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13<sup>TH</sup> ANNUAL EDITION

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## 2022 Buyers' Guide

THE BEST AIRCRAFT FOR YOU

WHAT'S NEW IN PRIVATE LIFT

READERS' CHOICE SURVEY RESULTS

AIRCRAFT & AIRFRAMER DIRECTORIES

ENTICING CABIN UPGRADES

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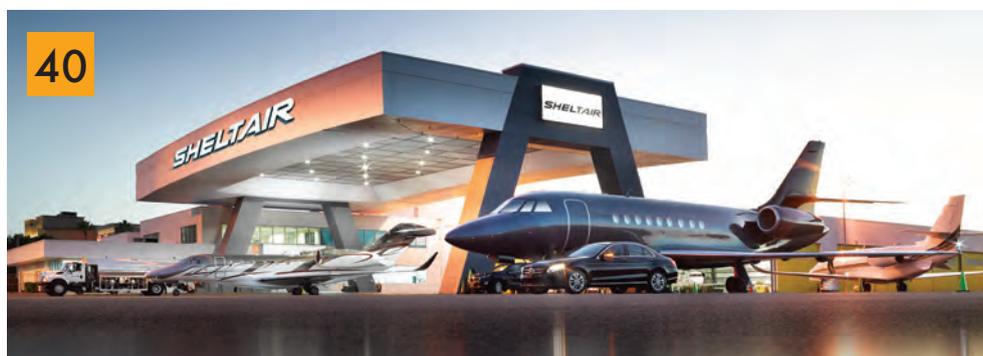
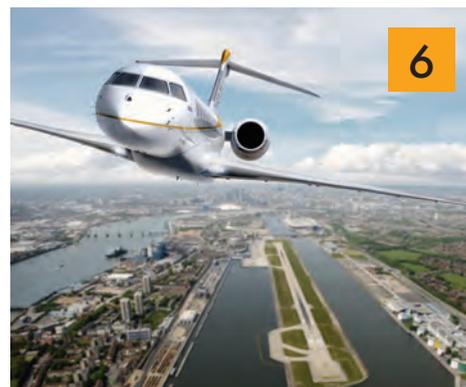
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BY EMBRAER



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# Up Front

Whether you're chartering for the first time, purchasing your first (or fifth!) business jet, or considering any of the options in between, our mission is to help you make the best possible choices about flying privately. With that in mind, we've gathered heaps of unbiased and valuable information from some of our best writers (*see below*) in this 2022 edition of our annual **Business Jet Traveler** Buyers' Guide.

Here you'll also find our comprehensive and updated Aircraft Directory (*page 54*), which collects key data about all popular models of jets, turboprops, and rotorcraft. (Go to [bjtonline.com](http://bjtonline.com) for an interactive version of the guide that offers more aircraft details.) In addition, we've included the results of our 12th annual Readers' Choice survey (*page 20*). Thank you to everyone who took the time to complete our poll, which gives great insight into how you are utilizing business aircraft and how your habits and preferences have evolved over time.

Make sure you're subscribed to **BJT Waypoints**, our free twice-weekly newsletter, to ensure you're among the first to see all our latest content, which includes interviews with distinguished business jet travelers, advice on how to handle the most complex tax regulations, news about flight providers and their programs, and much more. **BJT Waypoints** (available at [bjtonline.com/subscribe](http://bjtonline.com/subscribe)) also provides information about special events, webinars, and other reader offerings. We have a lot of exciting content planned for the rest of this year and 2023, and, as always, we're thankful to have you along for the ride.



CVR

Jennifer Leach English  
Editorial Director  
[jenglish@bjtonline.com](mailto:jenglish@bjtonline.com)

## EDITORIAL

Editor-in-Chief Matt Thurber

Editorial Director Jennifer Leach English

Editor Jeff Burger

Production Manager Martha Jercinovich

Art Director John A. Manfredi

Graphic Designer Grzegorz Rzekos

Contributors Mark Eveleigh, Narina Exelby, Margie Goldsmith, Mark Huber, Marilyn Jones, Debi Lander, Thomas R. Pero, Kim Rosenlof, Jeff Wieand, James Wynbrandt

Director of Video Ian Whelan

### EDITORIAL CONTACTS

214 Franklin Ave., Midland Park, NJ 07432  
(201) 444-5075 • [editor@bjtonline.com](mailto:editor@bjtonline.com)

## BUSINESS

Founder & CEO Wilson S. Leach

Chief Operating Officer Dave Leach

Vice President Sales & Marketing Karl H. Elken

Events Director Nancy O'Brien

Michelle James—Midwestern U.S., Western U.S./  
Western Canada/Asia Pacific (520) 343-0236

Joe Rosone—Mid-Atlantic U.S./Southeastern U.S./  
Caribbean/Brazil (301) 693-4687

Diana Scogna—Europe/Middle East (33) 6 62 52 25 47

Victoria Tod—Northeastern U.S./Eastern Canada/  
Great Lakes, U.S./United Kingdom (203) 733-4184

Audience Development Director Eileen Silberfeld

Marketing & Client Services Manager

Lisa Valladares

Social Media Marketing Zach O'Brien

Sales Administrator Cindy Nesline

Director of Finance & Human Resources

Michele Hubert

Accounts Payable Mary Avella

Accounts Receivable Bobbie Bing

Advertising Inquiries

(201) 345-0085, [adsales@bjtonline.com](mailto:adsales@bjtonline.com)

Circulation/Subscription Inquiries

(201) 345-0085, [subscriptions@bjtonline.com](mailto:subscriptions@bjtonline.com)

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## Contributors to This Issue



Curt Epstein



Mark Huber



Jeff Wieand



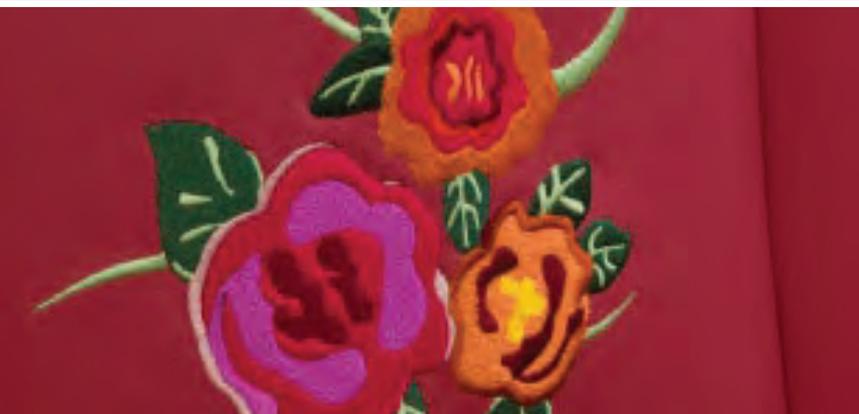
James Wynbrandt

**CURT EPSTEIN** covers FBOs as well as sustainable aviation initiatives for **BJT** sister publication *Aviation International News*, where he is a senior editor. In 2018, he won an Aerospace Media Award for Best Business Aviation submission. Here, he highlights the findings from *AIN's* latest annual FBO survey (*page 40*), which provides feedback from readers who regularly utilize private airports about the best places to land and refuel.

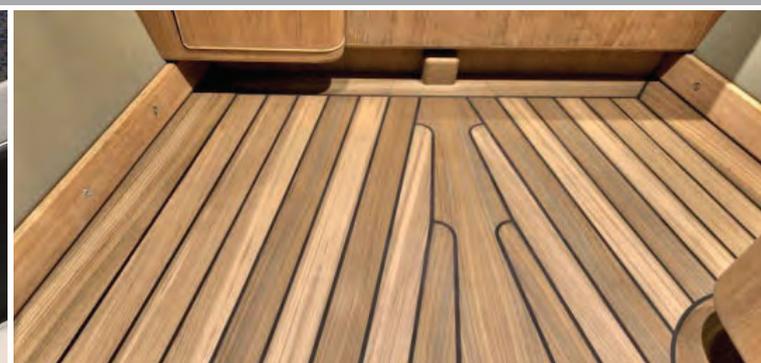
**MARK HUBER** has reviewed aircraft for us since 2005 and has been recognized in the Aerospace Media Awards and the American Society of Business Publication Editors' Azbee Awards. In this edition, he provides us with recommendations on the best aircraft for your needs, budget, and mission (*page 6*).

**JEFF WIEAND** has written for **BJT** about taxes, laws, and finance since our very first issue and has won nearly a dozen editorial awards. He is a senior vice president at Boston Jet Search and a member of the National Business Aviation Association's Tax Committee. Be sure to read his latest insights about financing an aircraft in today's crazy market (*page 28*) and what you need to know before you hire someone to manage your jet (*page 44*).

**JAMES WYNBRANDT**, who is known for his in-depth and easy-to-understand reporting, covers preowned aircraft and lift providers for **BJT** and has won 14 editorial prizes, including the National Business Aviation Association's Gold Wing Award in 2019 and 2021. Be sure to check out his roundups of new private lift offerings (*page 30*) and enticing cabin upgrades (*page 38*).



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# The Best Aircraft for Your Needs

Which airplane should you charter or buy?  
Many factors affect the answer, so our reviewer offers multiple picks.

by Mark Huber

Which wings are best for your mission? It's a question almost as old as powered flight itself. No one aircraft does everything well. But depending on your needs, some are better than others.

For 17 years, I've covered the new and used markets for **Business Jet Traveler** and flown some remarkable airplanes. Here are my suggested mission-aircraft pairings, which aren't necessarily the latest models but are the best fit in my view for the stated criteria. They're not all quite the aviation equivalent of savoring a bottle of 1959 Chateau Lafite Rothschild with chateaubriand at Restaurant Paul Bocuse in Lyon, but some can get you pretty close.

## Best Aircraft for Long-distance Travelers

### **Bombardier Global 7500**

Bombardier has delivered more than 100 of its new \$75 million flagship large-cabin, long-range jet since 2018. The aircraft can fly unrefueled for 7,700 nautical miles at speeds up to Mach 0.925 (10 passengers, four crew, average cruising speed of Mach 0.85).

The Global is the pick in this category for two main reasons: the wing and the cabin. The new-design thin wing is very efficient at cruise speeds and features a high-lift system with leading-edge slats, allowing the aircraft to have slower approach speeds and use less runway. While the cabin has the same cross section as the older Global 6000, it has been stretched by more than 11 feet, allowing for up to four distinct living zones.

Yielding 2,637 cubic feet of cabin space, the Global 7500 is designed for comfort with features including a galley that is 20 percent larger than that on the older Global 6000, with double convection/microwave and convection/steam capabilities; a mid-cabin/self-serve galley; redesigned and larger crew rest areas; panoramic passenger windows that give the cabin an airy feel; improved heating and cooling; redesigned seats; a center lounge/media room with 42- to 50-inch flat-screen monitors; adjustable color LEDs in the ceiling; a conference/dining table that seats six; a private stateroom; an optional stand-up steam shower; a robust environmental-control system; and a capacious, 195-cubic-foot baggage hold.

### Runner-up

#### **Gulfstream G650ER**

After its introduction in 2012, the long-haul, large-cabin Gulfstream G650 quickly became a popular



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ride for the world's elite. More than 200 were delivered during its first four years of production to corporations including ExxonMobil, Bank of America, and Walmart; global potentates from Saudi Arabia, Jordan, Bahrain, and Kuwait; and a variety of billionaires. What sells the G650 is the trifecta appeal of speed, range, and cabin size. In 2014, Gulfstream began offering a 7,500-nautical-mile (at Mach 0.85) variant, the G650ER. The extra-range option adds a few million dollars to the price. While the G650ER shares the G650's cabin, avionics, and systems, software for the fuel-quantity measuring and flight-management systems had to be updated to account for the extra fuel and performance gains.

Its speed and range notwithstanding, the G650's most appealing feature is undoubtedly its super-sized and refined cabin. The aircraft features 28 percent more cabin volume than Gulfstream's former flagship, the G550, itself a long-range 12- to 16-passenger jet; total cabin volume is 2,138 cubic feet. The G650's cabin door is more than six feet high, and the cabin is eight feet, six inches wide; six feet, five inches tall; and nearly 47 feet long. A cavernous 195-cubic-foot baggage compartment is accessible through the rear lav. All that space means room for larger seats, windows, and monuments. The single executive seats are 28 inches wide—two inches wider than those in the G550. The signature oval windows are the industry's largest at 28 by 20.5 inches.

Gulfstream can configure the cabin for up to 19 passengers in any of 12 standard floor plans, with forward or aft galleys and with or without a dedicated crew rest area. The conference area is

expandable from four seats to six by replacing the center cabin credenza with two single seats. With forward-galley layouts, a stateroom is an option just forward of the aft lavatory. Customers can also opt for floor plans tailored to their tastes.

## Best Aircraft for Flying into the Wild

### Pilatus PC-6 Porter

Yes, it's ugly. Almost as ugly as a trailer park privacy fence bolted atop a 1986 Plymouth Voyager minivan. But few airplanes can haul as much into runways that are high, short, and often sloped as the legendary Pilatus Porter. More than 600 were produced from 1959 through 2019. More than half of those are still flying. The high-wing, turboprop single gained fame during the Vietnam War when it was used in covert missions deep in the jungle by CIA contractors. A version built for the U.S. Air Force was fitted with a 20-mm Gatling gun and named the "Peacemaker."

Able to take off and land on runways well under 1,500 feet long, the Porter churns along at an unimpressive 125 knots but can carry up to 10 passengers or 3,373 pounds of payload over 870 nautical miles with auxiliary underwing fuel tanks. Its fixed main landing gear was designed for abuse. It can also be mounted onto floats for amphibious operations.

The structure is decidedly low-tech and no-frills, which makes for easy field repair. And just like a minivan, it sports a pair of giant sliding or hinged doors on both sides of the fuselage for easy



loading. The pilot can also drop that microfilm canister through a trap door beneath the cockpit.

Models produced after 1984 are known as the B2 variant and came standard with the Pratt & Whitney Canada PT6A-27 stuffed into the airplane's enormous nose. The aircraft has held its value remarkably well. A 30-year-old model can easily fetch more than \$700,000 and those made toward the end of its production run are routinely listed for close to \$2 million.

With the Porter, you're not arriving in a fashion statement, you're flying in a survival tool.

### Runner-up

### Viking 400

An airplane that can go virtually anywhere, do anything, and operate in the most extreme weather—and that could sell for twice what you paid for it after 30 years—might sound like a fantasy. But the iconic DHC-6 Twin Otter turboprop twin, which de Havilland Canada produced between 1965 and 1988, is just that.

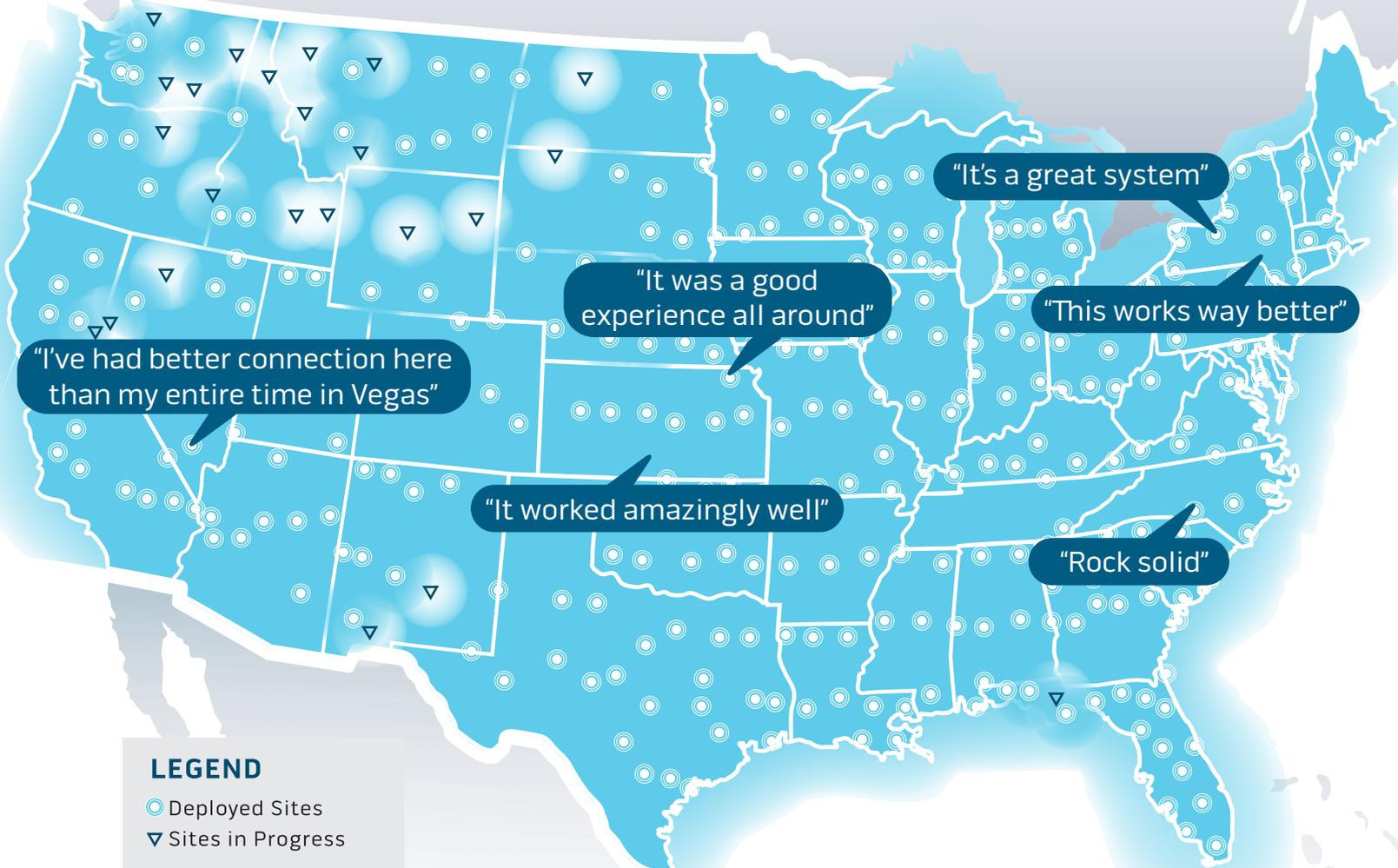


Pilatus PC-6 Porter

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In 2005, Viking Air of British Columbia purchased the assets of Bombardier's Commercial Service Center, including the product-support and spare-parts business for the Twin Otter, allowing Viking to work directly with operators. In 2006, it acquired the aircraft type certificate from Bombardier; and it restarted production in 2010, rechristening the Twin Otter the "Viking 400" and incorporating more than 800 changes and improvements. They include more powerful 750-shaft-horsepower Pratt & Whitney Canada PT6A-34 engines, robust Honeywell Primus Apex glass-panel avionics, and a modernized electrical system. Air conditioning and full de-icing systems are options.

