4** | 8.8 | **10.0** | **9.2** | **9.5** | **9.9** |
| Pratt & Whitney | 8.9 | 8.6 | 0.3 | 9.4 | 9.3 | **8.6** | **8.9** | 7.1 | **9.1** | 8.8 | 9.0 | **9.5** | 9.5 |
| **Turboshaft Engines** | | | | | | | | | | | | | |
| Pratt & Whitney | **8.6** | **9.1** | (0.5) | **9.0** | **9.0** | **8.3** | **8.4** | **7.6** | **8.4** | **8.7** | **8.8** | **8.8** | **9.2** |

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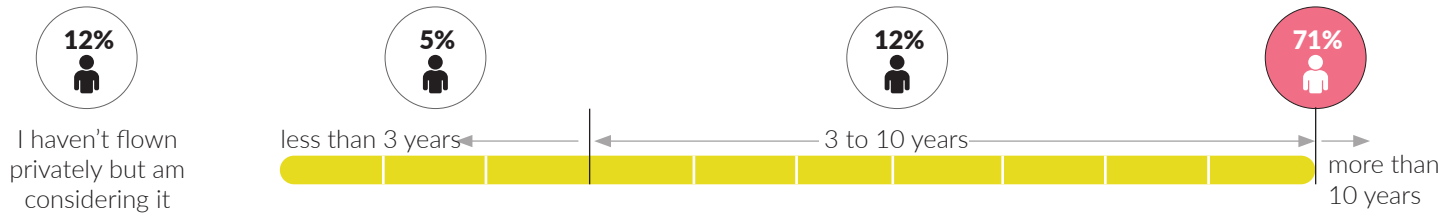
BUSINESS JET TRAVELER'S 14th ANNUAL

# Readers' Choice Survey

Here are the results of our 2024 Readers' Choice survey, which attracted over 1,000 respondents. As promised, we have made a contribution for every completed survey to Corporate Angel Network, which arranges flights on business aircraft to treatment centers for cancer patients.

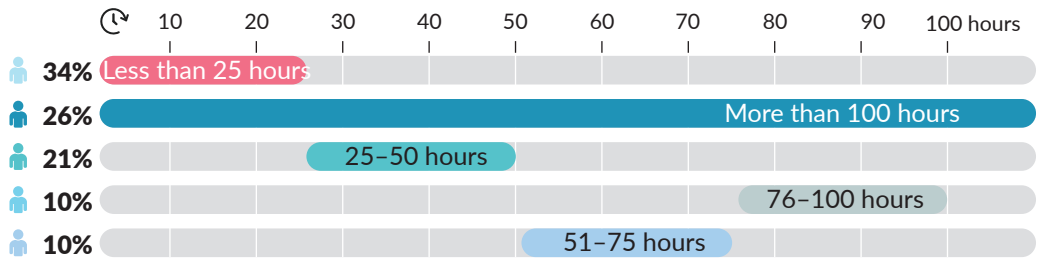
## FLYING PRIVATELY

**How long have you been flying privately?***

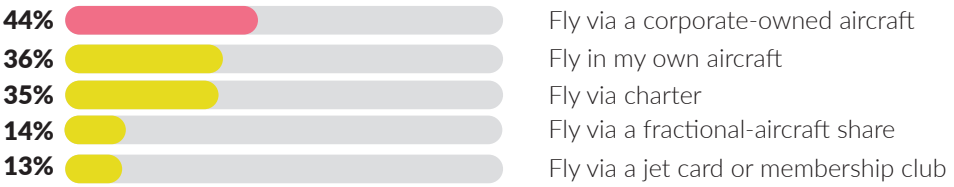



*Respondents who indicated that they had no plans to fly privately are excluded from these stats and were not asked any of the questions that follow.

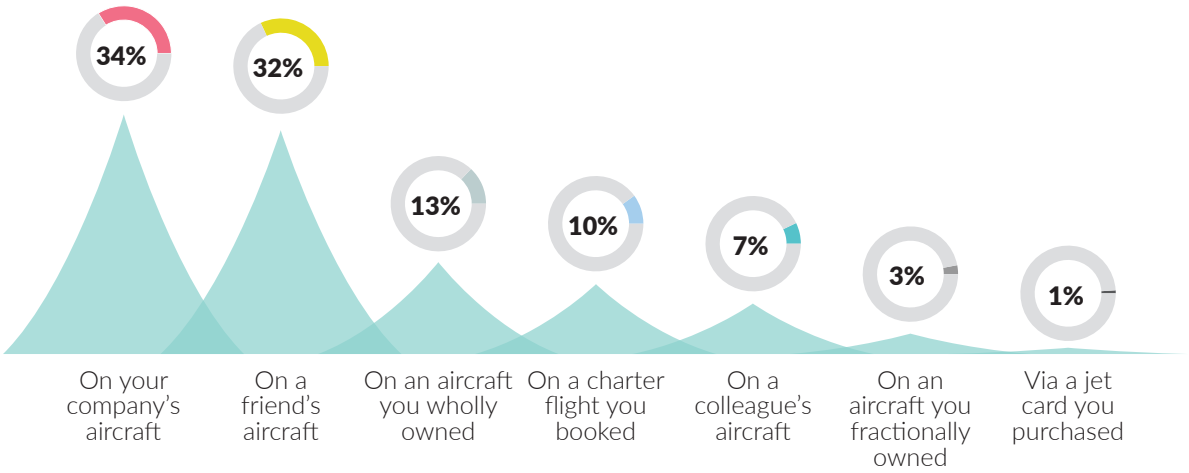
**About how much do you fly privately in a typical year?**