The 400 can pop off a runway and clear a 50-foot-high obstacle in less than 1,500 feet, and with auxiliary fuel tanks can stay in the air for nine hours; maximum cruise speed is 182 knots at 10,000 feet. The cabin isn't pressurized, but the airplane will climb to 25,000 feet, and supplemental oxygen is available for passengers and crew. The main cabin entry measures 50 by 56 inches, and the cabin dimensions are generous: more than 18 feet long, nearly five feet high, and more than five feet wide.



Viking 400

## Best Aircraft for Pilots on a Budget

### Mitsubishi MU-2 Marquise

A high-performance, twin turboprop with very-light-jet speeds and room for nine passengers for as little as \$500,000. That's what you get with this stretched version of Mitsubishi's legendary MU-2 twin turboprop. Used MU-2s also cost less than half as much as comparable used turboprops, are built like tanks, and enjoy the best product support of any used business aircraft.

The MU-2 was in a state of constant evolution over its 20-year production run between 1966 and 1989, but it basically comes in two flavors: short-body, which seats six or seven; and long-body, which seats seven to nine. The long-body models have a six-foot-longer fuselage and give up 10 knots of airspeed (down to 305 from 315). The most recent versions of the short and long bodies are referred to as the Solitaire and Marquise, respectively, and these are the most desirable MU-2s on the market. Power comes from a pair of Honeywell/Garrett engines that are compact and incredibly durable, with long intervals (5,400 hours) between recommended overhauls.

### Runner-up

#### Daher TBM 700B

The TBM 700 is a single-engine turboprop from France that first flew in 1988 and was certified in 1990. The six-seat, 295-knot pressurized aircraft is mostly metal but uses some composites on the control surfaces. It zips along in the relatively less congested airspace between 20,000 and 30,000 feet,



Daher TBM 700B

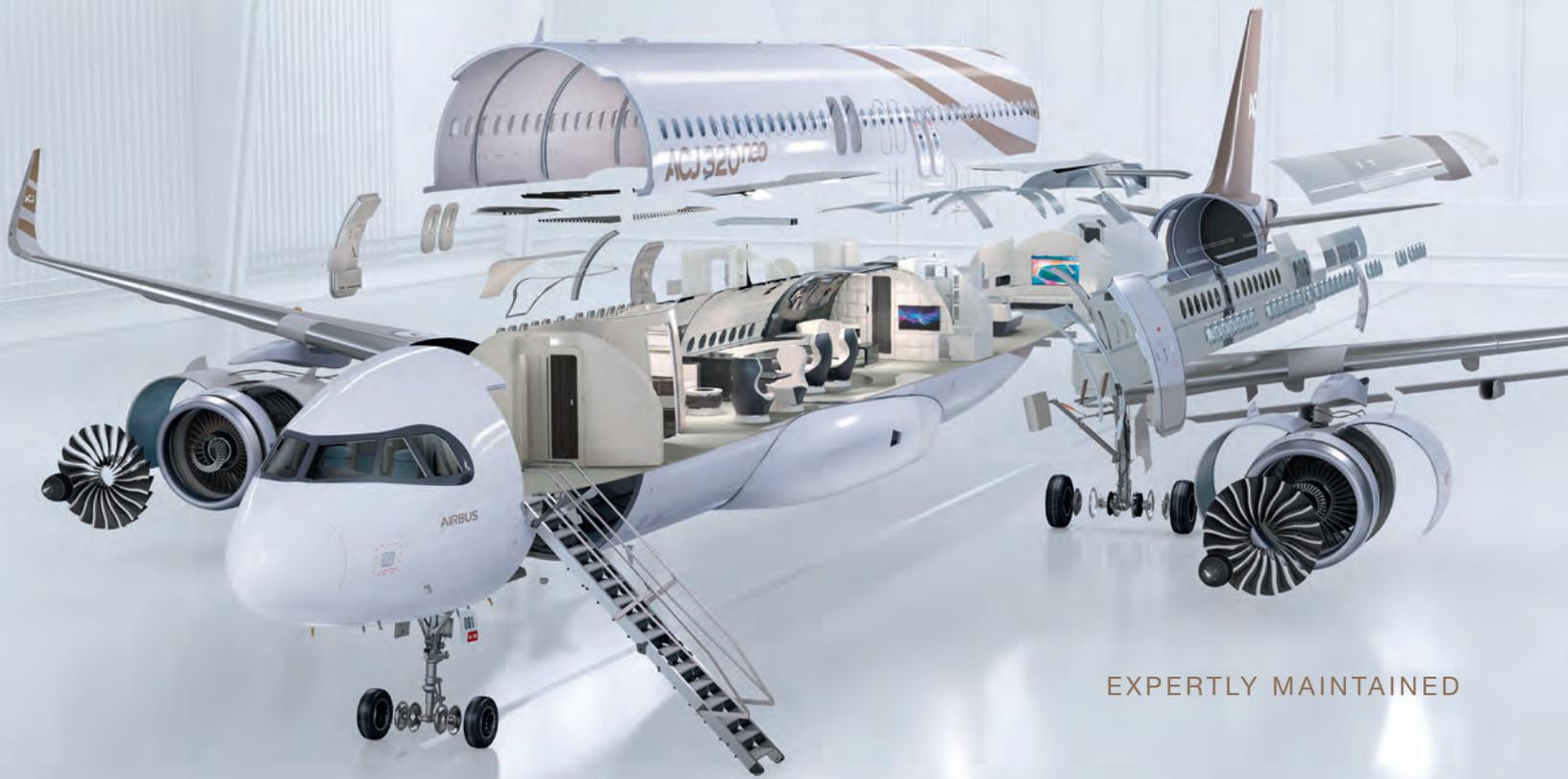
where the odds increase for more direct routing and, conversely, for running into rotten weather. Moreover, it will burn only about half as much fuel as a very light jet or twin turboprop, and it climbs like a rocket. Plus, it's a great short-runway performer. At maximum takeoff weight, the 700B will lift off from sea level in 2,133 feet.

The 700B debuted in 1999 (Serial Number 126) and Socata (now Daher) built 100 of them during the model's three-year production run. It was the first TBM to feature the oversized rear door, separate pilot door, plusher executive interior, and factory air conditioning. But, aside from the Piper Meridian/M500, the TBM has the least spacious cabin of any six-passenger turbine model. Most baggage is stored behind the rearmost row of seats in a cargo net and, if you require a bathroom, you need to ask the pilot to land. That said, TBMs enjoy a deserved reputation for ruggedness and their rakish appearance oozes speed, even when they're parked on the ramp. Shop carefully and you can find a good used one for around \$1 million.



Mitsubishi MU-2 Marquise

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Piper M600

## Best Aircraft for Short Hops

### Piper M600

Piper's M600 is ideal for an owner-pilot transitioning out of a piston-engine-powered aircraft or for a corporate flight department needing short-hop or short-field supplemental lift. The \$3.5 million single-engine, six-seat turboprop builds on Piper's M-series fuselage, which dates back to discontinued models of the 1960s.

No one would call the inside of this airplane voluminous: the cabin interiors for all M Class Pipers measure 12 feet, four inches long; four feet, two inches wide; and three feet, 11 inches tall. An M600 with a full bag of gas (270 gallons) has a sparse remaining available payload of just 422 pounds, about enough for the pilot, one passenger, and a bit of luggage. Still, on runs of 250 nautical miles, you could conceivably go seats full in an M600. Carrying just the pilot, the M600 has a range of 1,658 nautical miles (no reserves). Maximum cruise speed is 274 knots. This is an airplane that can easily use runways shorter than 3,500 feet and does particularly well under high-altitude/high-temperature conditions. Fuel burn at cruise power is 39 gallons per hour.

### Runner-up

#### Daher Kodiak

The \$2.5 million Daher Kodiak is a niche, no-frills, single-engine turboprop designed to get in and out

of tight spots under harsh conditions. The unpresurized aircraft gained certification in 2007 and since then more than 265 have been delivered. The basic aircraft features a 45-foot-long high wing mated to a rugged aluminum fuselage with a large 54-by-57-inch rear cargo door, heavy-duty and high-riding fixed landing gear, a time-tested Pratt & Whitney PT6A-34 series stuffed in the nose, and Garmin's G1000 series glass-panel avionics in the cockpit.

The Kodiak has a maximum cruise speed of 183 knots, seating for nine passengers and one pilot, 248 cubic feet of cargo space without the passengers, and an endurance of close to 10 hours when you pull the power back to 95 knots. At 174 knots, the airplane will get you about 1,000 nautical miles



Daher Kodiak 900

of range. It comes standard with fixed landing gear but can be mounted on aluminum or fiberglass straight or amphibious floats. A new version of the Kodiak, the 900 model, was released at the EAA AirVenture show in July. Both versions will continue to be available, but the \$3.5 million 900 offers a 3.9-foot fuselage stretch and a top cruise speed of 210 knots, thanks to its PT6 engine with an additional 150 shaft horsepower.

## Best Aircraft for Family Vacations

### Embraer Legacy 650E

When you are traveling with children, one aircraft attribute trumps all others: cabin space. And the \$27 million Embraer Legacy 650E twin-jet has an ample amount—1,410 cubic feet. The cabin is 43 feet long, six feet high, and just under seven feet wide with seating for up to 14. There is also a cavernous 240-cubic-foot baggage hold that can swallow up to 1,000 pounds of stuff.

Priced like a super-midsize jet but with the roominess of a large-cabin model, the 650E builds on its predecessor, the Legacy 650, and adds the Honeywell Ovation Select cabin entertainment and management system (because children must be entertained). The typical executive cabin features a forward galley and closet; four large executive seats (for the grownups) arranged in a facing group sharing two foldout tables; four slightly smaller seats with a conference table and

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an opposite-facing credenza; and an aft stateroom area with two more large single seats (perfect for those timeouts), a foldout table, and an opposite-facing divan or couch. The divan is available with a berthing top that slides out to create a comfortable sleeping surface. The six large executive seats recline, track forward, and aft and swivel. The lavatory contains a generous wardrobe closet, ideal for in-flight clothes changing.

## Runner-up

### Pilatus PC-24

Powered motion delights children of all ages, so you may well have kids who enjoy dirt bikes, snowmobiles, and the like and want to take them along on vacation. If so, you want a light jet with a mammoth cargo door big enough to swallow such toys. This is your ride. The Pilatus PC-24 is a flying SUV with a pair of jet engines can land on short grass or dirt strips. Pilatus calls it a “Super Versatile Jet.”

Tranches of \$12 million (price new) Pilatus PC-24s, representing several years of production, sold out even before the first aircraft rolled off the



assembly line. Over its first four years of production, the company delivered 250 of them. Want to order a new one? Get ready to wait. Want a used one? Get ready to pay up to 122 percent of the price of a new one, according to the aircraft valuation service Vref.

This airplane is genius on almost every level: it can be flown single pilot. The Williams International FJ44-4A engines have automatic thrust reserve and a quiet power mode in place of an auxiliary power unit to provide ground power. The engines help propel the PC-24 to 45,000 feet in less than 30 minutes and achieve a maximum cruise speed of 440 knots at 30,000 feet. Range with four passengers is 2,000 nautical miles. The 501-cubic-foot passenger cabin has a flat floor and is available with layout

choices that include executive, commuter, combi, medevac, special-mission, and quick-change configurations; you can also opt for an externally serviced lavatory (forward or aft) and any of several galley setups. The executive configuration features comfortable seating for six to eight.



### Boeing BBJ 747-8i

Production of the latest passenger variant of the venerable 747 quad engine jumbo jet began in 2011 and ended just a few years later. In total,



Boeing bagged a mere 155 orders for the 747-8, and more than two-thirds of those were for the cargo-only variant. The last of those will be produced this October. Airlines and VIP customers claimed the rest. Those sold as dedicated Boeing Business Jets amounted to a scant eight. Outfitting those aircraft routinely took 36 months after the aircraft left Boeing sans paint and interior. In VIP configuration it can carry 100 passengers 9,260 nautical miles nonstop. That's 22 hours in the air, long enough to exhaust the duty times of two flight crews and require a third. The aircraft offers a spacious 4,786-square-foot, 20-foot-wide cabin, a cruising speed of Mach 0.86, and a dash speed of Mach 0.92 or 533 knots/614 mph.

Designers looked at all the 747-8's interior space and drooled dollar signs, imagining two-story ballrooms, dramatic open lofts, and vaulted and trayed ceilings. A few VVIP 747-8s were finished to this level of opulence. The Qatari royal family took two to add into its livery of a dozen converted airliners. But both were placed onto the resale market before long. One airplane had flown only a little over 400 hours. Finding a buyer at market price—around \$567 million—for such a flying palace is nearly impossible, so one of the airplanes was gifted to Turkish President Recep Erdogan.

## Runner-up

### Airbus A340-500

The Airbus A340 quad-engine jets come in four main variants—the Dash 200, 300, 500, and 600 models—starting with footprints that are nearly 200 feet long and a wingspan of almost 200 feet and proceeding to 247 feet long and a wingspan of 208 feet, with maximum takeoff weights of 606,000 to 840,000 pounds. The larger A340-500 and 600 vari-



ants are powered by the Rolls-Royce Trent series 500 engines, with 54,000 pounds of thrust each. The 500 was the world's longest-range commercial aircraft at its introduction in 2002, able to carry 313 passengers 8,650 nautical miles; in VVIP configuration, that range can be increased to 9,900 nautical miles.

This is an airplane so large that you can bring along your spouse, lots of friends and relations,

dozens of children, their nannies, tutors, your butler, cooks, valets, stewards, footmen, personal aides, security staff, translators, deputy ministers, a dozen pesky reporters, and all their truckloads of stuff. There's room inside for an elevator, three kitchens with ovens big enough to roast a whole goat, a fully equipped operating room, and a secure communications suite in the cargo hold. What's not to like?

## Best Aircraft for Bargain-hunters

### Hawker 4000

The super-midsize Hawker 4000 represents an opportunity to purchase a relatively new aircraft for under \$4 million, but there are some caveats in terms of aircraft condition, maintenance, and parts availability. Hawker Beechcraft produced 76 of these jets before it declared bankruptcy in 2012. Textron Aviation, which acquired the company's assets two years later, did not resume production, and support for the aircraft is something less than robust. Many parts for the 4000 can be hard to come by and generally need to be made to order by Textron. Approximately 67 of the airplanes are still in service.



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The 4000's stand-up, flat-floor cabin features seating for eight or nine passengers in double- or single-club configuration plus a half club opposite a three-place berthing divan. A forward cabin galley, two forward closets, and a rear cabin lavatory with walk-in baggage compartment with external access complete the layout. The 100-cubic-foot baggage compartment can be accessed when the aircraft is flying below 41,000 feet. The 4000 was the first business jet designed around Honeywell's Primus Epic integrated electronic flight deck and Honeywell's cabin-management system. The aircraft features some fly-by-wire controls, including those for the rudder and spoilers. It needs 5,088 feet of runway at its maximum takeoff weight of 37,500 pounds. The range is 3,393 nautical miles.

## Runner-up

### Learjet 35A

Learjet produced more than 600 model 35A light jets between 1976 and 1993, and used ones trade today for \$400,000 to \$1 million. More than 400



are still in service and the aircraft continues to be supported by parent Bombardier, which shuttered the Learjet brand earlier this year.

The airplane requires a two-pilot crew and offers seating for up to eight passengers. This is a jet built for speed. The cabin measures a tight 12.9 feet long by 4.9 feet wide by 4.3 feet tall and volume is just 268 cubic feet. The sparse 40-cubic-foot baggage hold is something of an afterthought. There is no lav per se. Rather, a privacy curtain in the front of the aircraft can be undone and a cushion on one of the regular seats

folds up to reveal a pool of blue water below. If you are shy, this is not the airplane for you. Two Honeywell TFE731-2-2B engines power the 35A, which can fly at speeds up to 464 knots and has a brisk climb rate of 3,500 feet per minute, a service ceiling of 51,000 feet, and a range of 2,400 nautical miles. But bring your gas card. The 35A burns up to 200 gallons per hour and has a fuel capacity of 931 U.S. gallons.

Numerous modification kits were fitted to the aircraft from both the factory and third-party providers that can increase gross weight, improve range and handling, reduce approach speeds and runway requirements, and add baggage capacity via wing lockers. Similarly, a variety of instrument panel modernizations are available.



## Best Aircraft for Environmentalists

### Dassault Falcon 8X

The 8X long-range trijet builds on the features and





# BEYOND PROFICIENT... TO PREPARED!

Have you ever wondered what it takes for a person to be entrusted with the operation of a multi-million dollar bizjet and the lives of all souls on board? Certainly, pilots of business aviation aircraft must complete a few years of training; learning systems, regulations, and procedures while gaining valuable experience flying various types of aircraft. Many even earn a Bachelor's degree on the way.

But after all that training is complete and the pilot starts flying high-net-worth passengers, how does he or she continue to stay sharp? After all, do you remember how to calculate the area of a circle or diagram the structure of a sentence, assuming you're not an engineer or English teacher?

The point is, if it's not something you do every day, you're not likely to have the skills at hand when a situation warrants that skill.

It's the same with flying, and that's where simulator training comes in. While federal regulations require business aviation pilots to undergo recurrent training to stay proficient, FlightSafety goes beyond to help prepare pilots for situations not covered in the regular proficiency checks like unstable approaches, emergencies that can't be simulated in the aircraft, and recognizing when to go-around.

Who do you want for your pilot? A proficient pilot, or a prepared pilot?



# THANK YOUR PILOT ON THE NEXT GO-AROUND

## FLIGHTSAFETY AND PRESAGE GROUP STUDYING PSYCHOLOGY OF GO-AROUNDS TO ENHANCE AVIATION SAFETY

Working in your bizjet's cabin, you notice subtle changes that indicate the airplane is in descent. Sure enough, the seatbelt sign illuminates and you fasten your seat belt for landing. As the landing gear extends, you know you'll be on the ground in just a few minutes. But then you hear the engines spool up again and there's the unmistakable feeling of acceleration. You realize the aircraft is climbing and you may think, "What's going on?"

If you've never experienced a go-around before, it can be a bit startling to rapidly transition from the descent to level off or climbing. Sometimes the startle factor develops into irritation or anger at the delay. But a go-around is a normal maneuver that pilots practice often, and if your pilots perform one, it's a good bet that something wasn't right, and the safest choice was to climb to a safe maneuvering altitude and fly another approach.