**Which of the following have you done in the past two years or plan to do within the next two years?** (select all that apply)




**The first time you ever flew privately was...**



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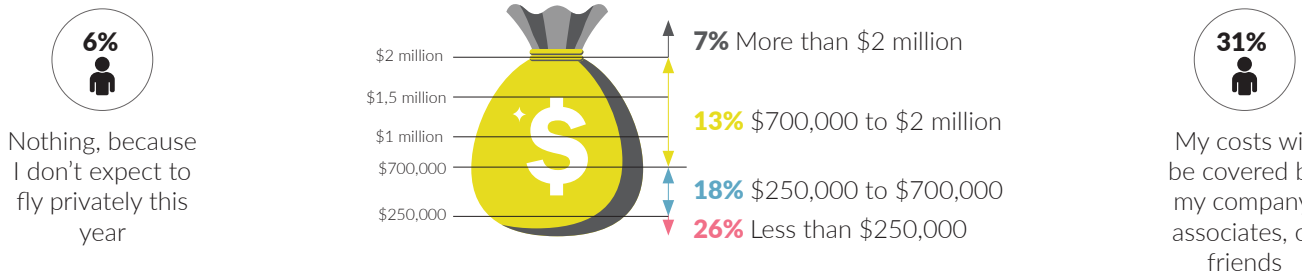
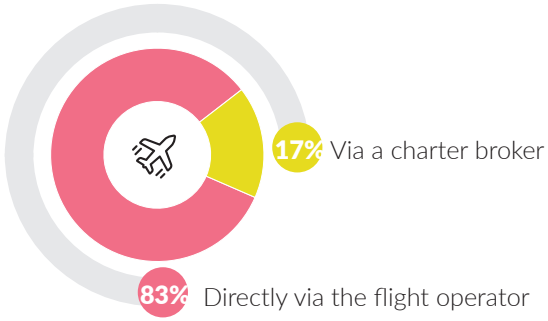
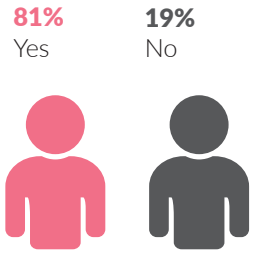
**How much do you expect to personally spend on flying private this year?**



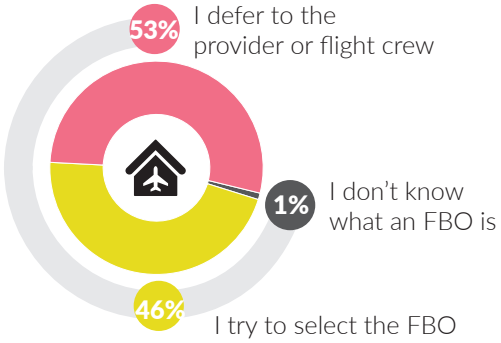

**If you fly via charter, how do you prefer to book flights?**



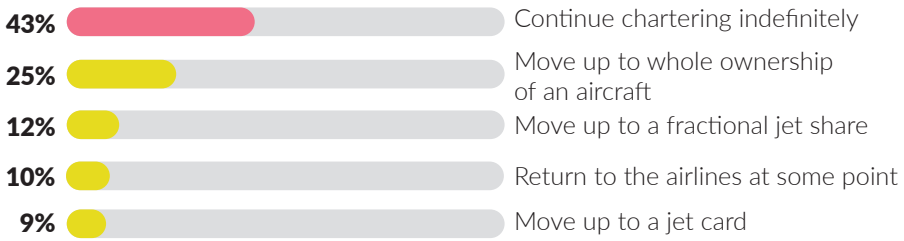

**Have you ever used an app to book a charter flight?**



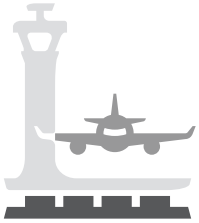

**Do you select the FBO when booking flights or leave it up to the provider or flight crew?**

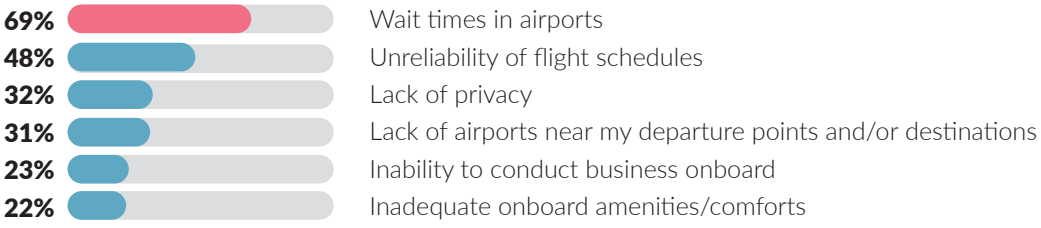


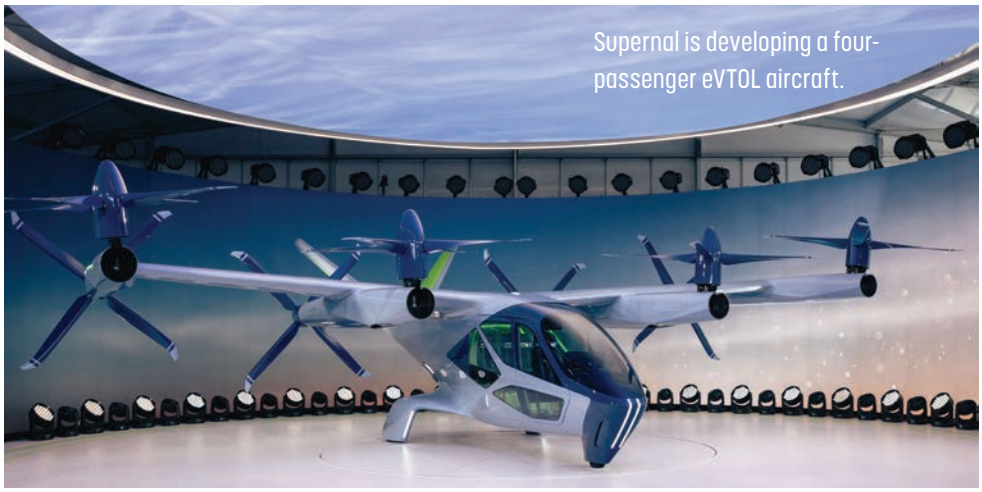

**If you fly via charter, do you plan to...**




**Which of the following do you least like about airline travel? (select all that apply)**







Supernal is developing a four-passenger eVTOL aircraft.

# Supernal teams up with Blade and Clay Lacy

By Charles Alcock

Blade Air Mobility and eVTOL aircraft developer Supernal are exploring how they will launch commercial advanced air mobility (AAM) services. Through a partnership announced in Las Vegas on Tuesday, the companies said they will study various early use cases, gathering data that will shape how the Hyundai subsidiary completes development of the four-passenger aircraft it aims to bring to market in 2028.

In a related announcement on the first day of the NBAA-BACE show, business aviation group Clay Lacy Aviation said it is working with Supernal to prepare its FBOs to receive eVTOL aircraft. Initially, the companies will focus their efforts on Clay Lacy's bases at John Wayne Orange County and Van Nuys airports in Southern California before rolling out services across the wider U.S. network.

Clay Lacy, which also operates aircraft and provides services including maintenance, has previously signed agreements to develop vertiport operations at its FBOs with two other eVTOL aircraft developers, Overair and Joby.

According to Scott Cutshall, Clay Lacy's president of real estate and sustainability, these collaborations are part of the group's commitment to sustainable aviation. The company is the first in the world to be accredited under NBAA's Sustainable Flight Development program.

Private flight provider Blade has been looking to expand beyond its business jet and helicopter business model for some time. It already has partnership agreements with other eVTOL aircraft manufacturers including Eve Air Mobility and Beta Technologies.

Under the new three-year agreement, Supernal will provide Blade with technological and operational insights to guide the development of AAM services. Blade will provide input on the design of the Supernal aircraft, including factors such as passenger comfort and the flexibility needed to serve different markets. The companies will conduct scenario planning for hypothetical routes in markets such as New York City and Southern California.

Visitors to the NBAA-BACE show can learn more about Supernal's S-A2 product concept vehicle through a virtual reality presentation on the static display at Henderson Executive Airport. The aircraft will cruise at 104 knots up to a range of 52 nm.

Blade is operating flights between that location and the Las Vegas Convention Center during the show.