"Pilots know they are flying some very high-net-worth individuals that often expect perfection," said Richard Meikle, executive vice president of operations and safety for FlightSafety International. "A go-around may be perceived by some as less than perfection, when in reality it might be

exactly what is needed. It should be a moment for praise: thanks for doing what you needed to do to keep us safe."

### ANATOMY OF A GO-AROUND

Transitioning an aircraft from landing configuration to climb configuration involves several steps, and a go-around is one of the busiest "normal" procedures that pilots practice. It involves making the decision to go-around, applying power to arrest the descent, pitching up to begin climbing, retracting flaps and landing gear at appropriate times, communicating with air traffic control, and possibly reprogramming the navigation system. Most business aircraft today have features to assist the pilots; depending on the aircraft, pressing the Go Around button may automatically increase the throttle, disengage the autopilot, or command it to fly a missed-approach pattern, and/or set pitch attitude and altitude guidance indicators on the flight deck.

"Although it's an uncommon procedure, there is nothing unsafe about a go-around," said Meikle. "It's essentially a modification of the same procedures used during takeoff."

Go-arounds are uncommon because once the aircraft is

configured to land in a stabilized approach, the reasons for not landing don't occur often. One of the most obvious reasons for going around is another aircraft or vehicle unexpectedly appearing on the runway. Air traffic control may also request a go-around for spacing between aircraft or other reasons; they may leave the aircraft high, resulting in the crew not being able to continue to a touchdown in a stable condition.

Weather can throw more curve balls on final approach. A thunderstorm even 20 miles away can generate strong downdrafts, hail, and gusty winds that can destabilize an approach. Fog or mist can hamper visibility; depending on the airport approach minimums and the equipment on board, if the pilots cannot physically see the runway by a certain minimum altitude, they must perform a "missed approach" and either try again or divert to another airport.

### **PRESSURED TO LAND**

The hardest go-around decision for a pilot to make, however, is when the approach is just subtly destabilized: a little too fast or too slow, a little too high or too low. Perhaps ATC requests required maneuvering that resulted in a destabilized approach; a switch to a different runway, vectors to avoid traffic, requests to maintain a slower or faster speed than normal, or direct the crew to maintain a higher altitude than normal can all result in the aircraft not being in exactly the right configuration when it passes through the decision "gates" established for safety.

Feeling the pressure of wanting to get the airplane on the ground—whether because of pride, perceived peer or professional pressure, or continuation bias—pilots sometimes try to salvage unstable approaches rather than go around to set up again, especially at high-traffic airports. Usually there's sufficient runway length to absorb a slightly unstable approach, and the pilots get the aircraft stopped in time. But for as many as two aircraft per week worldwide, the runway length or width is not enough for the resultant landing and the airplane rolls off the runway in what's known as a runway excursion.

"The vast majority of runway excursions are the result of a landing continued from an unstable approach that should not have been allowed to continue," said Meikle. "Despite the publication of stabilized approach criteria, the go-around from an unstable approach rate has not shown any material difference for quite a few years."

According to Meikle, less than 2 percent of unstable approaches result in a go-around. And while only a fraction of the other 98 percent of unstable approaches result in runway excursions, Meikle and his team at FlightSafety want to understand the psychology preventing pilots from making go-around decisions that could prevent more runway excursions.

“Although it's an uncommon procedure, there is nothing unsafe about a go-around. It's essentially a modification of the same procedures used during takeoff.”

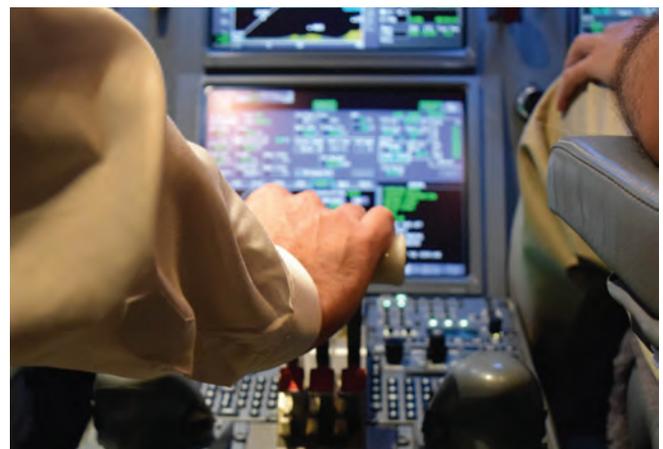
"With runway excursion events continuing in the business aircraft sector, we have to do more to address the root cause," Meikle said. "By focusing on the decision-making leading up to touchdown in training, we can directly attack the threat in flight operations."

### **STUDYING PILOT PSYCHOLOGY**

To understand the pilot psychology regarding go-arounds, FlightSafety has partnered with Presage Group, a world leader in predictive human behavior in the workplace, to study aviation go-around decision-making by two-pilot Gulfstream G550, G600, and G650 business jet crews. The study, which began during summer 2022, builds on a previous Citation Jet Pilots Association / Presage / FlightSafety endeavor that studied single-pilot go-around decision-making in 2020-21 and led to CJP's Safe to Land Initiative in 2022.

"The focus of the [Gulfstream] study is the management of environmental instability," Meikle said. "Some of the approaches will be completely normal with no reason to go around, and others will have just a minor variation to cause the instability. After each one, the pilots will be debriefed on their decision-making process and the factors that led them to go around or not...Once a pilot gets past expectation bias from being in the study, it really becomes an interesting scientific experiment. When I went through it [for the CJP study], it was some of the most powerful time I've spent in a simulator in my career."

Presage's Gulfstream pilot study will take place through early 2023 at FlightSafety's Savannah, Georgia Learning Center where

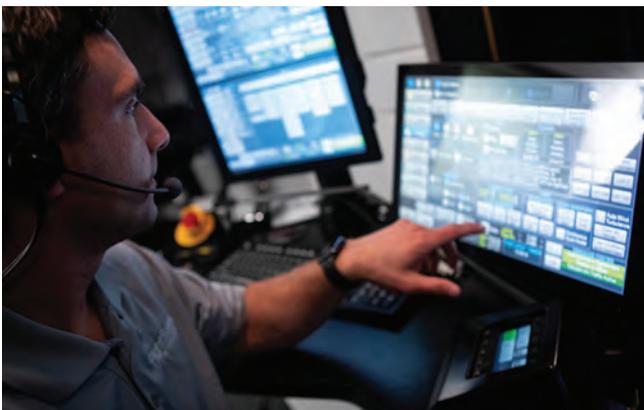


half of the 20 participating crews will receive new procedures and guidelines developed and updated from the earlier CJP study. The other half will serve as a control group, using their own experience to determine which situations require go-arounds. Each crew will perform about 10 approaches with a mix of varying environmental difficulty. At the end of the study, Presage will use its proprietary methods and intellectual property to make key recommendations to be rolled out in future FlightSafety curricula.

“Using our psychological tool to understand human behavior in the moment adds an important capstone to conventional procedural development, which goes beyond what normal operators do. It’s a switch in thinking,” said Piyush Gandhi, vice president of operations and business development at Presage in a press release about the Gulfstream study. “When this methodology was deployed with the Citation Jet Pilots Association, also in partnership with FlightSafety, the results were revolutionary. We intend to do the same for Gulfstream operators.”

The various Gulfstream models chosen for the study will help gauge whether a difference in control methodology affects pilots’ decisions to go around; in most two-pilot crews, either pilot can initiate the go-around. The G500 contains control columns where the pilot and copilot each have their own control yoke on top of a column directly in front of each pilot. The columns move together and can be seen out of each other’s peripheral vision. The G600 and G650 contain side sticks that are essentially out of the normal field of view.

“If I’m the non-flying pilot, and I can see the control column moving relatively quickly in my peripheral vision while monitoring the aircraft’s flight path, I can tell that the pilot flying the airplane is dealing with more instability than in a normal approach,” said Meikle. “But in a side-stick situation, it’s very difficult to sense what the other crewmember is doing as their hand movements are much smaller and the side-stick is out of the normal field of view. By using the two different platforms in the study, we’ll see if that factor influences the go-around decision-making process.”



Another interesting comparison will be the difference in go-around tendencies between the Citation pilots and Gulfstream crews. Besides the single-pilot/dual-pilot difference, the smaller Citations are about one quarter the weight of a Gulfstream 600 and pilots can make the go-around decision lower and later than Gulfstream pilots.

“It’s going to be a very interesting comparison because the Citation and the G600 are almost the bookends of the business aviation sector,” said Meikle. “There’s real strategy in having the same vendor do both studies because now we’re using the same methodologies with minor variations to accommodate the differences in the fleets, and we may find that one has a particularly unique characteristic that triggers a follow-on study in a different category of airplanes like the super midsize.”

### TAKING THE DATA A STEP FURTHER

After the study has been completed and analyzed, Presage and FSI will develop course content and scenarios to use exclusively in FlightSafety training. During this phase, FSI will also pull in additional insights gathered from its partnership with GE Digital, which collects and analyzes anonymous and aggregated flight data from more than 300 operators and 1,300 business aircraft.

“We already have some great insight to approach stability and trouble spot airports through the GE Digital partnership that we address in training,” said Meikle. “For example, we’ve seen that sometimes air traffic controllers insist the aircraft maintain higher speeds to the final approach fix. While this helps the controller, it can put the pilot in a less stable position because newer aircraft are very hard to slow down on short final. They can find themselves coming in high and fast which if not managed correctly, or a go-around is not initiated, could result in an overrun of the runway. Now we can focus the training even more precisely on stable approach criteria, and soon we will add the psychology of the go-around decision by combining the insights from GE Digital data analysis of actual flights with the results of the Presage go-around studies. All this will further enhance the effectiveness of FlightSafety training.

“By better preparing pilots to manage situations they may experience in the real world, we’re enhancing aviation safety,” said Meikle. “If just one crew makes the go-around decision that they might not have done otherwise—resulting in a non-event instead of a runway excursion with potentially catastrophic consequences—then we’ve done our job and every penny we’ve invested in the Presage studies and the GE Digital Partnership will be worth it.”



# YOU'RE IN GOOD HANDS

## FIGHTSAFETY PREPARES PILOTS AND AVIATION PROFESSIONALS TO HANDLE THE EXPECTED AND UNEXPECTED

When was the last time you had to take a test that put your job on the line? A multifaceted, multi-hour assessment of your physical skills, decision-making ability, and systems knowledge that, if you failed, could cost you your employment? Depending on the type of operation and their crew position, pilots may be required to take a check as often as every 6 months or as infrequently as every 24 months.

If the pilot cannot demonstrate proficiency in any of the required maneuvers to the examiner during the annual checkride, he or she cannot fly in the commercial operation again until they are retrained and a subsequent proficiency checkride is satisfactorily completed.

### BEYOND THE REGULATORY REQUIREMENTS

While the FAA regulatory requirements may seem strict—especially to those in professions that don't require such formal testing—some in the industry feel they're not enough.

"Virtually all the pilots involved in accidents have been legally proficient," said Brian Moore, senior vice president of operations at FlightSafety International [Moore has since been promoted to CEO and director of operations at FlightSafety Textron Aviation Training]. "That's why we're not satisfied with just meeting the regulatory requirements. It's not about just

checking the boxes and sending the pilots out there but training to achieve the highest level of preparedness and safety."

FlightSafety has provided simulator training for business aviation pilots since A. L. Ueltschi, a pilot for Pan American Airways, founded the company in 1951 under the premise that business aviation pilots should have access to the same high-quality training as airline pilots. Today's high-fidelity full-motion simulators allow pilots to experience scenarios that can't or shouldn't be performed in the aircraft, from equipment failures to extreme weather to difficult approach and runway configurations.

"FSI has a relentless focus on enhancing the quality of our course, the realism of the simulator, and the quality of our instructors with the goal of helping each pilot become more proficient and prepared out in the field," said Moore.

Each recurrent training course combines several hours of "ground school"—including a refresher on aviation rules and regulations plus aircraft-specific systems training—with flying procedures and maneuvers in the simulator under the watchful eyes of an experienced FlightSafety instructor. Both the FSI courseware and the instructors go beyond the regulatory checkboxes by introducing scenarios that provide a deeper understanding of aircraft systems and codependencies.

## PARTNERSHIPS KEY TO CONTINUOUS IMPROVEMENT

Some scenarios have developed out of FSI's partnerships with aviation industry leaders. Working with GE Digital data analysts since late 2021, a team of FSI safety experts work with instructors to address trends and insights from the aggregated data of more than 1,300 business aircraft, incorporating the insights into FSI courseware as appropriate. For example, the team created a 15-minute brief focused on stable-approach execution after GE Digital data pointed to a correlation between unstable approaches and aircraft overrunning the runway.

"We're so excited about the partnership with GE Digital because we're interested in where the data indicates the industry is struggling, and then targeting those issues from a training standpoint," said Moore. "If we can focus on what's happening out there in the real world and provide enhanced training in those areas, those pilots will be more prepared to handle those situations in real life."

Another key partnership involves working with the Presage Group, a leader in predictive human behavior in the workplace, to conduct studies on go-around decision-making by single-pilot and dual-pilot operations. The single-pilot study, conducted at FSI in conjunction with the Citation Jet Pilots Association, resulted in the association's Safe to Land Initiative, which was rolled out in January 2022. A second study initiated by FSI focuses on dual-pilot crews in Gulfstream G500/G600 and G650 aircraft, with insights and comparisons between the two studies to be incorporated into FlightSafety Gulfstream training sometime in 2023.

"We invest heavily in internal instructor training to enhance not only their technical knowledge but also their teaching manner by incorporating the latest in adult learning theory," said Moore. "We help the instructors with their approach to identifying areas of improvement with individual pilots to help them become more prepared out in the field."

FlightSafety instructors are also encouraged to remain actively flying in business aviation to bring that experience back to the



classroom. Instructor safety groups pool their knowledge and experience to identify gaps and help shape curriculum. For example, after a high-profile 2020 helicopter accident, an FSI instructor safety group developed an Inadvertent Flight into Instrument Meteorological Conditions for Rotorcraft spotlight, which was subsequently incorporated into all recurrent rotorcraft training.

"About a month after we rolled out the Inadvertent IMC curriculum, a helicopter pilot from a state agency who went through the course with his tactical officer was flying a night mission and had an encounter with inadvertent IMC," said Moore. "He applied the training and was able to recover back to base. He wrote us a long letter crediting the FSI training with saving their lives."

“ We help the instructors with their approach to identifying areas of improvement with individual pilots to help them become more prepared out in the field. ”

## EXECUTIVES IN BACK NEED EXECUTIVE-LEVEL EXPERTISE UP FRONT

Simulator training is not cheap, and there are times when aircraft owners or operators balk at the cost of sending their crews every six to 12 months. But doing so allows them to build a higher degree of skill and experience than flying alone provides. In a continuous-improvement environment like FlightSafety's, pilots benefit from the wisdom of instructors and shared experiences of other pilots.

"Who do you want flying the airplane?" asked Moore. "Someone with a basic-level knowledge who has done just enough to check the boxes, or a PhD-level individual who knows the aircraft inside and out, and who's been training in a simulator in all sorts of scenarios?"

Moore likened the need for professional pilots to the need for professional translators in a business situation. "If you're going to Paris for personal reasons but you don't know any French, you can generally get by with Google Translate," said Moore. "But if you're conducting high-level business negotiations in French, you need a top-notch translator fluent in English and French who also understands terms specific to your business or industry."

FlightSafety provides ample opportunities for pilots to continue sharpening their skills and expanding their knowledge beyond the classroom. FSI maintains an extensive library of online courses in topics such as navigation, international procedures, human factors/crew resource management, avionics, safety, and security. These are available to any pilot, with many courses under \$250.



“These courses are geared towards rounding out pilot knowledge and refreshing them on specific types of operations,” Moore said. “Recently, we completely overhauled our international procedures course to capture recent operational changes in the region.”

FlightSafety’s Master Aviator program recognizes those pilots who attend training at least every eight months (initial, recurrent, or prior-experience course) and complete a certain number of supplemental simulator, eLearning, or LiveLearning courses. The aircraft-specific program covers 21 models from Airbus Helicopters to Gulfstreams, so pilots can earn Master Aviator status in more than one aircraft.

### **MASTER-LEVEL EXPERTISE FOR NON-PILOT AVIATION PROFESSIONALS**

Though FSI is known for its simulator pilot training, it also provides in-depth training for other aviation professionals, including cabin and flight attendants, aircraft schedulers and dispatchers, and maintenance technicians. Maintenance technicians can earn Master Technician certificates in six areas: airframe, avionics, cabin systems, composites, engine-specific, and management.

“The core training for technicians is just as intensive as our pilot training,” said Moore. “Recently we’ve even introduced virtual engine simulators that allow technicians to practice taking apart engines, installing line replaceable units, and troubleshooting scenarios. Large corporate flight departments can come to FSI for one-stop shopping: pilot, cabin crew, and maintenance personnel training are at the same intensive level, ensuring a high level of proficiency and preparedness across their entire flight department.”

### **CONFIDENCE FOR BACK-SEAT DRIVERS**

FlightSafety has even developed courses for the VIPs in the back of the corporate airplane and spouses of single-pilot owner-operator aircraft. The Executive Emergency Training course is tailored to business aircraft passengers to provide a basic understanding of aircraft systems, onboard emergency equipment, and security and safety procedures. These can be especially important for international operations.

“We send instructors all over the world, so we conduct risk assessments to determine the risks going into various areas,” said Moore. “We look at health risks, safety, security, and much more, and roll those into the executive training.”

For spouses and family members who fly with single-pilot operators, FSI offers the Confidence Builder program. This program incorporates classroom training with simulator time to train non-pilots on how to get the aircraft back on the ground safely if the pilot becomes incapacitated, as recently happened on a Cessna Caravan flying from the Bahamas to Fort Pierce, Florida. A passenger with no previous flight experience landed the single-engine aircraft in Palm Beach, Florida, based on guidance from an air traffic controller after the pilot became sick and fell unconscious in the air.

“The passenger kept his composure and air traffic control did an amazing job of coaching him back on the ground,” said Moore. “Our Confidence Builder course does exactly that—shows what to do, how to contact ATC, and how to manipulate the gear and power levers to land safely. And then they fly a few scenarios in the simulator to gain the confidence that they could do it for real if they had to.”



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Dassault Falcon 8X

flight characteristics that have made the Dassault Falcon 7X popular, adding increased utility and luxury and a 43-inch fuselage stretch. The aircraft has a fast cruising speed of Mach 0.9, a range of 6,450 nautical miles (with eight passengers and three crew, at Mach 0.8), 500 more than the 7X. The extra range—courtesy of an additional center-fuselage fuel tank and a lighter, redesigned wing—enables the 8X to fly nonstop from Hong Kong to London, Paris to Singapore, and Beijing to Los Angeles. The reworked wing also keeps the 8X competitive on short runways; it needs 6,000 feet to take off fully loaded but can stop in 2,150 feet. The Pratt & Whitney Canada PW307D engines have been optimized to offer 6,725 pounds of thrust each, with a 5 percent thrust increase and lower emissions. Dassault claims the 8X is up to one-third more fuel-efficient than other offerings in this class.

### Runner-up

#### Eclipse 550

Eclipse manufactured nearly 300 of its very light, six-seat twinjets between 2006 and 2017. The

airplane offers 1,125-nautical-mile range, 370-knot top speed, and low direct operating costs. Pilots routinely see fuel burns at maximum cruise altitude of less than 60 gallons an hour and can easily use runways shorter than 3,000 feet.

Production of the Model 550 began in 2013. Some of these are remanufactured Model 500s and these updated versions host a variety of improvements and sell used for between \$1.8 million and \$2.3 million. Like the original model 500, the 550 is certified for single-pilot operation. Cockpit avionics



Eclipse 550

upgrades include synthetic and enhanced vision; sharper, more powerful display screens; a separate avionics standby display unit; dual integrated flight-management systems; and autothrottles for smoother, more efficient engine operation. The aircraft also adds new electronic antilock brakes.

An upgraded cabin features higher-grade, piped leathers; finished carpets; more robust table and cup-holder attachments; better handrails; a one-piece headliner that improves aesthetics; a portable server; iPad and Bluetooth connectivity; and an intercom system for pilot-passenger communications. Still, the passenger cabin is somewhat tight, the luggage compartment is little better than a shelf, and there is no lavatory.

### Best Aircraft for Travelers in a Hurry

#### Cessna Citation X+

Cessna manufactured 29 Citation X+ aircraft between 2014 and 2018. It is an updated version

of the original Citation X that was made between 1996 and 2012 and sold 313 copies. Both the X and X+ are rockets. The X+ was the fastest production business jet you could buy with a top speed of Mach 0.935 and a cruising speed of 528 knots, seating for eight to 12, and a range of 3,460 nautical miles.

A near-supersonic top speed isn't the Citation X+'s only standout feature. It also boasts a new Garmin G5000 avionics glass cockpit; an updated, mood-lit, and uber-connected cabin; elliptical winglets; and more powerful Rolls-Royce engines, a tad more speed and range, and better brakes than its predecessor offers. But it could not overcome the birth defects that it inherited from the airplane's first generation, the original Citation X, which hit the market in 1996. Those include a narrow, stoop-over cabin replete with a 1960s-style trenched center aisle, complex hydraulics, and direct operating costs that are 25 to 33 percent higher than those of a stable of competing super-midsized aircraft—business jets that have wider,

taller cabins and burn a lot less fuel.

The Citation X+, posting economic numbers that were increasingly hard to defend, never found a sustainable audience. You can purchase a good used one for less than \$12 million. Ten of the 29 buyers were upgrading from old Citation Xs. Like the supersonic airliner Concorde and the Mach 3 plus SR-71 U.S. spy airplane, the X+ fell victim to the actuary's knife. The X and X+ are one-trick ponies that were built for speed. And the trick got old.

## Runner-up

### Gulfstream G500

In October 2014, Gulfstream Aerospace formally launched two large-cabin jets designed to replace its G450 and G550 models: the G500 and the G600. The top speed for both aircraft is Mach 0.925, the same as for Gulfstream's G650ER. With the introduction of the G500 and G600, all the company's large-cabin



models will pay homage to the need for speed.

Possible nonstop city pairs for the G500 include Istanbul to Cape Town, South Africa; Los Angeles to London; and San Francisco to Tokyo. The aircraft has a range of 5,300 nautical miles at Mach 0.85. The spacious 1,715-cubic-foot cabin can seat up to 13 across three living areas. **BJT**



Cessna Citation X+

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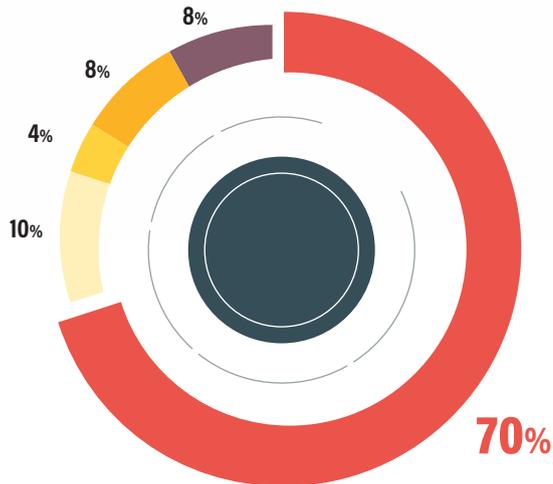
**BUSINESS JET TRAVELER'S 12<sup>TH</sup> ANNUAL**

# READERS' CHOICE SURVEY

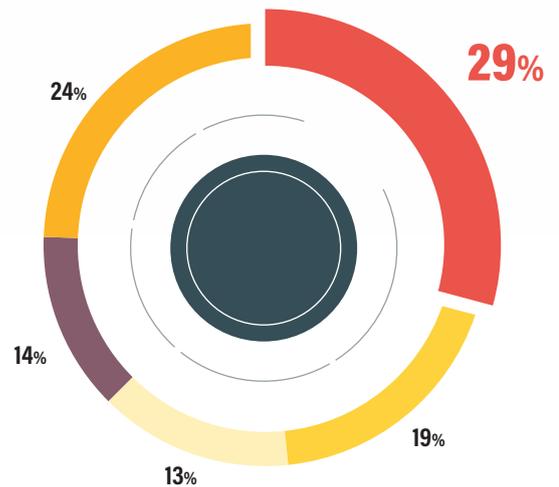
Here are the results of our 2022 Readers' Choice survey. Our thanks to the 1,289 of you who took the time to share your opinions and experiences. As promised, we have made a contribution for every completed survey to Corporate Angel Network, which arranges flights on business aircraft to treatment centers for cancer patients.

## FLYING PRIVATELY

How long have you been flying privately?



About how much flying do you do in a typical year?



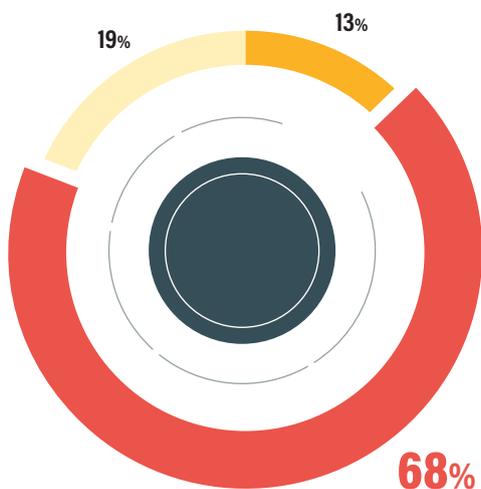
- More than 10 years
- Less than 3 years
- 3-10 years
- I haven't flown privately but am considering it
- I don't fly privately and have no plans to do so\*

- More than 100 hours
- 51-75 hours
- 76-100 hours
- 25-50 hours
- Less than 25 hours

\*Readers who selected this response were not asked any of the questions that follow.

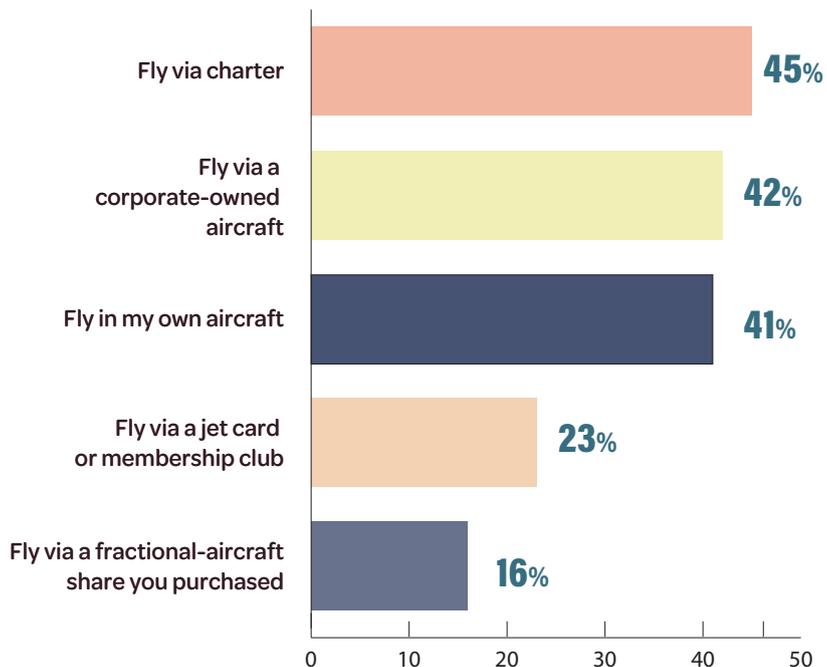
Note: Percentages don't always total 100 due to rounding and because respondents were allowed to select multiple answers for one question.

Which statement best describes your decision to begin flying privately?



- I have long been able to afford flying privately but just happened to begin in the last two years.
- Changes to my financial situation allowed me to begin.
- The pandemic provided the impetus.

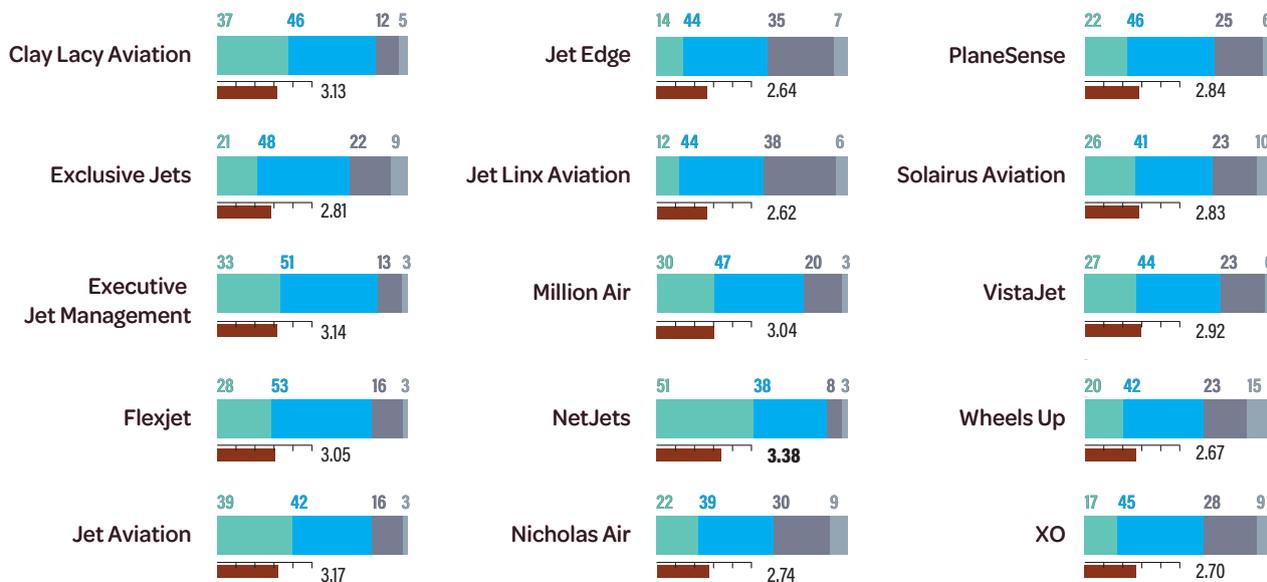
Please indicate which of the following you have done in the past two years or plan to do within the next two years (check all that apply)



## LIFT PROVIDERS

Please indicate your overall impression of each of these lift providers. (Asked of all respondents)

■ Excellent   
 ■ Good   
 ■ Fair  
■ Poor   
 ■ Weighted Average\*



Note: results exclude those who responded with "don't know/not sure."  
 \*Determined by assigning points to ratings: Excellent (4), Good (3), Fair (2), Poor (1).

# LIFT PROVIDERS

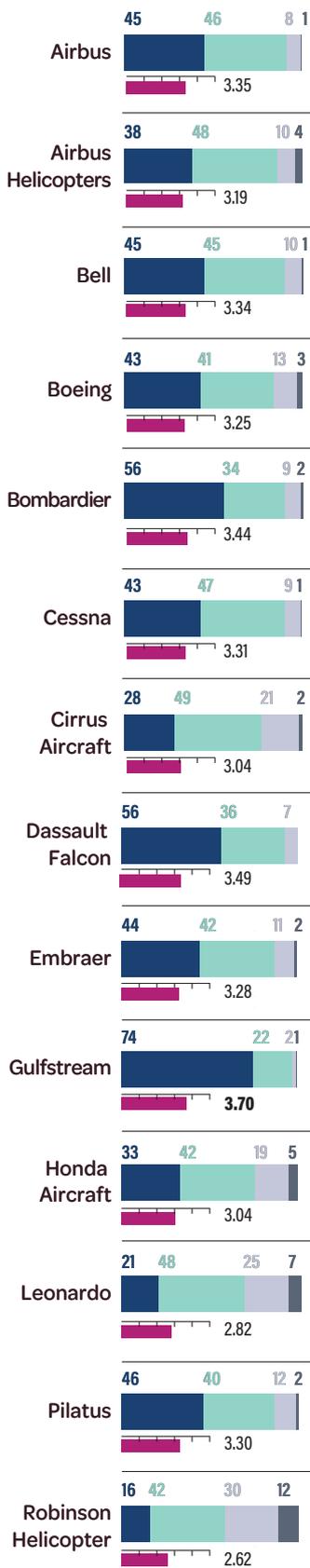
Please rate the company with which you have the most experience.  
(Respondents each rated only one provider.)

% Excellent   
 % Good   
 % Fair  
% Poor   
 % Weighted Average\*



Note: We received insufficient response to provide meaningful results regarding companies that are not listed above.  
\*Determined by assigning points to ratings: Excellent (4), Good (3), Fair (2), Poor (1).

## AIRCRAFT MANUFACTURERS



Please indicate your overall impression of each of these aircraft manufacturers.

- % Excellent
- % Good
- % Fair
- % Poor
- % Weighted Average\*

\*Determined by assigning points to ratings: Excellent (4), Good (3), Fair (2), Poor (1).

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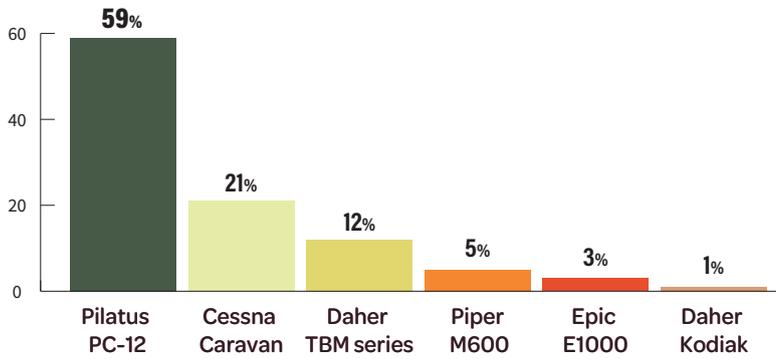


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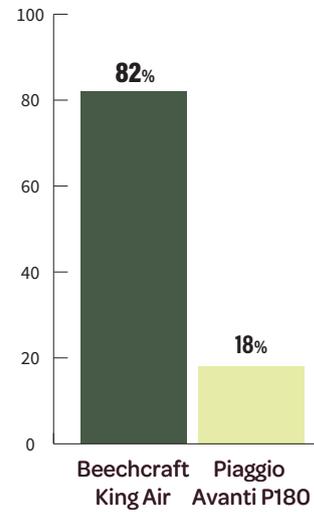
# PREFERRED AIRCRAFT

If you could regularly fly on any of these aircraft, which would you choose in each category?