"It is critical we collaborate with experienced commercial partners like Blade to ensure our eVTOL's cabin features align with passenger expectations for comfort, safety, and efficiency in the next generation of intercity mobility," said David Rottblatt, Supernal's senior director of strategy and commercialization. "Supernal and Blade's collaboration underscores how the AAM industry has evolved. The dialog is no longer about the feasibility of eVTOL technology, but rather how it can be optimized to suit existing commercial platforms and operators."

## Jet Aviation breaks ground in Miami

Ending months of speculation, Jet Aviation announced it has broken ground on a new FBO at Miami-Opa Locka Executive Airport (KOPF). The facility will occupy 27 acres on the bustling dedicated general aviation airport.

It will feature a silver LEED-certified 8,500-sq-ft terminal, a 4,800-sq-ft U.S. Customs and Border Protection facility for onsite clearance, 12.4 acres of ramp space, and a pair of 20,000-sq-ft hangars that can accommodate the latest ultra-long-range business jets.

"Adding Miami to our network is key to further strengthening our footprint in the U.S.," said David Best, Jet Aviation's senior v-p for regional operations Americas. "We are committed to growing in locations where our customers want us to be."

He added that Florida is an important destination for business aviation and the company has built a reputation on service quality there with its Palm Beach facility, which has been in operation since 1985.

When the first phase of development is completed in third-quarter 2025, it will be the fifth FBO on the field, as well as Jet Aviation's 13th location in the U.S. and its territories. **C.E.**

# Nimbl simplifies safety management with 'Quick FRAT'

By Jessica Reed

Nimbl, a provider of aviation manuals and safety management solutions, introduced a series of updates to its platform aimed at improving operational efficiency and enhancing safety for aircraft operators. These updates include the launch of a redesigned dashboard with new tools such as the "Quick FRAT" (flight risk assessment tool), designed to make safety management systems (SMS) more accessible and easier to implement.

The Nimbl platform, which integrates industry-standard tools for weather, security, and scheduling, now allows operators to access critical information with minimal effort. Mark Baier, CEO of Nimbl (formerly AviationManuals), emphasized the company's commitment to simplifying the SMS process, saying, "Our goal is to make the flight risk analysis and SMS adoption easier, thereby helping operators continually become better and stay safer."

Nimbl's dashboard aims to centralize vital information, enabling operators to perform risk assessments with just a few clicks, minimizing the possibility of errors and maximizing operational convenience.

The Quick FRAT system is a significant feature in the updated dashboard. It streamlines the risk assessment process, reducing the previous 25 questions to just eight without compromising safety.

"We want to provide tools that make it easy for you to implement an SMS because the ultimate goal is to make operators safer," Baier explained during a press briefing at NBAA-BACE. Each assessment now includes recommended mitigations, drawing from Nimbl's extensive experience in the aviation sector, allowing operators to make informed decisions and enhance flight safety.

In addition to flight risk analysis, the platform update offers several other improvements. Nimbl has refined the integration of critical operational data into the platform, automatically populating key flight information from partners. These include data from the National Oceanic and Atmospheric Administration (NOAA) for weather updates, as well as integration with scheduling software like Universal and ForeFlight. This allows for more efficient pre-flight planning, reducing the time and effort required by operators.


MARIANO ROSALES

Nimbl CEO Mark Baier (left) and Clément Meersseman, v-p of strategic partnerships, speak at BACE.

Nimbl has also introduced a project tracker to assist operators with managing manual updates and regulatory requirements. This tool enables operators to engage with Nimbl's team of experts in real-time, making it easier to stay compliant with safety regulations and keep operational documents current.

"The project tracker allows clients to interface with us online about changes and updates they want to make," Baier noted. This feature is particularly useful for operators without the resources to maintain in-house compliance teams because it simplifies manual development and ensures up-to-date documentation.

Nimbl's focus on partnerships has been a critical element of its growth. Clément Meersseman, Nimbl's v-p of strategic partnerships, highlighted the company's collaborations with aircraft manufacturers, regulators, and technology providers. "Strong flight departments start with strong partnerships," Meersseman said, citing its alliance with Dassault Falcon Jet and ongoing work with the FAA to streamline operational approval processes.

In addition to technological improvements, Nimbl emphasizes personalized support for its clients. Unlike some companies that offer only software solutions, "We don't just offer you software; we actually have a team of experts in the office that hand-hold you through this," Baier stressed.

Nimbl supports more than 7,000 operators globally, reviews approximately 33,000 flights annually, and maintains nearly 4,000 operational manuals.

Nimbl is showcasing the new dashboard features at NBAA-BACE. Baier reiterated Nimbl's dedication to making safety management accessible and effective for operators of all sizes, stating, "The more professional they are, the better they are, and the easier we make it for them to become better, the safer all of us will be."

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AIN FBO AWARDS

# SkyShare reduces rates for PC-12 fractional owners with new program

By Charles Alcock


SkyShare offers fractional shares in aircraft including the Cessna Citation CJ2 and Excel, Gulfstream G200 and G450, and Pilatus PC-12.

Private flight provider SkyShare introduced a new SFX-12 program for its fractional ownership clients, offering reduced rates for Pilatus PC-12 single-turboprop aircraft.

Under the program announced on Tuesday at the NBAA-BACE show, owners can start with a 1/16 share priced at $220,000, which SkyShare said is 41% below its previous entry-level price point. The Salt Lake City-based group is seeking to attract newcomers to fractional ownership who have been deterred by costs.

Moving up through its product offerings, SkyShare also has the intermediary SFX-Jet program, which provides shared use of aircraft including the Cessna Citation CJ2 and Excel, as well as the super-midsized Gulfstream G200 model. Owners can opt to use smaller aircraft at lower hourly rates, including the PC-12 now offered through the SFX-12 program.

Earlier this year, SkyShare launched the SFX+ program, which adds the Gulfstream G450 into the mix, as well as gives access to its entire fleet. The company said its day-based ownership model makes it easier for users to predict total costs and manage their travel budgets.

"We are thrilled to debut our SFX-12 program here at NBAA-BACE," said Cory Bengtzen, founder and CEO of SkyShare. "When we launched our SFX+ program back in April, we knew we were revolutionizing private flight. However, we realized we were only scratching the surface of our goal to make private flight more accessible."

Almost half of the flights operated by SkyShare are now with PC-12s, and it has reported already seeing a growing demand for this lower-cost option. Flight hour fees for the PC-12 are $1,500, and these increase progressively to $6,500 for the G450.

SkyShare takes a 35% downpayment on shares, which are offered in increments of 1/16, 1/8, 3/16, and 1/4, giving access to aircraft for between 20 and 80 days each year. The balance for share prices is paid monthly.

The company also provides aircraft management services as well as charter flights, and it operates several FBOs. It has been in business since 2009.

## APG's NaviGuard app tackles GPS spoofing

Aircraft Performance Group (APG) has launched NaviGuard, a free GPS anomaly detection app, amid a 500% surge in GPS spoofing incidents affecting global aviation safety this year. The Apple iOS app allows pilots to detect abnormal GPS readings on iPads and verify data through radio navigation. The latest updates allow users to edit navigational aid points and share GPS logs with aviation safety departments.

The recent spike in GPS spoofing poses significant challenges for flight crews, particularly in conflict zones. OpsGroup has issued alerts regarding multiple aircraft types encountering false GPS signals, leading to potential navigation failures.

With approximately 1,500 flights affected daily, particularly over high-risk areas in the Middle East, the need for reliable navigation tools is urgent. Since its launch, the app has seen more than 3,000 downloads, reflecting strong demand from the aviation community.

NaviGuard goes back to basics, offering users a way to verify positional data using traditional navaids such as VOR and NDB. It is a lean app that "does what it says on the tin," said product manager Michael Shama, adding that APG made this choice to offer the app for free as a service to aviation safety.

Potential spoofing zones are updated with EASA data and update every aeronautical information regulation and control cycle. The app is meant to be a tool for situational awareness and positional verification, not navigation, Shama said. "If you're flying along the border of Iran, and your GPS says you are here, but you do an input fix and you're actually there based on your heading, you're about to have dinner with the Ayatollah."

Additionally, the app allows users to export data, whether saving it to their own devices or using it to report anomalies to agencies such as the FAA. **A.W.**

› continued from page 1

had rotor and fixed wing. Now we have a third type. It's really an extraordinary moment."

When asked by **AIN** about his past experiences as a senior executive with Supernal, Whitaker declined to speculate about what his former colleagues' reaction to the SFAR could be. "I'm recused from any contact in my new role, so I haven't had any discussions about it, but I think coming from that background, it's a new form of transportation, and to just make an aircraft but not have an effective way to fly would be a missed opportunity," he said.

The administrator further provided a little insight into the FAA's approach to the SFAR: "I think what we've done here is complete the ecosystem to come up with performance-based rules for operation and a recognition that there's some pretty amazing technology in these vehicles, but they're all different. So we've got flexibility to deal with things such as pilot training and calculating the minimum altitudes and fuel reserves in a performance-based way. It creates that ecosystem to allow this industry to thrive."

With U.S. advanced air mobility (AAM) sector frontrunners such as Archer and Joby committed to making first deliveries and starting air taxi services in 2025, the SFAR release on Tuesday has not come a moment too soon. These manufacturers and their various customers and partners will now be scrambling to assess whether the published requirements present any late obstacles to service entry.