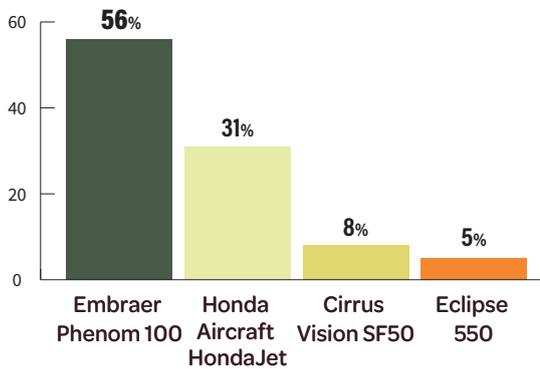
## Single-engine turboprops



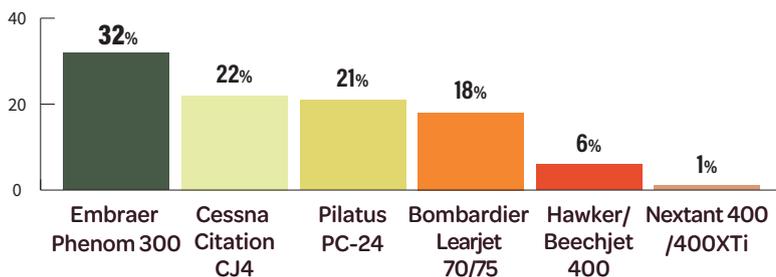
## Twin turboprops



## Very light jets (VLJs)



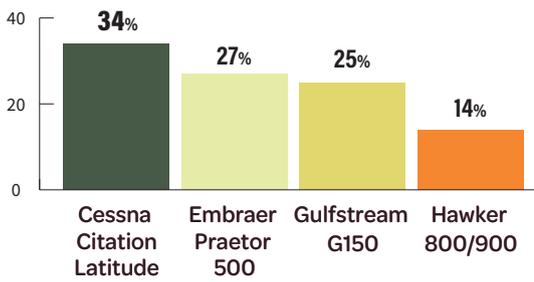
## Small-cabin/light jets



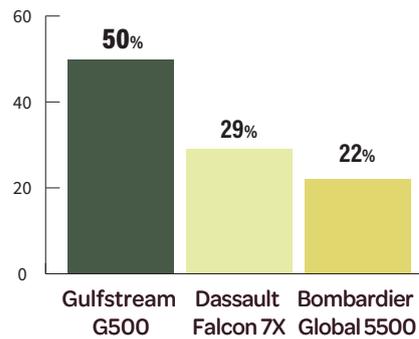


Gulfstream G500

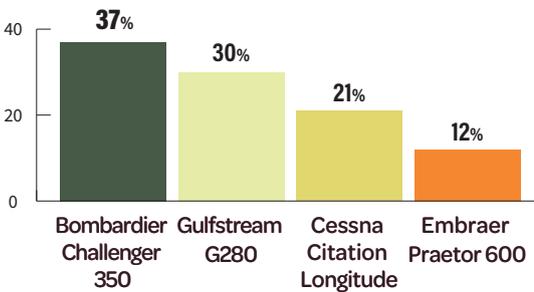
### Midsize-cabin jets



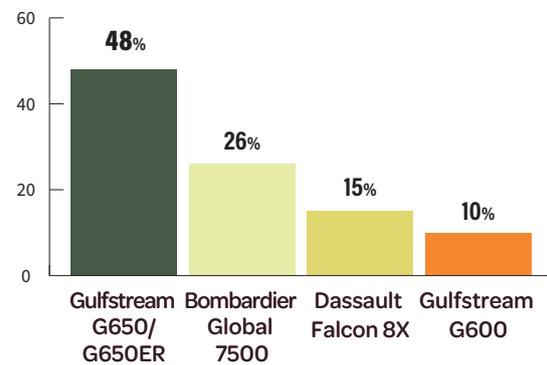
### Large-cabin jets



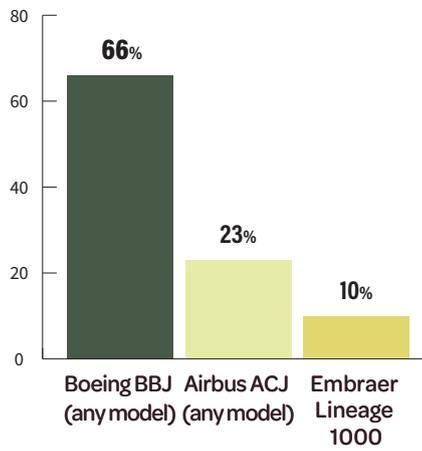
### Super-midsize-cabin jets



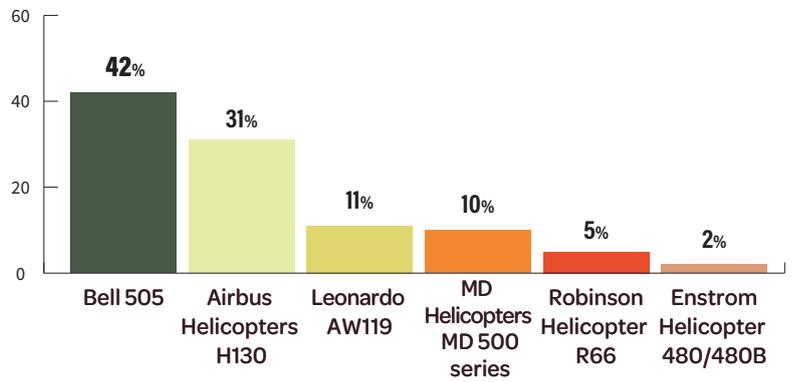
### Ultra-long-range/heavy jets



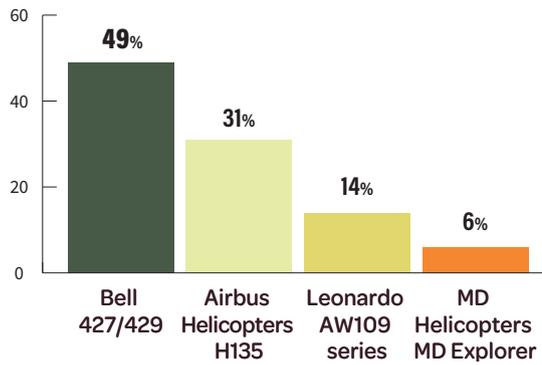
### Bizliners



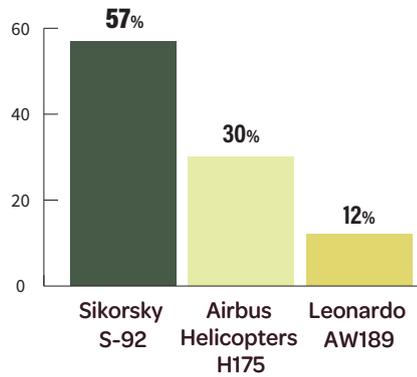
### Light, single-turbine helicopters



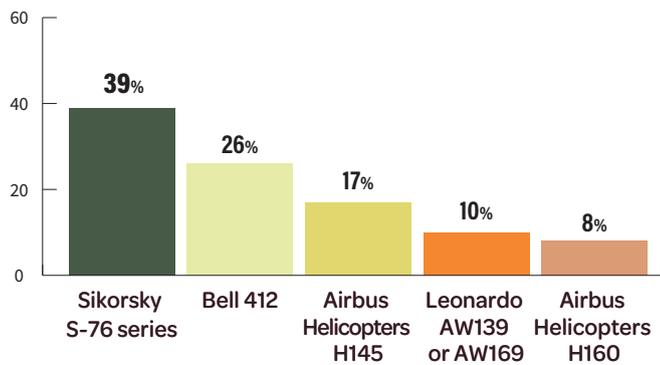
### Light, twin-turbine helicopters



### Large, twin-turbine helicopters



### Medium, twin-turbine helicopters



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# Financing a Business Jet in Today's Volatile Market

Concerns about future values and interest rates can make it harder to find attractive loans.

by Jeff Wieand

**L**ike many others in the private aviation field, bank officials had cautious expectations for 2022. After all, the hot business jet market had to cool off at some point. Yet, as of this writing, supply-chain problems, the war in Ukraine, and various economic woes have all failed to halt the ravenous appetite for acquiring aircraft.

The increase in demand vis-a-vis supply lately appears to have resulted more from the pandemic than from the tax benefits of bonus depreciation. “We continue to see strong interest among high-net-worth clients seeking to buy aircraft and avoid the airlines,” says Peter Bullen at Key Equipment Finance. Jet prices have increased simply because the number of people wanting to own them, charter them, and purchase shares in them has dramatically increased.

Business jet financiers are secured lenders that view the aircraft as loan collateral. Unlike houses, which in good neighborhoods have steadily appreciated over decades and indeed centuries, aircraft are, ineluctably, wasting assets. Over time, their technology becomes outdated, they wear out, and their value declines accordingly. They reach a point where virtually no one wants to buy them for transportation and the most they are good for is to be sold for parts.

Historically, the value of business jets has been a function of what buyers are willing to pay for them and how much sellers are willing to sell them for. In a normal market, aircraft lenders can make reasonably safe estimates and assumptions regarding the value of their collateral and how fast it is likely to decline, but nothing about values seems safe right now.

Instead of going down, jet prices have been rising. Lenders all have stories about being asked to finance the purchase of an aircraft at a price that is 20 or 30 percent higher than it was a short time ago. Can a jet really be worth that much more than it was last year? And if so, how much of that value can it hold onto and for how long? As Keith Hayes, senior vice president and national sales manager for PNC Aviation Finance, remarked, “One of the biggest jet financing questions today is: What will the value of the jet be when the loan matures?”

Lenders have traditionally relied on professional appraisals of preowned aircraft they are asked to finance, but appraisals are generally based on actual transactions. If prices in these transactions are overblown, or if there's a danger that inflation, a recession, or other economic calamities will cause the value of business jet collateral to plunge, the aircraft could easily be worth less than the outstanding principal amount when the loan comes due. This is not only a problem for the bank; it puts borrowers in a difficult spot because they won't be able to pay off the loan by just selling the aircraft.

## Purchase prices may not reflect values

Aircraft lenders have various strategies for dealing with this situation. Some have pulled back somewhat from assuming that purchase prices agreed to by buyers and sellers reflect actual values. One banker I spoke with identified three levels of value: the pre-pandemic antiquated value (too low), the prices at which jets are currently selling (too high), and the value of business jets in a “low inventory” market where demand exceeds supply (a middle ground). He suggested that his bank is often basing its lending decisions on the middle ground, which recognizes legitimate “low inventory” reasons for higher values without assuming that a jet must be worth what the client is paying for it. Thus, if you pay \$20 million for the aircraft, the bank might lend 90 percent of, say, \$16 million, if it thinks that represents the “low inventory” market value.

Another option is for the bank to adjust advance rates and require a larger downpayment, thereby reducing the loan amount. Advance rates of only 75 or 80 percent of the purchase price are not unusual today. The lender may also want a shorter amortization schedule (10 years isn't uncommon now), thereby causing the principal to be paid back more quickly. (But not too quickly; lenders continue to seek prepayment penalties for the first three or four years of the loan term, typically five to seven years these days).

Note that advance rates and amortization are connected: the lower the advance rate, the longer the amortization schedule banks can tolerate. For

buyers who are flexible regarding advance rates, PNC still offers asset-based jet financing. Keith Hayes reports that a large percentage of PNC's jet financings in 2022 still involve non- or limited-recourse loans with no financial disclosure.

Aircraft loan agreements also often have loan-to-value covenants that apply periodically, and in the current market, this could be an annual event for some banks. The covenant can require that if the aircraft's value falls below what the covenant requires, the borrower is obligated to provide additional collateral or pay down the loan principal until the covenant is satisfied. Needless to say, this is not a right that banks look forward to enforcing, and at least one bank told me it is no longer using loan-to-value covenants on aircraft financings.

Supplemental financing is also a possibility. One bank I spoke to has provided separate financing for the gap between the (presumably inflated) actual purchase price and the (more realistic) price the institution was willing to finance. The gap financing would likely have a short amortization fuse—a couple of years, say, allowing borrower and lender to revisit the situation when the gap loan comes due. Finally, for especially creditworthy borrowers and for banks focused on credit rather than collateral, the lender can simply rely on the borrower's ability to pay and not worry that the asset may go under water.

### Prebuy inspections matter more

Of course, if the borrower fails to prepay an aircraft loan, the lender has the option of having recourse to the collateral. Thus, another concern for lenders in the current market is the condition of the aircraft. Traditionally, a retail jet purchase included a comprehensive prebuy inspection at a manufacturer or manufacturer-authorized service center—a Level III or IV Prepurchase Evaluation at Bombardier or a standard or premium-package Aircraft Records and Condition Survey at Gulfstream, for example.

In the current market, however, many buyers have agreed to cut back on the prebuy, often drastically, or to forgo a prebuy altogether. This may be acceptable to the purchaser, but it is unlikely to be acceptable to the bank. As several bankers mentioned, dispensing with a prebuy is unacceptable. A lender may not require the most comprehensive prebuy imaginable, but for most banks, some reasonable due diligence on the aircraft is a must.

Buyers testing the waters with their bank before cutting a deal on an aircraft should understand its expectations in this regard. Where closing quickly is important, some banks have also been open to permitting prebuys to occur after closing, especially if there is a purchase price holdback to cover the cure of discrepancies.

The need for a prebuy disappears when you're purchasing a factory-new aircraft from the manufacturer, though of course you should still conduct a delivery inspection. But like sellers of preowned aircraft, business jet makers have been affected by the strong demand; prices have gone up and delivery dates have been pushed out. You will often have to wait two to three years to take delivery of an aircraft that is completed to your requirements.

### The role of inflation

This year, inflation has been a source of worry for both aircraft buyers and banks as it steadily drives up interest rates and shows no sign of stopping. Here in the U.S., LIBOR has generally been replaced by SOFR (secured

overnight financing rate), an improved published benchmark based on actual transactions, as well as other indexes like BSBY. SOFR has risen from about five basis points at the end of 2021 to close to 150 basis points as of this writing, putting floating rates in the 3 percent range. Fixed rates, on the other hand, are currently in the 4 or 5 percent range. Accordingly, whereas almost all aircraft buyers chose floating rates last year, as Ford von Weise, head of aircraft finance at Citi Private Bank notes, fewer jet buyers are doing so today.

The continued availability of 100 percent bonus depreciation still motivates business jet buyers. However, you can take depreciation for tax purposes only on an aircraft you own, which rules out an aircraft lease if depreciation is important to you. However, the bank or leasing company that acts as an aircraft lessor can generally use the tax depreciation (including bonus depreciation) on most U.S. aircraft in its leasing business and can take this into account in setting lease financing costs. This also saves the lessee from having to worry about satisfying the requirements for tax depreciation, in the first year and going forward.

In this market, leases offer another advantage to the lessee: the opportunity to walk away from the aircraft when the lease terminates. If the value of your leased Falcon 7X plunges before your lease ends, that won't be your problem. Banks are still haunted by the 2009 recession, which caused a dramatic drop in aircraft prices, leaving many bank lessors with overvalued business jets. That could happen again soon, which is why lease rate factors are reportedly up 10 to 15 percent this year. As a result, leases may be more expensive for the lessee, but they still pass the residual value risk on to the lessor.

An issue many lessees have with an aircraft lease is getting out of it. Aircraft financed by loans can be sold and the loan paid off at any time, though there are usually penalties for doing so in the first few years. A lease may have one or two early-buyout options, and many can be cancelled pursuant to monthly termination values on a schedule to the lease, which would typically not commence until three years after the loan begins. However, termination values aren't exactly designed to be good deals for the lessee. Still, owning a business jet is unlikely to be the best investment a business jet owner ever makes, so it's a good idea for most buyers to consider letting the bank put up the cash so they can invest their own money elsewhere.

### Early signs of a changing market

Lenders do report initial signs that the business jet market is changing. Steve Day at Global Jet Capital, for example, is seeing corporate clients taking a more cautious stance in the face of high jet prices and seeking flexible interim solutions to their short-term planning challenges. Jim Crowley at BciCapital (City National Bank of Florida) is also witnessing price corrections, generally model-specific, and a slowing down of the jet acquisition process. A saner market may be in the offing.

Given the complex situation today, buyers seeking to finance a business jet purchase should reach out to banks they have a relationship with, but obtain additional proposals as well. They should also seek professional acquisition assistance to help them buy the right aircraft at the best price.

A listing of banks and finance companies offering business aircraft loans is available in the company directory at [BJTonline.com](http://BJTonline.com). 

# What's New in the World of Private Lift

As demand from travelers accelerates, flight providers are expanding fleets and rolling out innovative programs.

by James Wynbrandt

*Business aircraft flight activity set records in the first half of 2022, according to data from Argus, WingX, and legions of operators and brokers, and the market has responded with new card and fractional offerings, revamped access programs, enlarged aircraft fleets, and more. Here are some of the latest developments.*

## Access in the Americas

California-based **Clay Lacy Aviation** has added six large-cabin jets to its charter fleet: a Dassault Falcon 900EX EASy and Bombardier Global 5000 in the New York market; and in California, a Gulfstream G650ER based at Silicon Valley's San Jose International Airport and a Gulfstream G550 and two Embraer Legacy 600s at Van Nuys and John Wayne Airports, where Clay Lacy operates FBOs. Having established a national footprint with its 2020 merger with Key Air, based at Connecticut's Waterbury-Oxford Airport, Clay Lacy plans to open an FBO at that field next year.



.....

**Elite Jets**—which serves North, Central, and South America and the Caribbean with four Phenom 300s and a Legacy 500—recently added a dozen employees, more than half of them pilots. Meanwhile, the Florida-based company has earned International Standard for Business Aircraft Operators (IS-BAO) Stage 2 certification and renewed its Argus Platinum safety rating.

.....

On-demand charter operator **Executive Fliteways**, based at Long Island, New York's Islip-MacArthur Airport, has added more long-range jets to its fleet, including a Gulfstream G550 and GV and a Falcon 7X—all available for complex, international flights. The company also operates a new Embraer Praetor 600 and a Phenom 300, plus three Learjet 60s. The Praetor and one Learjet are based in South Florida. The fleet additions follow the company's purchase in late 2020 by



James Prinzivalli, a 25-year company veteran, who reports that more fleet additions are forthcoming.

.....

**Flexjet** has ordered 50 jets—which will bring its fleet total to 231 aircraft—for its fractional shareowners. The new jets will include Embraer's Phenom 300, Legacy 450, and Praetor 500; Bombardier's Challenger 350; and Gulfstream's G450 and G650.

Flexjet's new helicopter division uses a dozen Sikorsky S-76 medium twins from Associated Aircraft Group, the New York-area operator acquired last year by Flexjet's parent, OneSky Flight. Operations will be seasonally located in the Northeast and in Florida year-round. In addition to fractional helicopter ownership opportunities, the company offers complimentary helicopter hours for Gulfstream G650 fractional owners, as well as add-on fractional, lease, and charter access to the rotorcraft.





North Carolina-based membership and on-demand fleet operator **flyExclusive** has introduced a Cessna Citation CJ3+ fractional ownership program, ordering 30 of the light jets to launch the offering, with options for another 60 over the next three years. Share plans start at 40 hours of access annually. Owners will pay the same daily and hourly rates featured in flyExclusive's Jet Club and Partnership programs but with no monthly management or repositioning charges or daily minimums. Owners will also have access to the company's 85 light, midsize, and super-midsize jets through preferred fractional pricing.

Augmenting its rotorcraft charters, Orlando, Florida-based **HeliTeam** has introduced a fixed-wing charter arm, Speedbird. Offering access "from one of the most convenient and in-demand locations," according to the company, Speedbird operates Citation CJ2, CJ3, and Beechjet 400A light jets, the Citation X midsize jet, and the Beechcraft King Air 350 turboprop.

HeliTeam provides aerial application, electronic newsgathering, firefighting, and external load and utility transport services using a fleet of turbine airplanes and helicopters.

Houston-based aircraft management firm and charter operator Cockrell Resources has been rechristened **Houston JetDirect** to reflect an increased emphasis on the charter end of its business, which has been experiencing higher demand. Based at William P. Hobby Airport, the Argus Gold and Wyvern-registered company operates a Bombardier Learjet 45 and 75, a Cessna Citation Sovereign, a Bombardier Challenger 300/350, and a Falcon 2000LX.

Following the success in Europe of its designated point-to-point route card, **InstaJet** has launched in the U.S. the JetAhead jet card, providing route-based



full- or multiple-day lift access on 10 routes, including East Coast flights between New York and Miami. InstaJet sources sufficient lift on a daily basis for the fixed routes. With sufficient advance booking, passengers can pay as little as \$8,000 for the exclusive use of a light jet for one day.

Anticipating an increase in business flight activity, Omaha, Nebraska-based **Jet Linx** has reintroduced its Enterprise Jet Card membership, which is designed for corporate clients and was suspended last October to ensure that the company had sufficient capacity to serve existing customers. Also reintroduced: the Tier II Executive Jet Card, for leisure travelers with less frequent lift needs than the company's Tier I membership provides.

Meanwhile, building on its new southern Florida presence, Jet Linx has opened a terminal at Miami-Opa Locka Executive Airport, its 20th branded ground facility, and acquired **Southern Jet** in Boca Raton, Florida. Southern Jet's charter fleet includes a Challenger 300, two Hawker 800XPs, and three Learjet 60s, and it will serve as Jet Linx's 21st facility.