The industry has had cause for concern over what it has viewed as possible roadblocks the SFAR could introduce. In 2022, the FAA pitched a curve ball at the industry when it unexpectedly resolved not to stick to a previously settled framework to certify eVTOLs under existing Part 23 rules. Instead, it determined that the 21.17(b) special class of requirements should apply.

When the SFAR consultation period closed 14 months ago, the General Aviation Manufacturers Association (GAMA) called for the FAA to take a performance-based approach to the SFAR. GAMA's submission highlighted the following four aspects of the draft SFAR about which aircraft manufacturers were concerned: the basis on which pilots will be certified to fly the new aircraft types; the requirement for dual controls in the flight deck; flight simulation devices; and the requirements for energy reserves electric aircraft will need to have to ensure they can land safely in the event of an emergency.


MARIANO ROSALES

FAA Administrator Michael Whitaker signs the special federal aviation regulation "Integration of Powered Lift: Pilot Certification and Operations" at the NBAA-BACE opening session on Tuesday.

The energy reserves requirement is critical to determining the effective range for the new aircraft, which are mostly constrained by the limits of today's battery technology to flying short sectors of up to around 100 miles.

California-based Joby and Archer have appeared reticent to commit to a precise timeline for the launch of commercial operations in U.S. cities, including Los Angeles, New York, and Chicago. At a recent presentation of Joby's aircraft in New York City's Grand Central Station, Bonny Simi, the company's head of air operations and people, told **AIN** that its first air taxi services are now expected to launch in Dubai in the latter part of 2025 and implied that operations in U.S. cities may not begin until 2026.

While the industry reviewed the final details of the SFAR and its ramifications, leaders widely welcomed its release.

"The regulation published today will ensure the U.S. continues to play a global leadership role in the development and adoption of clean flight," said Joby founder and CEO JoeBen Bevirt. "Delivering the guidance ahead of schedule is testament to the dedication, coordination and hard work of the rulemaking team."

Sergio Cecutta with SMG Consulting, which works closely with companies in the AAM sector, told **AIN** that the SFAR represents "a stable standard for the current and upcoming OEMs that are certifying and will certify power lift aircraft...It takes away the uncertainty in the regulatory path and therefore reduces the certification risk and costs for the OEMs as they know without ambiguity what they have to test."

National Air Transportation Association (NATA) president and CEO Curt Castagna said the SFAR "provides a pathway to open dialog between operators, OEMS, and other industry stakeholders with FAA regulators."

"We applaud the FAA for their timely delivery of a safe path forward for pilot certification and operations of powered lift aircraft," said Kristen Costello, Beta Technologies' regulatory affairs lead. "It's an important and encouraging step for the industry. We look forward to reviewing it in depth and working alongside our customers to operationalize it."

Astrophysicist Neil deGrasse Tyson closed out the opening ceremony as the keynote speaker, encouraging attendees to use the conference as inspiration to continue in their aspirations. "I'm not worried about the youth," he concluded. "I'm worried about adults who have lost their curiosity."

# FlightPulse Pilot app gaining altitude

GE Aerospace's Passport engine is on display in the NBAA-BACE exhibit hall. The company is working to certify the engine for Bombardier's Global 8000 ultra-long-range business jet.

by Hanneke Weitering

More than 40,000 pilots are now using GE Aerospace's FlightPulse electronic flight bag software, and the company said it is on track to surpass 50,000 users next year. According to GE, 25 airlines and 20 corporate operators have signed up for FlightPulse, which provides flight crews with historical flight data in an easily digestible format in the mobile app, FlightPulse Pilot.

"You capture your data being recorded on board the aircraft...then when you process that parameter data, you can extract snapshots, you can find out when exceedances occur, and then you can aggregate that data a step further," GE product manager Jonathan Morrell told **AIN**.

"We tried to find a way to package all of that and provide it to pilots in a way that's actionable, in a way that that data carries meaning, rather than what we would traditionally provide the analysts or gatekeepers at these operators."

Operators across the industry can see and learn from each other's flight data—which remains anonymous—to benefit from each other's past experiences, Morrell explained. Users can filter a map showing historical flight trajectories and safety events for factors such as the type of aircraft, the runway where it takes off or lands, and seasonal meteorological conditions.

FlightPulse recently added a 3D animation module that replicates the flight deck with realistic imagery and flight safety data. It also added a module to support preflight planning. Its most recent addition is a "home" module that gives airline administrators the ability to distribute announcements to their pilots.

According to GE, the FlightPulse Pilot app has more than 3,000 daily users and 20,000 monthly users.

"Pilots using FlightPulse is very analogous to how a runner might use a fitness watch to improve their run times or an individual using a weight loss app to be healthier," said Andrew Coleman, general manager of GE Aerospace's software business. "It's an app they can access on their iPads to become better pilots."

In addition to software solutions that improve aviation safety, GE Aerospace remains focused on innovating aircraft engines. The manufacturer recently teamed with NASA to modify the GE Passport 20 engine with hybrid-electric components for testing. It is preparing to certify the Passport engine for Bombardier's Global 8000, which will enter service next year. That engine entered service in late 2018 on the Global 7500. GE's Catalyst turboprop engine also remains on track for FAA certification by year-end. That engine powers the Beechcraft Denali turboprop single that is also slated for certification in 2025.

## AIN editor Kerry Lynch wins Gold Wing Award

**AIN** monthly editor Kerry Lynch received the 2024 NBAA Gold Wing Award on Tuesday morning during the NBAA-BACE media kickoff breakfast. She was recognized for her story marking the 30th anniversary of the General Aviation Revitalization Act (GARA) published in the August 2024 issue of **Aviation International News**.

The Gold Wing is presented by NBAA annually for "excellent, accurate, and insightful reporting on issues related to business aviation." In the story, Lynch recounted the critical stage that the general aviation industry was in as the high cost of product liability threatened aircraft manufacturers in this space.

"Kerry Lynch did a masterful job in recreating one of the most seminal moments in general aviation history," said NBAA president and CEO Ed Bolen, who at the time was an aide to then-Sen. Nancy Kassebaum (R-Kansas), the chief architect of GARA. "Her story explains how industry stakeholders and members of both parties mobilized with a united voice to win passage of GARA." **C.T.**

AIN editor Kerry Lynch receives the Gold Wing Award from NBAA board chair John Witzig.

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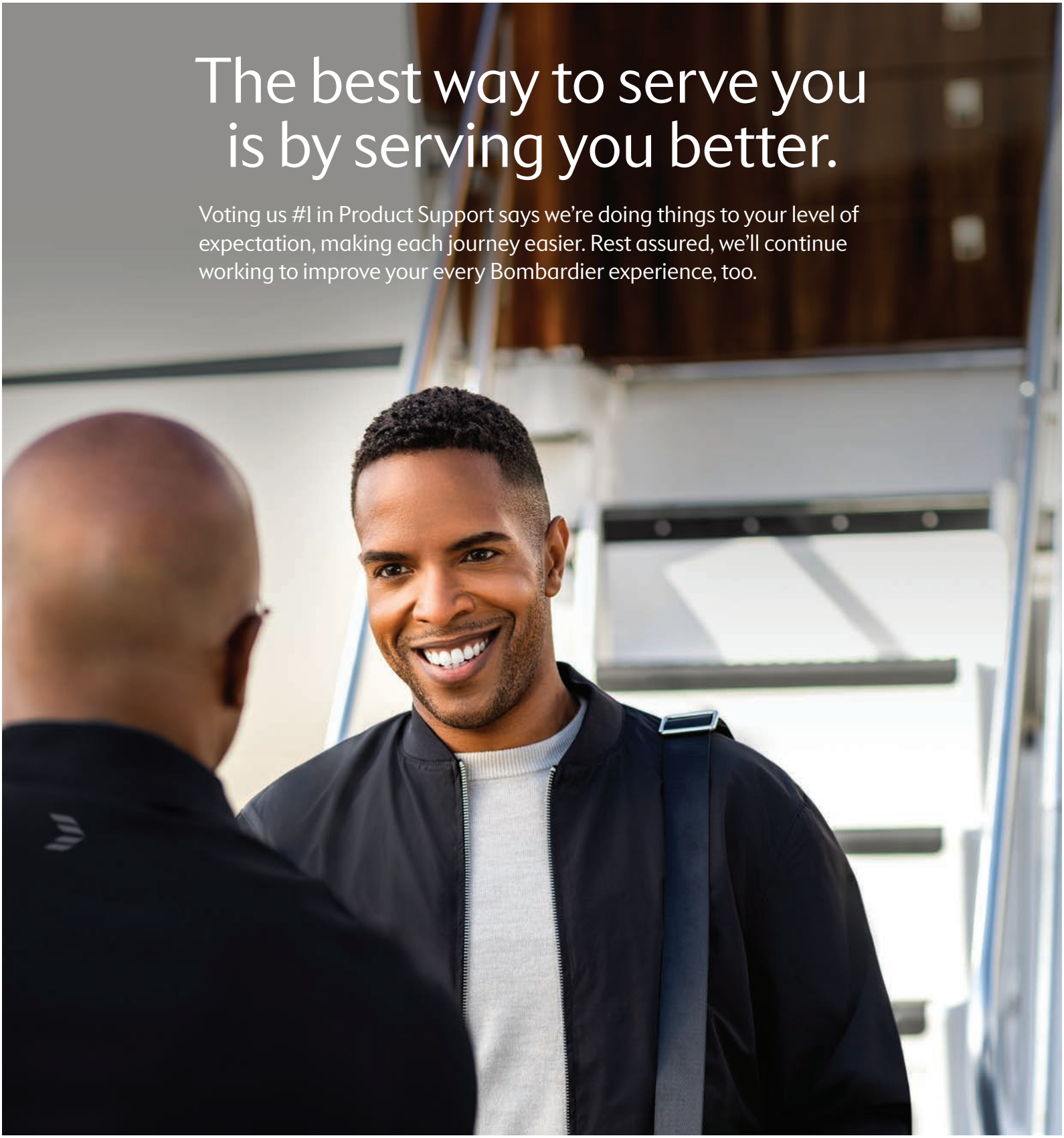