Business aircraft consultancy **Mente Group** has launched **Four Corners Aviation**, an access management firm. Four Corners' tailored Freedom programs provide clients with what it claims are "all the benefits of their own scalable aviation department, without the hassles of ownership such as administration, accounting, and uncertainties." Based at Stewart International Airport in New York, Argus Platinum-rated Four Corners operates a fleet that includes Citation, Phenom, Challenger, and Gulfstream jets.

Long noted for its model-specific light jet and midsize jet cards, fleet operator **Nicholas Air** has introduced a card for access to the super-midsize Challenger 300 family and recently added four factory-new aircraft to its fleet within 90 days to support the new and current card programs. Super-midsize jets are among the most in demand, with few options for travelers seeking guaranteed access, notes Nicholas Air president Peder von Harten.

Nicholas offers three jet card types: Blue, Rise, and Lite. Blue cards are for model-specific access (15-hour minimum). Rise cards, for clients needing a wider range of aircraft, offer access to the entire fleet at preset hourly prices (account deposits start at \$200,000). Lite cards, for clients with flexible





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schedules and agnostic model preferences, offer access at lower hourly rates. Nicholas also provides fractional ownership plans, starting at 100 flight hours per year for shareowners.

The 25-year-old, family-owned company's fleet—boasting an average aircraft age of five years or less—includes the midsize Citation Latitude; Citation CJ3 and Phenom 300 and 100 light jets; and PC-12 turboprops. The customer base is 95 percent east of the Rockies and south of the Mason-Dixon line, but Nicholas Air also serves California, Mexico, and the Caribbean, and well as Boston and New York.

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Charter operator **PrivateFlite Aviation**, with bases in Sellersburg, Indiana, and Fort Worth, is offering point-to-point charter on Argus Platinum-rated midsize Challenger 300, Citation X, Sovereign, and Excel twinjets; Hawker 400XP and Nextant 400XT light jets; and Pilatus PC-12 turboprops. The network includes more than 225 aircraft in a dedicated floating fleet.

\*\*\*\*\*

Jet card provider **Sentient Jet** is rolling out a service enabling cardholders to arrange charter flights via text messaging. The user-authenticated service will provide quotes and an option to book flights automatically in less than 60 seconds, according to the company.

More light lift is available in the Yellowstone-Jackson Hole area as Phenom

300 charter operator Summit Aviation, based at Bozeman Yellowstone International Airport in Belgrade, Montana, has doubled its fleet to 10 of the Embraers since the beginning of 2021, with more on the way. Summit, founded in 2001, took three 300Es last year and two this year, and two more are slated for onboarding next year. For customers needing a larger platform, Summit brokers flights through partner charter operators.

\*\*\*\*\*

This summer, **Tailwind Air** introduced seaplane service from New York City to Provincetown, Massachusetts, via Boston Harbor, on Cessna Caravan single-engine turboprops. Operating through September 6 this year, it charges \$795 for the Manhattan-Boston Harbor segment and another \$275 to Provincetown. Tailwind also has seasonal seaplane service from New York to East Hampton, Sag Harbor, Montauk, and Shelter Island on Long Island, and offers a Fast Lane Club for commuters and discount prepaid ticket books.

\*\*\*\*\*

**Verijet**, which operates an all-Cirrus SF50 Vision Jet charter fleet, this summer expanded service to the Northeast, with destinations including Nantucket and Martha's Vineyard, Massachusetts; Montauk, New York; and Newport, Rhode Island. Airports in the region available for service are within a 600-nautical-mile radius of the New York metro's Westchester County Airport. This follows the addition of service to select Caribbean locations earlier this year by the Opa-Locka,

## Sustainability Initiatives

Bizav-focused carbon offset services specialist Azzera, launched this year, creates and manages tailored compliance programs that meet the requirements of emissions regulations including the EU Emissions Trading System (EU-ETS), Swiss ETS, U.K. ETS, and ICAO's Carbon Offsetting and Reduction Scheme for International Aviation (CORSA) offsets. Azerra's service is aimed at small to midsize operators, for which "selecting and implementing top-quality offset solutions can be very complicated," the company says. With offices in Montreal and Zurich, Azzera also provides direct access to the voluntary carbon offsetting market and aims to become a centralized spot-trading carbon market exchange.

A new carbon offset program from flyExclusive in partnership with 4Air enables members of the charter operator's Partners and Jet Club programs to opt in to carbon offset solutions for their flights, with offset programs funding forestry projects along the East Coast U.S., a major flyway for the North-Carolina company.

Booking platform Mirai Flights has launched an environmentally focused program aimed at filling empty-leg segments. The U.K.-based company, founded in 2021, says it has already saved more than 200 tons of CO<sub>2</sub> by reducing the wasted emissions that empty legs create. The AI-based app uses alerting tools, online booking takes less than a minute, and empty legs are offered at up to 70 percent off standard rates, says the company's non-executive director, Evgeny Chuprov.

NetJets reported that since it launched its expanded sustainability program in October 2020, it has offset more than 2.7 million tonnes of CO<sub>2</sub> and purchased nearly nine million gallons of sustainable aviation fuel. In March, it announced a partnership with Lilium, which is developing an all-electric vertical takeoff and landing vehicle.

VistaJet announced a new sustainability initiative this year, pledging to be carbon neutral by 2025, and now offers clients global access to sustainable aviation fuel (SAF). The operator also released a whitepaper, "A 2022 Action Handbook for Change in Business Aviation," which recommends increased adoption of SAF and of greenhouse gas emissions auditing and reporting. The whitepaper notes that more than 85 percent of VistaJet's customers have adopted voluntary carbon offsetting plans.

California's Sun Air Jets, which operates some 10 midsize to heavy jets, has partnered with 4Air for an evaluation of the charter operator's emission levels and offsetting measures. Sun Air Jets' Camarillo Airport and Van Nuys Airport facilities are both NATA-certified Tier 1 Green Aviation Businesses, featuring technologies including solar-roof arrays, EV charging stations, refillable water stations, and motion-sensing and LED lighting.

Wheels Up and Hertz have partnered to offer members access to the rental agency's electric vehicles, including Teslas and Polestars. The cars are available at more than 100 general aviation airports, and plans exist to expand the program to more than 500 airports in the coming months. Wheels Up members will also have access to a dedicated Hertz Private Aviation Specialist at the Wheels Up call center for reservations assistance. The partnership complements a Wheels Up program that allows members to offset their carbon footprint in the air.

London-based online charter marketplace Victor has teamed with Finland-based SAF producer Neste to enable customers to purchase the fuel when booking charter trips on the Victor platform, representing anywhere from 5 to 100 percent of a flight's fuel load. However, the SAF is actually used in the fleet of one of Neste's partner airlines, where it replaces conventional jet fuel. —J.W.

Florida-based company, which now provides flights that cover most of the East and West Coasts. Established in 2020, Verijet focuses on providing sustainable travel and highlights the single-engine Vision Jet's reduced carbon footprint, emitting over a ton less CO<sub>2</sub> per hour than other light jets. The charter company has partnered with carbon credit provider 4Air to further offset its footprint.

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**Vista Global Holdings**, parent of Malta-based **VistaJet** and U.S.-based **XO**, has continued expanding its global fleet with the acquisitions this year of large-cabin jet operator **Jet Edge** in the U.S. and German charter powerhouse **Air Hamburg**. The jets the two charter-management companies operate will augment the owned and operated charter fleets of VistaJet and XO and will bring Vista's global fleet to some 350 aircraft, predominantly super-midsize, large-cabin, and ultra-long-range jets.

Jet Edge's fleet consists primarily of Bombardier Challengers and Gulfstreams. Air Hamburg, Europe's largest private jet operator by number of flights (more than 18,000 in 2021), manages 44 aircraft, including a Dassault Falcon 7X and Embraer Legacy and a Lineage 1000.

Jet Edge Reserve Program Members and AdvantEdge aircraft management clients will benefit from Vista's broader global fleet and be able to take advan-



tage of the charter demand, global infrastructure, and procurement advantages that Vista generates via its branded VistaJet and XO solutions.

Jet Edge has grown aggressively since the beginning of last year, propelled by \$265 million in funding from equity investment firm KKR. Twenty additional Gulfstreams and Challengers joined its fleet in the first half of this year, bringing its rolls to some 95 aircraft.

Other recent Vista acquisitions include charter management/MRO provider **Talon Air** and charter broker **Apollo Jets**, both U.S.-based.

Also last year, the Global 7500, the world's longest-range purpose-built business jet, joined the VistaJet fleet. Group founder and chairman Thomas Flohr called the addition "game-changing," with customers of the block-hour and on-demand charter program using the jet's 7,700-nautical-mile range on nonstop flights including São Paulo to the Maldives (15 hours 43 minutes) and Los Angeles to Hong Kong (14 hours 50 minutes). VistaJet expects to have 17 Global 7500s by year-end and is considering an upgrade of some of the last of its current orders to the recently introduced Global 8000, a slightly larger, faster, and longer-range variant.

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Access to the HA420 HondaJet, Honda Aircraft's cutting-edge light jet, is trending, with two operators launching HondaJet access programs last year. **Volato**, primarily serving the East Coast, augmented by a California base,



offers a fractional ownership plan in the HondaJet with a 1/16th (50-hour) minimum share costing about \$350,000. The company also offers on-demand charter when fleet aircraft are not in use by shareowners.

Volato offers an innovative revenue-sharing plan that returns a percentage of fleet income annually to owners. (If the aircraft were fully booked, the return would amount to \$50,000 for a 1/16th share.) However, rather than owning a share of an actual aircraft, as traditional fractional programs provide, Volato offers buyers an equivalent percentage of shares in an LLC that owns the aircraft. The Atlanta-headquartered company has some six jets in its fleet and 18 on order.

Las Vegas-based **Jet Token** offers HondaJet fractional ownership, membership access, and on-demand charter programs. One-fifth fractional shares provide 75 flight hours per year and cost about \$1.3 million. Hour- and day-based membership access programs are available. Prospective owners can alternatively buy a 1/5th share via a "Special Purpose Vehicle" for \$278,000, which Jet Token will finance, according to the company, but rather than a share in the actual aircraft, buyers receive the equivalent share in the SPV.

With a charter booking platform as its core business, Jet Token has raised more than \$14 million from over 30,000 crowd-sourced investors who now own roughly one-third of the company, it says, and those funds covered deposits on the two HA-420s delivered in 2021 and the two expected this year.

Continuing its goal of becoming an Amazon-modeled private aviation access company, **Wheels Up**, which went public a year ago, acquired light jet operator **Alante Jet Charter** early in 2022. Scottsdale, Arizona-based Alante, which



had been providing supplemental lift to Wheels Up for a year prior, operates 12 Citation CJ3/3+ and CJ4 aircraft and employs 39 pilots. In addressing the acquisition, Wheels Up founder and CEO Kenny Dichter called light jets “arguably the most in-demand category of aircraft in the industry.”

Since listing on the Nasdaq exchange last July, Wheels Up has reported record revenues and membership growth, but increased costs have led to widening losses, as it has faced pilot shortages and other supply constraints, and the stock has lost some 75 percent of its value. But the company is surmounting its operational challenges, and its investors are patient, Dichter says.

## International Access

The all-inclusive jet cards that many providers offer can simplify card shopping and lift access, says **365 Aviation** CEO Chris Tofts, but “may not be the most cost-effective for many clients.” In response, the London-based broker has launched its 365Bespoke jet card for travel within the European Economic Area, the U.K., Switzerland, and Norway, providing lift at guaranteed rates for service tailored to cardholders’ flying patterns. The card accesses Cessna Citation CJ2 and CJ3 light jets and the midsize Citation XLS. Service options such as de-icing and last-minute booking or cancellation authorization may be added to the card features.

**AllianceJet** has added a 189-passenger Boeing 737-800 based in Malta, its headquarters, primarily to serve the Middle East. The fuel-efficient, low-carbon-emitting aircraft meets the two-year-old company’s commitment to what it terms “sustainable aircraft mobility,” it reports. AllianceJet also operates a Global 6000 and a Challenger 605.

Addressing what it sees as “a huge gap in the market” for charter customers seeking more comprehensive access options, China’s **Amber Aviation** is acquiring 20 jets over the next two years from NetJets to offer shared lease, jet card, and membership programs under a new sub-brand, AmberNet. Deliveries of the first of the aircraft, Gulfstream G450s, have begun. Jet cards are sold in 25-hour minimums; lease share minimums in what the company says will be China’s first fractional lease program are 50 hours per year. Aircraft will be deployed from AmberJet’s Shenzhen base as well as from locations including Beijing, Guangzhou, Shanghai, Macau, Hong Kong, and Singapore. Clients will have guaranteed access to NetJets aircraft in the U.S. and Europe.

**Blade Air Mobility** has acquired the commercial transport services of three European helicopter operators, which henceforth will employ their fleets exclusively for Blade’s scheduled per-seat and on-demand charter services in the south



of France, Monaco, Switzerland, and Italy. The three operators—Monacair SAM, Héli Sécurité, and a French company (undisclosed at signing)—will also work with Blade toward the transition to eVTOL aircraft in the region. Burnishing the ground portion of the journeys, the New York City-based company is developing branded passenger terminals at more than 10 airports and vertiports that the carriers service in France, Monaco, and Switzerland.

**Cirrus Aircraft**—manufacturer of the single-engine SF50 Vision Jet and SR20/22 pistons—appears intent on adding more light lift to the European market. The company has opened a sales office in Valenciennes, France, and plans to add a European regional operations office in Rotterdam, Netherlands. The U.S.-based, Chinese-owned manufacturer notes that the Vision Jet is certified in more than 40 countries, and nearly 700 pilots have type ratings.

Charter customers in northern Germany now have a local broker in Hamburg-based **Elbjets**, which was established a year ago to serve charter customers. The primary focus is on flights within Europe in light and midsize aircraft, says company cofounder Alexander Mueller.

Brazil-based online charter broker **Flapper**, which recently expanded into Mexico, is now moving into southern Europe via Portugal. In Latin America, Flapper has a proprietary inventory of more than 1,000 general aviation aircraft available for charter. Its platform allows real-time charter quotes and the sale of individual seats on flights, subject to owner approval, and the company plans to extend its footprint on the Continent with additional offices in Spain, Italy, and Switzerland, while registering local business jet and helicopter operators to source for lift. High-season flights to Mallorca and Algarve will likely be offered on a per-seat basis, including frequent departures from London. Flapper’s trip total in Europe quickly surpassed 100 charter flights and empty-leg deals booked through local operators.

Pursuant to the planned doubling of its European fleet, **Flexjet** has added three super-midsize Praetor 600s and a Gulfstream G650 to it rolls this year, with another G650 to come by year’s end. To ensure smooth operations in the



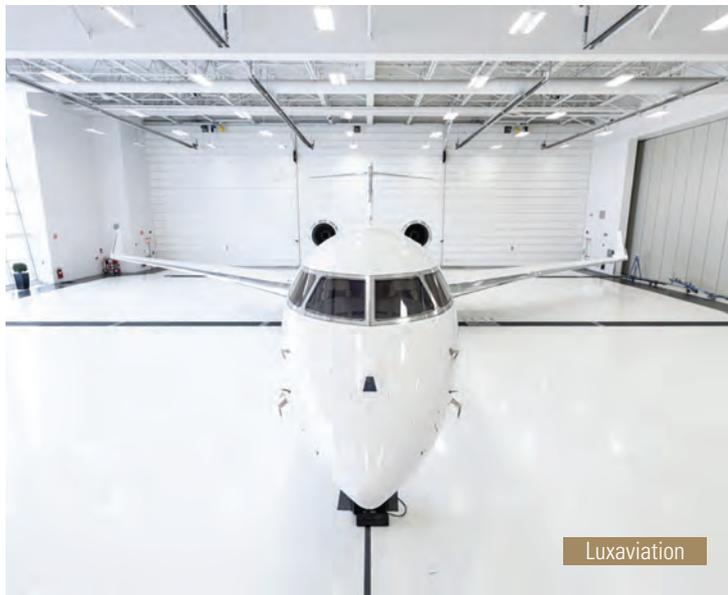
theater, Flexjet opened this spring a state-of-the-art Tactical Control Centre and office complex at Farnborough Airport, which now serves as command headquarters for its European flight activity. Additionally, ultra-fast Ka-band Wi-Fi has been retrofitted aboard its Embraer Legacy 500s, bringing all of Flexjet's Europe-based jets up to speed on Ka-band connectivity.

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Luxembourg's **Global Jets** has implemented cloud-based software that it says streamlines and centralizes its operations, providing a single charter platform across the operator's 10 offices in Europe, Asia, and Aruba. Global Jets manages approximately 70 aircraft, including a large G650 fleet and more than 35 aircraft types.

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German bizliner operator **K5 Aviation**, whose fleet includes four single-aisle ACJ319s and a Bombardier Global 6000, is readying entry into the VIP wide-body market, with an ACJ350 and ACJ330 now in completion and scheduled to enter charter service in 2023 and 2024, respectively. The A330 will be EASA-registered—the first EASA AOC for a VIP transport category aircraft, according to K5 director Luca Madone. Among the registration's advantages: it will provide full traffic rights in Europe and the U.S.



Luxaviation

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After working together since 2018, charter broker **LunaJets** and Monaco-based yacht services provider Hill Robinson Group have partnered to synchronize travel plans for clients seeking both aircraft lift and yacht charter. Headquartered in Geneva, LunaJets also has offices in London; Paris; Monaco; Dubai, U.A.E.; and Riga, Latvia.

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Charter operator **Luxaviation** has added a large-cabin Global 6500 in the U.K. and a super-midsize Embraer Legacy 500 and a Citation M2 Gen2 in France. The five-passenger M2 Gen2, a new version of Cessna's entry-level twinjet, features ambient accent lighting, satellite communication, and wireless charging. It is capable of covering much of Western Europe and landing in restricted destinations, including London City and Cannes. Luxaviation has also opened an office at Mandelieu Airport in Cannes to support "ambitious growth plans throughout the Côte d'Azur area," the Luxembourg-based operator reports.



Qatar Executive

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Hamburg, Germany-based charter operator **Platoon Aviation**, founded in 2020, continues building out its all-Pilatus PC-24 fleet. After taking its first of the light twinjets early last year, it added number four this spring, and more are on order. Platoon offers charter throughout Europe, with popular summer holiday destinations including Mallorca, Spain; Naples and Olbia, Sardinia in Italy; and challenging locations like La Môle in France, and Saanen in Switzerland that the short-field PC-24 can easily access.

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**PrivateFly**, a U.K.-based charter broker and jet card provider, has upgraded its midsize jet card into a super-midsize jet card, offering access to larger models such as the Citation Latitude and Challenger 350. A division of Directional Aviation's OneSky, PrivateFly still sells cards for light and heavy jets; all three categories offer fixed hourly rates and guaranteed flights within the Continent.

A year ago, PrivateFly introduced its Aviator Membership, aimed at new-to-business-aviation charter customers needing more than one category of aircraft. The €10,000 annual membership provides choice of category as needed at guaranteed hourly rates, along with short-notice cancellation rates and services including de-icing and a London helicopter transfer. PrivateFly added extended-range fixed hourly rates on several popular routes to Aviator Membership privileges late last year. It includes any flight between the U.K. and the U.S.; the Caribbean; and the Middle East.

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**Qatar Executive**, charter arm of Qatar Airlines, has installed active air ionization systems aboard all seven of its Gulfstream G650ER ultra-long-range jets. The ecofriendly system can eliminate potentially harmful pathogens and allergens and eradicate volatile organic compounds, visible smoke, and undesirable odors.

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**RoyalJet**, which is based in Abu Dhabi, U.A.E., has added a late-model Boeing Business Jet to its charter certificate and is "pursuing further additions of new aircraft" to meet an increase in demand for VIP transport, according to the company. The 23-passenger aircraft—the 11th BBJ in RoyalJet's fleet—has been upgraded with soundproofing, air filtration, and new connectivity and in-flight entertainment systems. The company also operates three Global 5000/6000 large-cabin, long-range jets.

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New York-based **Wheels Up** has a foothold in Europe, where it now offers on-demand charter access in the wake of its purchase of Air Partner, a publicly traded U.K. charter broker. The acquisition represents the first international expansion for the New York-based access provider. Founded in 1961, Air Partner offers private jet, group, and freight charter, and aviation safety and security services.

BJT



# Seven Enticing Cabin Upgrades

These futuristic new and soon-to-be-available products will enhance your ride.

*by James Wynbrandt*

The passenger experience aboard business jets continues to improve dramatically as the industry responds to new technologies, fierce competition, and ever-more-demanding customer expectations. This roundup showcases seven of the most noteworthy recent innovations for the cabin.

## Cool and Unusual

The private jet as chill space takes on new meaning as Collins Aerospace prepares to bring its SpaceChiller personal refrigeration unit to business aviation. The modular and lightweight thermoelectric system is well-suited for small aircraft, according to Collins, with units weighing only about a pound and measuring five inches square and 1.5 inches deep. Possible onboard applications include in-seat minibars and chilled-snacks bars.

Derived from heat-exchange technology that Collins developed for military aircraft, SpaceChiller uses much less power than conventional cooling devices and can quickly bring food to safe temperatures or be set for chilling of items ranging from ice cream to Champagne. Moreover, the units can be adapted to provide heating as well as cooling, giving passengers “infinite flexibility in terms of dialing in and controlling a thermal environment,” the North Carolina-headquartered company says.

## A Jet That Listens to You

The voice-controlled aircraft cabin has arrived via Bombardier’s Challenger 3500, an updated version of its bestselling super-midsize 300/350 twinjet family that is set to enter service by year’s end. With its new Nice (Network Integrated Cabin

Equipment) 4K cabin-management system from Lufthansa Technik (LHT), voice-activation controls lighting, sound, temperature, and the entertainment selections for viewing on the jet's 24-inch, 4K display monitors. Artificial intelligence manages the self-contained system—it requires no internet connectivity, unlike home and office cloud-based voice-recognition systems. It's operated through an app on passengers' personal devices. Adding a sonic feature borrowed from the Canadian airframer's flagship Global 7500, the audio system can also enable a "sweet spot" sound experience, optimized for your seating location.

Wireless charging pads folded into side ledges and Nuage seats with their floating base and deep recline position—previously available only on Bombardier's Globals—are also part of the 3500's standard interior.

LHT reports that the 4K's voice-control product could be easily adapted to work with other manufacturers' cabin control systems, for airframer or aftermarket installations. Meanwhile, development continues on a library of commands that the multilingual Nice voice-control system understands.

## The Beam Team Connects

SmartSky Networks' long-awaited air-to-ground broadband Wi-Fi service went live in June, offering nearly full coverage over the continental U.S. SmartSky's patented beamforming technology connects each aircraft to the network through a dedicated beam, rather than sharing a connection with other aircraft, lowering latency, and accelerating bidirectional throughput speeds. The Morrisville, North Carolina telecom developer terms it "a 10X experience compared to legacy air-to-ground technology." The network's complementary Skytelligence data platform enhances the capabilities of existing applications and improves access to connectivity data that can be used in real-time by flight crews and maintenance personnel.

The base radio and antenna are lightweight and compact, and STCs for installation on some of the most popular midsize and larger business aircraft models are in hand, with more in development, according to the company. Monthly service plans range from \$2,995 for five gigabytes to \$9,995 for unlimited data; hardware and installation costs have not been released.

SmartSky's upcoming LiTE system will extend connectivity, at lesser speed and bandwidth, to light jets and turboprops. Charter and fractional operator flyExclusive has signed on as SmartSky's fleet launch customer; HondaJet fractional operator Jet It will debut the LiTE offering.

## Sending Data Economy Class

If you don't stream content or use other high-bandwidth applications in the air, you can save money with Send Solutions' Airtext, which offers voice, email, and texting anywhere in the world without a costly Wi-Fi installation or full-time satellite connectivity; the vast majority of work communications are handled via such low-data applications, anyway, the Georgia-based airborne messaging specialist notes.

The Airtext system uses on-demand "burst messaging" on Iridium's constellation to deliver data anywhere in the world, on the ground or in the air. You can connect to the Airtext satcom transceiver with Bluetooth via iOS or Android devices. When you're offline, sensors detect incoming and outgoing data as it becomes available, eliminating the need for continuous connectivity, further reducing costs.

Send Solutions has approvals for installation of the compact, lightweight (just over a pound) units on more than 50 aircraft types. The Airtext+ system, which provides email, voice calls, and text, costs \$17,500. AirtextLT+, without voice calling, costs \$6,995. Data plans are \$400 per year and include the first 2,500 text messages; voice calls are \$1.25 per minute.

## Walking on a Cloud

Kalogridis International's Origins Collection of luxury handmade aircraft carpets can transport you to new worlds before you leave the ground. With evocative names such as Kathmandu, Cenote, Gilf Kebir, and Lumanai, the collection offers designs and color palettes inspired by civilizations long gone and mythical domains. The beauty of the Orient, the wonders of ancient Egypt, and the mysterious imagery and astral influences of Neolithic art all find expression in Origins.

The textures, movement, and layering provide multiple options to customize the designs to your taste through a choice of colors, textures, materials, and tufting, and "can be fully personalized to any interior and to the unique individual taste of each owner," Dallas-based Kalogridis says. Additionally, Origins' Undyed portfolio offers environmentally friendly options that use only naturally colored heather wools, and the entire collection coordinates with a custom selection of Kalogridis's Deconel surface coverings for side panels, bulkheads, and other interior surfaces.

## The Chameleon Within

Could costly refurbishments of VIP airliners be replaced by a simple reprogramming of an interior projection system? That's the idea Lufthansa Technik and Diehl Aerospace showcase in the Explorer cabin concept for the ACJ350, presented this year. The widebody jet's large, multifunctional lounge area integrates Diehl's small, lightweight, passively cooled projectors into the sidewall and ceiling elements, enabling customized animation displays to cover almost the complete interior, from the window belt up. The software developed for the Explorer cabin includes several thousand visual projection options that can dramatically alter the cabin atmosphere: virtual daytime and nighttime skies, underwater scenes, a flying discotheque, and imaginary, fanciful worlds. The system can also mimic the static look of conventional VIP cabins in any design motif, from traditional to avant-garde.

Though the Explorer concept was developed for a widebody aircraft, the interior projection technology is adaptable to any executive airliner, from narrowbody up, and Lufthansa Technik sees a growing market for the quick-change artistry. It's especially suited "for younger people who don't want to spend the time or money for a custom cabin, or people who want to resell the aircraft," says a company spokesperson. "You only have to change the content of the projection system, and then you have a totally different cabin."

## Connectivity Standards

With low earth orbit (LEO) satellite networks promising higher connectivity speeds and smaller, less-costly connectivity solutions, Gogo Business Aviation has created an on-ramp: business aviation's first electronically steerable antenna for LEO network connectivity. Designed to operate on OneWeb's forthcoming constellation, the connectivity will enable data-heavy activities including multiple simultaneous live video conferences, access to cloud solutions such as Office365, and streaming television.

The antenna, introduced in May at the European Business Aviation Association Exposition in Geneva, will be paired with a Gogo Avance LRU for air-to-ground connectivity in the U.S. The housing for the antenna assembly, designed in conjunction with Hughes Network systems, is small enough for any business aircraft from a turboprop up, Colorado-based Gogo says, and the system has been designed to simplify installation. Performance will be comparable to terrestrial broadband, with a latency of less than 100 ms—up to 10 times faster than geostationary earth orbit (GEO) satellite network connectivity. The OneWeb network is expected to become operational later this year, and service should be available shortly after that. 



# The World's Best FBOs

These airport facilities can make your journey more pleasurable. An annual survey identifies the ones that stand out from the crowd.

by Curt Epstein

Private jet flights usually begin and end at FBOs, the businesses at airports that cater to general aviation aircraft and their passengers.

To determine which of these locations provide the best overall experiences, **BJT** sister publication *Aviation International News (AIN)* conducts an annual survey, polling a select subset of its readers, including pilots, flight schedulers, and dispatchers—those who know and can evaluate FBOs most knowledgeably. They have access to a website that allows them to rate these facilities at any time during the year. This lets them keep their observations up to date, with their latest rating of a location replacing their previous one.

*AIN* culled through thousands of responses from the past five years to compile cumulative average scores for this year's lists of the best FBOs in the Americas and the rest of the world.

Survey respondents were asked to rate facilities they'd used over the past year on a scale of 1 to 5 in the following categories:

**Line service:** competence and professionalism of the workers who meet the airplane on the ramp and service it.

**Passenger amenities:** quality of lobbies, lounges, and conference rooms; availability of refreshments and ground transportation.

**Pilot amenities:** availability and quality of pilot lounges, flight planning facilities, snooze rooms, crew showers, entertainment and recreation offerings, and complimentary crew cars.

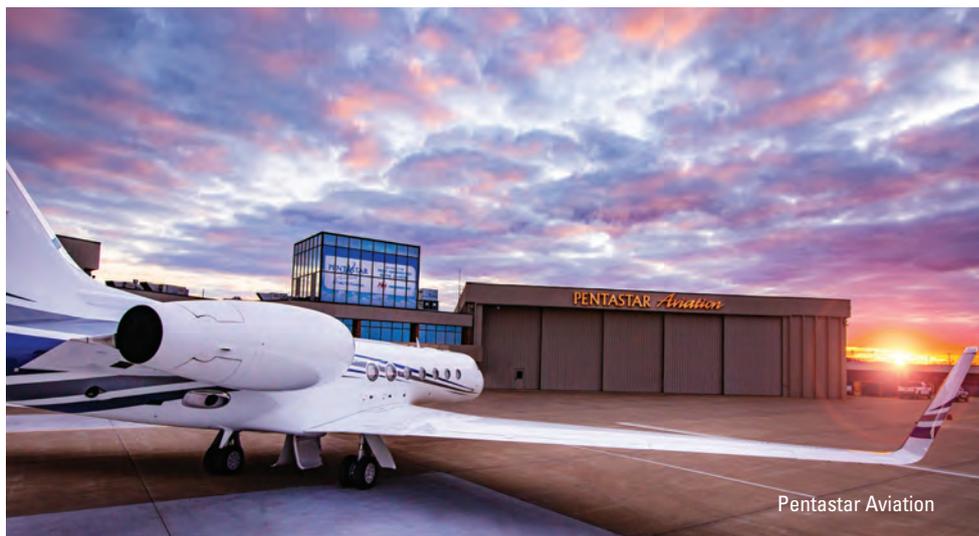
**Facilities:** cleanliness, comfort, upkeep, and convenience of the location.

**Customer service:** professionalism of customer service representatives, their familiarity with the local area, and their assistance with hotel

reservations and catering arrangements.

Two FBOs share the honors for highest-rated location for 2021 with an average score of 4.76: Pentastar Aviation, at Oakland County International Airport, in Pontiac, Michigan; and Sheltair at Tampa International Airport in Tampa, Florida.

Pentastar Aviation, one of five service providers at its airport, earned the same total as it did on last year's list and garnered its highest score



Pentastar Aviation

this year (4.84) in the customer-service category. Founded in 1964, the company originally served as Chrysler Motor Company's flight department. It has since developed into a full-service FBO, offering not just the traditional ground handling and fueling, but aircraft maintenance, avionics, and cabin interior shops, aircraft management and charter, and even its own catering department and café.

Occupying nearly 22 acres, Pentastar has 10 acres of reinforced ramp and about 130,000 square feet of hangar space, which houses 21 aircraft ranging from a Gulfstream G100 to a BBJ. The FBO's main 5,000-square-foot terminal, which operates

24/7, has passenger lounges, multimedia-equipped conference rooms, a concierge, and the Fivestar Café. The 10,000-square-foot, two-story satellite Stargate terminal is equipped to handle large charter groups such as sports teams, with the country's only privately operated jet bridge and baggage carousel, along with a departure lounge. The company has leased six more acres on the airport to build another hangar complex.

In 2016, Florida-based FBO chain Sheltair acquired Tampa International Jet Center, this year's other top scorer, which received some of the best grades for line service (4.79), passenger amenities (4.76), pilot amenities (4.72), and facilities (4.78). It

was one of only two FBOs to score above 4.7 in every category on this year's list. (The other, American Aero in Fort Worth, is discussed later in this story.) The FBO is known for its 13,000-square-foot aircraft arrival and departure canopy, which can handle jets up to the size of a Bombardier Global 7500 and shelters passengers from Southern Florida's intense sunshine and rain showers. The canopy adjoins the location's 11,000-square-foot terminal, which features an airy two-story atrium and inlaid marble floor map. A porte cochere welcomes vehicles.

The company recently remodeled its cantina area and two conference rooms and is set to begin a major modernization project by the end of the year.

## TOP-RATED FBOs IN THE AMERICAS

FBO	AIRPORT CODE	AIRPORT [STATE]	OVERALL AVERAGE	CHANGE FROM LAST YEAR	
PENTASTAR AVIATION	KPTK	OAKLAND COUNTY INTERNATIONAL [MI]	4.76	0.00	Top 5%
SHELTAIR	KTPA	TAMPA INTERNATIONAL [FL]	4.76	0.01	
AMERICAN AERO	KFTW	FORT WORTH MEACHAM INTERNATIONAL [TX]	4.75	-0.01	
BANYAN AIR SERVICE	KFXE	FORT LAUDERDALE EXECUTIVE [FL]	4.72	0.03	
HENRIKSEN JET CENTER	KEDC	AUSTIN EXECUTIVE [TX]	4.72	-0.02	
JET AVIATION	KPBI	PALM BEACH INTERNATIONAL [FL]	4.72	-0.01	
WILSON AIR CENTER	KMEM	MEMPHIS INTERNATIONAL [TN]	4.72	-0.01	
SHELTAIR	KBJC	ROCKY MOUNTAIN METROPOLITAN [CO]	4.71	N/A	
WESTERN AIRCRAFT	KBOI	BOISE AIR TERMINAL/GOWEN FIELD [ID]	4.71	0.01	
SHELTAIR	KFLL	FORT LAUDERDALE/HOLLYWOOD INTL. [FL]	4.70	0.02	
BUSINESS JET CENTER	KDAL	DALLAS LOVE FIELD [TX]	4.68	0.01	
MERIDIAN	KTEB	TETERBORO [NJ]	4.68	0.01	
BASE OPERATIONS AT PAGE FIELD	KFMY	PAGE FIELD [FL]	4.67	-0.04	
FARGO JET CENTER	KFAR	HECTOR INTERNATIONAL [ND]	4.67	0.01	
GLOBAL SELECT	KSGR	SUGAR LAND REGIONAL [TX]	4.67	-0.03	
HENRIKSEN JET CENTER	KTME	HOUSTON EXECUTIVE [TX]	4.67	-0.04	
SHELTAIR	KJAX	JACKSONVILLE INTERNATIONAL [FL]	4.67	0.00	
HAWTHORNE GLOBAL AVIATION SERVICES	KPWK	CHICAGO EXECUTIVE [IL]	4.66	N/A	Top 10%
WILSON AIR CENTER	KCHA	LOVELL FIELD [TN]	4.66	0.01	
AERO-ONE AVIATION	KDHN	DOTHAN REGIONAL [AL]	4.65	0.01	
DEL MONTE AVIATION	KMRY	MONTEREY PENINSULA [CA]	4.65	0.03	
MODERN AVIATION	KAPA	CENTENNIAL [CO]	4.65	0.01	
SHELTAIR	KORL	ORLANDO EXECUTIVE [FL]	4.65	-0.01	
TEXAS JET	KFTW	FORT WORTH MEACHAM INTERNATIONAL [TX]	4.65	0.01	
ATLANTIC AVIATION	KMKC	CHARLES B. WHEELER DOWNTOWN [MO]	4.64	0.00	
MONTEREY JET CENTER	KMRY	MONTEREY PENINSULA [CA]	4.64	0.01	
ROSS AVIATION at STUART JET CENTER	KSUA	WITHAM FIELD [FL]	4.64	-0.04	
ATLANTIC AVIATION	KCRQ	MCCLELLAN-PALOMAR [CA]	4.63	-0.03	
HERITAGE AVIATION	KBTV	BURLINGTON INTERNATIONAL [VT]	4.63	-0.05	
MERIDIAN	KHWD	HAYWARD EXECUTIVE [CA]	4.63	0.02	
MILLION AIR	KADS	ADDISON [TX]	4.63	-0.01	

FBOs with the same overall average are listed in alphabetical order.

### What Exactly Is an FBO?

In aviation's early days, FBOs (fixed-base operations) were places where pilots could be assured of finding fuel and possibly even a mechanic to sort out problems with their fragile airplanes. Nowadays, FBOs' staffs provide ground handling, secure parking areas, hangar space, and towing for aircraft.

In addition, they offer services and facilities for passengers, including refreshment bars, waiting areas, conference rooms, and concierges. For aircraft crews, there may be lounges, snooze rooms, work areas, gyms with showers, and complimentary crew cars. Some even offer loaner golf clubs and complimentary access at local golf courses to crew who are awaiting the return of their passengers. Some FBOs are global chains with dozens of locations; others are run by the airports or are family-owned.