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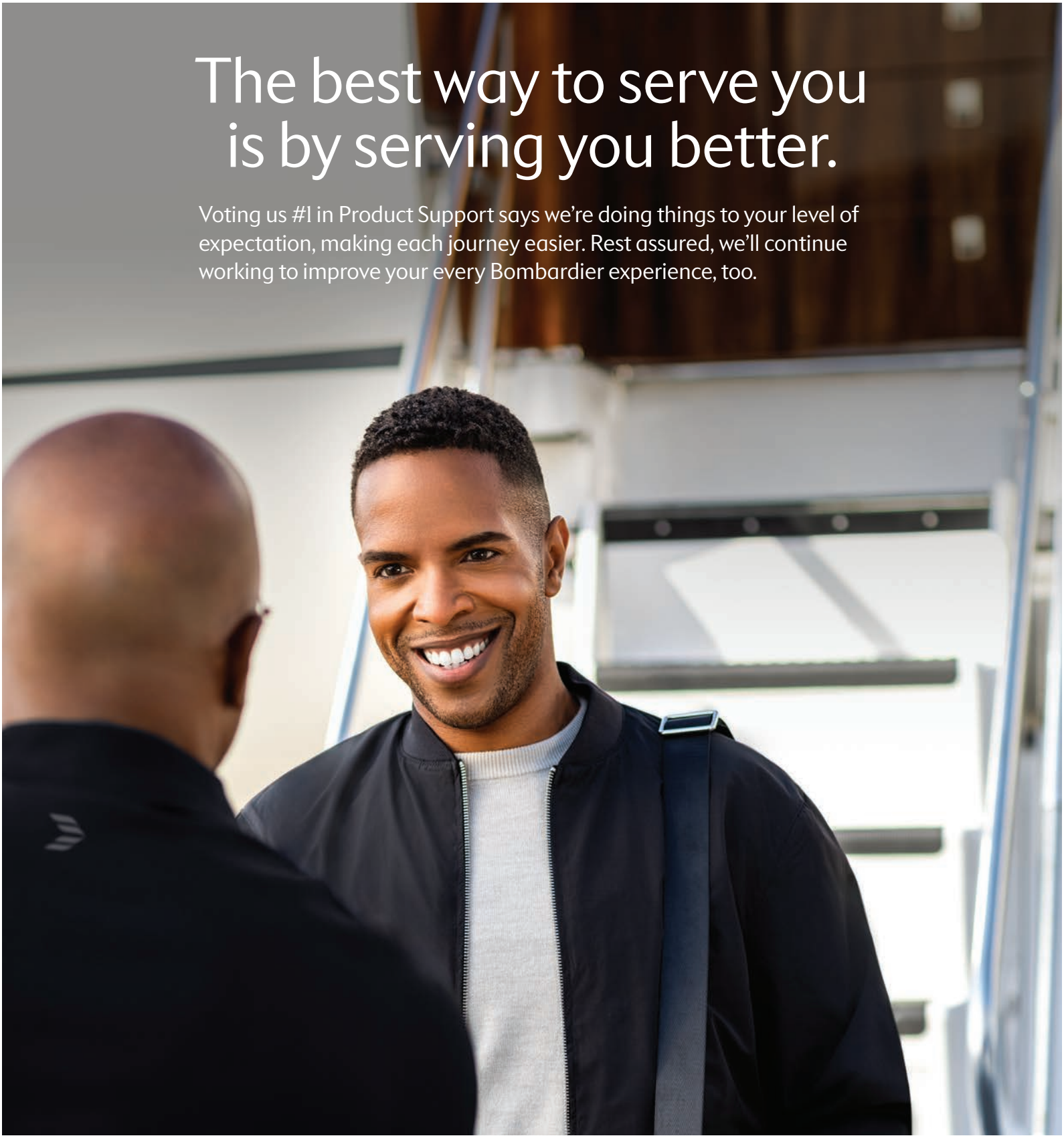


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