In addition to taking care of general aviation traffic, FBOs in most cases serve as collection agents for the airport's fees for that segment of the industry, and at some smaller airports in North America at least, they're responsible for all the fueling for aircraft ranging from the smallest single-engine model to giant bizliners.

The IS-BAH Stage 2-registered facility is open 24/7 with U.S. Customs located adjacent to the terminal. Its 150,000 square feet of hangar space is home to 29 business jets, six turboprops, and four helicopters. A hangar complex that is under development will add another 100,000 square feet of aircraft storage and office space.

Close behind Pentastar and Sheltair in the Americas ratings is American Aero FTW at Fort Worth Meacham International with a 4.75 average score. In a four-way tie for third place with a score of 4.72 are Banyan Air Service at Fort Lauderdale Executive, Henriksen Jet Center at privately owned Austin Executive Airport in Texas, Jet Aviation at Florida's Palm Beach International Airport, and Wilson Air Center at Memphis International Airport.

Outside the Americas, European service providers earned four of the top five slots, with U.K. FBOs Farnborough Airport at No. 1 with an average score of 4.67. The privately owned airport has held that position for more than a decade, and while the scores for FBOs in North America tend to be higher than for those in the rest of the world, the London-area gateway's rating lands it among the top 5 percent of all FBOs including those in North America, with its ranking in the facilities category (4.86) the highest this year overall. The location's 52,000-square-foot, three-story terminal also placed among the highest globally in passenger and pilot amenities (4.75 and 4.72, respectively). It features VIP customer lounges that can accommodate 60 people, conference rooms, crew lounge and snooze rooms, a work area, passenger and crew showers, laundry service, a concierge, and a gymnasium. Drive-through customs and immigration clearance is available along with the on-airport Aviator Hotel.

Home to 54 business jets, the airport has 240,000 square feet of hangar space that can shelter aircraft up to the size of a Boeing BBJ or Airbus ACJ TwoTwenty. Farnborough's management plans to increase that capacity with a \$46 million (£35 million) development, which will add another 164,000 square feet of climate-controlled hangar space. As part of the project, for which construction began this summer, the airport will enlarge and resurface its apron parking areas and rehabilitate the existing runway to allow for more efficient aircraft movement.

The facility, with a staff of 157, is open from 7 a.m. to 10 p.m. on weekdays and from 8 a.m. to 8 p.m. on weekends. **BJT**

## TOP-RATED FBOS IN EUROPE, THE MIDDLE EAST, AFRICA, AND ASIA-PACIFIC

FBO	AIRPORT CODE	AIRPORT [COUNTRY]	OVERALL AVERAGE	CHANGE FROM LAST YEAR
FARNBOROUGH AIRPORT	EGLF	FARNBOROUGH [U.K.]	4.67	0.01
UNIVERSAL AVIATION	EGSS	LONDON STANSTED [U.K.]	4.61	0.00
EXECUJET AUSTRALIA	YSSY	SYDNEY KINGSFORD SMITH [AUSTRALIA]	4.51	0.01
SIGNATURE FLIGHT SUPPORT	EDDM	MUNICH [GERMANY]	4.48	0.00
JET AVIATION	EHAM	AMSTERDAM SCHIPHOL [HOLLAND]	4.46	-0.02
MJETS FBO	VTBD	DON MUEANG INTERNATIONAL [THAILAND]	4.45	-0.01
ECCELSA AVIATION	LIEO	OLBIA COSTA SMERALDA [SARDINIA]	4.43	0.02
HARRODS AVIATION	EGSS	LONDON STANSTED [U.K.]	4.42	0.02

*FBOs with the same overall average are listed in alphabetical order.*



# Fair Skies Forecast for Preowned Market Through Mid-2020s

by James Wynbrandt

**G**iven the unprecedented market changes wrought by COVID, the war in Ukraine, rising interest rates, and sinking financial sectors, you may well wonder where the pre-owned market goes from here. The answer, according to two five-year forecasts, is along a route to steady, sustainable growth.

The preowned business jet market “will continue to grow over the next five years as the global economy continues to expand,” says Global Jet Capital (GJC) in its *Business Jet Market Outlook, 2022–2026*. Jetcraft, meanwhile, predicts that pre-owned values will “remain rational” in the face of high demand in *Looking Ahead: 5-year Pre-Owned Business Aviation Market Forecast, 2021–2025*.

Though the two firms track and base their forecasts on different mixes of business jets and use different sources for their transaction reports, their outlooks are largely in sync.

For its 2021–2025 outlook, business jet brokerage Jetcraft forecasts 12,261 preowned transactions valued at \$57.2 billion. The company expects sales volume to grow 16.8 percent through 2025. The annual transactions value is expected to increase 21.6 percent during the period, from \$10.2 billion to \$12.4 billion.

Corporate aircraft financier GJC, which tracks a larger number of business jet models, predicts 15,419 preowned transactions, valued at \$83.6 billion, occurring through 2026. It expects annual volume to climb 17 percent, with dollar value growing 27 percent over the five years, from \$14.8 billion to \$18.8 billion.

Addressing the war in Ukraine, GJC foresees “minimal impact on the business aviation market,” as no major economic fallout is currently expected, adding, “We believe the relevance of business aviation is heightened at a time like this.”

The Boca Raton, Florida firm cites the 3.5 percent year-over-year GDP growth that Oxford Economics anticipates in 2022, and projection of continued steady growth through the forecast period, as validation for its prognostication.

North Carolina-based Jetcraft expects market values to rise marginally until 2024, due to supply and demand pricing pressure, and an expected increase in large-cabin jet transactions.

Indeed, both forecasts say large-cabin jets will take a bigger share of the market in coming years. Jetcraft sees annual preowned large-cabin jet sales in the fleet it tracks growing from 310 in 2021 to 457 in 2025—a 47.4 percent increase. GJC calls for yearly heavy-jet sales to climb from 714 this year to 937 in 2026, a 31 percent increase.

Executive airliners will also see strong transaction activity, Jetcraft says, increasing from 18

preowned sales last year to 26 expected in 2025. (GJC doesn't track this category.)

Jetcraft also predicts robust growth in the mid-size-cabin market, with preowned sales volume growing 29.4 percent over the five years, from 524 transactions to 678, while GJC predicts only 10.5 percent sales growth for the segment. Both see limited expansion in light-jet transactions (4.9 and 7.3 percent at Jetcraft and GJC, respectively), though GJC expects robust VLJ activity, with annual pre-owned sales forecast to rise from 581 to 710 aircraft during the forecast period, a 22.2 percent increase. (Jetcraft doesn't track VLJs.)

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MONTAGE: JOHN A. MANFREDO

# What You Need to Know about Aircraft Management Contracts

They're complex but can save jet owners money and considerable work.

by Jeff Wieand

**B**usiness jet buyers face an important choice about operating their new aircraft: they can hire their own flight department and “manage” the aircraft themselves, or they can hire a management company to do it for them. A big corporation might not balk at creating its own flight department, but an individual’s view when buying a business jet for the first time will probably be: “Thank God I can hire somebody to take care of this for me.”

A good management company handles most aspects of owning and operating a business jet, including scheduling, fueling, and operating flights; hiring, training, and employing crew; and hangaring, insuring, and maintaining the aircraft. Of course, these services aren’t free, but a management company can nevertheless save you money by offering significant discounts on fuel, maintenance, and insurance. It may also offer side benefits, like finding room in its hangar for your aircraft at a crowded airport.

What a management company doesn’t ordinarily do, at least when operating the aircraft for you, is take operational control of your jet. When you hire

the company, the FAA regards you (or your operating entity) as having operational control of non-commercial flights; the management firm merely helps you with that. Ultimate responsibility, and corresponding liability, associated with aircraft operations generally resides with you, assuming the management company isn’t acting negligently or recklessly or outside its purview, though your use of such a company does give an injured party someone else to sue. (In case this responsibility might be unpalatable to you, many management companies have a solution: “Lease the aircraft to us and we’ll add it to our air carrier certificate and take operational control.” Basically, you would be chartering your own aircraft, and you might be charged for that, though usually at a significant discount from what third parties would pay.)

## First Steps

There are many things to consider in deciding whether to retain a management company and in selecting the right one, but let’s assume you’ve been

through the process and have picked the outfit you want to work with. This should be accomplished well in advance of taking delivery of your aircraft, so the first question that needs to be addressed is: What will the management company do before there is an aircraft to manage and what will it charge for this initial work?

A “management” or “services” agreement addresses the duties and responsibilities of the management company. However, before sending a draft of this agreement for review, the management company is likely to provide a proposed letter of agreement covering various “start-up” matters, including hiring crew members, with a “start-up fee.” Many management companies also charge a “conformity fee” for verifying that the aircraft complies with FAA regulations and the management company’s own requirements, especially if it is to be placed on the company’s charter certificate. If a preowned aircraft is being purchased, the management company is often retained to monitor the prebuy inspection and assist with the delivery, and in the case of a factory-new aircraft, the company can monitor the completion and conduct an acceptance inspection. The management company will often charge separate fees and travel expenses for these services.

Paying a monthly management fee on top of these start-up costs when there is no aircraft to manage should be unnecessary; the management fee should commence when (or close to when) there’s an aircraft to manage. The fee is subject to negotiation. For a heavy jet, the monthly charge at major management companies starts around \$10,000 to \$12,000. The best way to see what’s possible is to ask your acquisition consultant to solicit proposals from several companies; the fees can vary a lot.

## Cancellation Terms

Once the aircraft is acquired and in service, the management agreement typically has a one-year term that’s renewable (often automatically unless one party wants out), with the management fee subject to a CPI-based increase each calendar year. Some management companies are reluctant to let the owner cancel the agreement during any term, or perhaps only during that first year, which is understandable; they don’t want to spend a couple of months getting clients all set up with an airplane and crew only to have them pull the plug and go it alone to save the management fee.

Nevertheless, it’s important to try to negotiate the right to cancel the agreement on 30 to 90 days’ notice, or immediately if, for example, the management company’s charter certificate is revoked, or a government agency takes significant action against the company. Of course, it should also be possible for a party to cancel the agreement if the other party defaults or goes bankrupt or if the aircraft is badly damaged, destroyed, or sold. Upon termination, the agreement should prevent the management company from holding a jet hostage and require it to turn over the aircraft’s logs and records, manuals, and loose equipment to the owner. It should also require the company to bring the aircraft home and not leave it parked on the ramp in some far-off city.

Management companies have termination concerns as well. Though the owner has the option to do so itself, the management company usually employs the crew. The terminating owner’s plan typically includes taking its flight crew along, either to operate in-house or with another management company. Making that difficult helps dissuade the owner from leaving, and for crew members employed by the management company, at a minimum, the agreement will generally require the owner to pay for accrued vacation and any severance the employees are entitled to if the arrangement terminates.

## Key Protections

Though the management company should be required to consult with the owner on certain issues, like making improvements to the jet, it generally has the ball regarding “managing” the aircraft. The agreement should protect the

owner from the company’s unauthorized use of the aircraft or from using crew members to fly or work on other managed aircraft without the owner’s consent, but it should allow the management company to provide alternative crew for the owner’s flights to the extent that the owner’s crew is unavailable.

Since it’s usually the management company’s job to retain service providers to do everything from cleaning the aircraft to conducting a 10-year

inspection, it has the ability to mark up fees to third parties when passing charges on to the owner. Some management companies take advantage of this opportunity. Instead, though, they should use their leverage to negotiate discounts from third-party providers, and the agreement should require them to pass all discounts, rebates, and the like on to the owner. The owner should never pay more for third-party services than the management company itself.

As we have seen, liability is a key issue. Management liability arrangements tend to rely heavily on the owner purchasing adequate insurance, with both the owner and the management company accepting the insurance proceeds to cover injuries, death, or property damage in actions against each other. Each party may nevertheless acknowledge its responsibilities for damages based on its gross negligence and willful misconduct, while both parties may disclaim liabilities for consequential damages, lost profits, and the like.

The agreement should make clear that the management company is responsible for FAA, DOT, and to the extent required, foreign regulatory compliance and filings for the aircraft, flights, and crew. The owner, on the other hand, usually wants to approve any additions and improvements to the aircraft, and many agreements require owner approval of all expenses exceeding a given dollar amount (say, \$10,000). But the owner will be responsible for creating and replenishing a fund of money (an “operating expense fund”) at the management company (best held in a separate account) for payment of expenses as incurred.

Management agreements can seem complex, though they’re not as complicated as managing the aircraft. Still, don’t wait until the last minute to negotiate yours.

**BJT**

The agreement with the management company should require it to pass all discounts, rebates, and the like to the owner.

# Major Business Aircraft Manufacturers at a Glance

Shopping for an airplane or helicopter? Start by reading the key facts about the airframers whose products you're considering.

## AIRBUS

**Founded:** 1970 **HQ:** Toulouse, France

**Top executive:** Guillaume Faury, CEO

**Employees:** 131,000 **Info:** [airbus.com](http://airbus.com), +33 (0) 5 81 31 75 00



Airbus is a multinational aerospace conglomerate. The company traces its roots to the formation of the Airbus Industrie consortium in 1970 and is the result of decades of European aerospace consolidation efforts designed to compete with American defense and aerospace monoliths.

Airbus launched its first passenger jet, the A300, in 1972. The model was revolutionary; it was not only the world's first widebody twin-engine passenger jet but also marked the initial offering from what would become Europe's largest aerospace and defense company.

The years following the launch of the A300 were marked by intensive consolidation and further aircraft development, with the release of the A300B2 (1974), the Tornado multirole combat jet (1974), the A310 (1982), and the ubiquitous A320 family of jets (1987). In 1991, Airbus launched the ultra-long-range A340 four-engine passenger jet, and the A330 followed in 1992. Additional fixed-wing developments in the 1990s included the launch of the A300-600 Beluga transporter (1994), the first flight of the Eurofighter (1994), the standing-up of Airbus Industrie's Large Aircraft Division, the development of the A380 (1996), and the first flight of the C295 (1997).

Airbus forayed into the corporate jet market in 1997 with the release of the A319 Corporate Jet. The A320 family was an easy first choice for the

development of a VIP transport aircraft, but offerings across the Airbus product line have emerged over the decades. Today, the Airbus Corporate Jets (ACJ) business unit offers the ACJ TwoTwenty, ACJ319neo, ACJ320neo, ACJ330neo, and ACJ350 XWB. ACJ330 and ACJ320 aircraft are now exclusively offered with the New Engine Option (neo), which provides customers with a choice between the Pratt & Whitney PW1100G and CFM International LEAP-1A engines.

Airbus—which maintains roughly 180 global locations—has delivered close to 13,000 aircraft since the launch of the A300.

## AIRBUS HELICOPTERS

**Founded:** 1992 **HQ:** Marignane, France

**Top executive:** Bruno Even, CEO **Employees:** 20,000

**Info:** [airbus.com/en/products-services/helicopters](http://airbus.com/en/products-services/helicopters), +33 (0) 4 42 85 85 85



Airbus Helicopters is the rotorcraft wing of Airbus, Europe's largest aerospace and defense conglomerate. The company was founded as Eurocopter Group after a merger between the helicopter divisions of Aérospatiale and DaimlerChrysler Aerospace.

Airbus Helicopters has been a pioneer in rotorcraft development for decades. Legacy company Aérospatiale developed the world's first turboshaft-powered helicopter in 1955, the Alouette II, as well as the "Fenestron" shrouded tail rotor design, which debuted on the Gazelle in 1968. In both civil and military applications, Airbus's helicopters have proven to be bestsellers with a reputation for

ruggedness and durability. They sport features such as full flight capabilities in icing conditions and digital flight control systems. Airbus Helicopters variants have also accomplished high-profile feats never attempted by other rotorcraft, such as the 2005 landing of an AS350B3 at the peak of Mt. Everest.

Eurocopter was officially rebranded as Airbus Helicopters in 2014, after 22 years of operation as Eurocopter SA and Eurocopter SAS. Rotorcraft names were changed across the board, with each receiving a new numerical designation with an "H" prefix.

The Airbus Helicopters product line includes entries in the intermediate-single segment (H125 and H130), light-twin segment (H135, H145), medium and super-medium segments (H155, H160, H175), and heavy segment (H215, H225). In 2017, Airbus Helicopters launched the Airbus Corporate Helicopters (ACH) business unit, a luxury corporate helicopter development wing mirrored after the successful Airbus Corporate Jets model. ACH offers up-market VIP variants of the H125, H130, H135, H145, H160, and H175, positioning an offering in every segment from intermediate single to super-medium. Cabin configurations and design characteristics are customizable to consumer preference, and most feature extended ranges over their base-model counterparts.

Airbus Helicopters is headquartered at the Marseille Provence Airport in Marignane, France. The company is currently developing the RACER compound, high-speed civil helicopter and the CityAirbus eVTOL.

## BELL

**Founded:** 1935 **HQ:** Fort Worth

**Top executive:** Mitch Snyder, president and CEO

**Employees:** 7,000 **Info:** bellflight.com, (817) 280-2011



Bell, a subsidiary of Textron, is an aerospace manufacturer that has developed both civilian and military aircraft and rotorcraft since 1935. Lawrence Dale Bell founded the original business, Bell Aircraft Corporation, in Buffalo, New York. The company now specializes in rotorcraft development and manufacturing.

In its early years, Bell focused on fighter aircraft. The company's founding coincided with the buildup for World War II, and Bell consequently developed aircraft such as the XFM-1 Airacuda and P-39 Airacobra during the war years. The Bell P-59 Airacomet, the first American jet-powered fighter, took its first flight in 1942 but was never adopted for service.

In 1941, Bell hired engineer Arthur M. Young, who would provide the knowledge and innovative spirit required for the development of the company's first helicopters. Bell's initial civilian-certified offering, the Bell 47, first took flight in December 1942, marking the beginning of a long and illustrious

development path that continues to this day.

Textron purchased Bell, then known as Bell Aerospace, in 1960, just after the introduction of the Bell 204. This turboshaft-powered helicopter was the first in the line of ubiquitous Huey-family rotorcraft and was designed initially to meet the U.S. Army's requirements for a utility rotorcraft. In the military role, the type was designated the HU-1 and later UH-1. The image of the Huey family is intrinsically connected to the rotorcraft's enormous involvement in the Vietnam War, during which it served both the U.S. Army and Marine Corps. The combat-tested reputation of the UH-1 translated into strong civilian sales of the 204 and 205 models and later into sales of the 212, 214, 214ST, 407, 412, and more.

In 1976, Textron rebranded the Bell Helicopter division as Bell Helicopter Textron. This designation remained until 2018 when the company was officially renamed Bell.

Currently, Bell manufactures the 505, 407, 429, 412, and 525 rotorcraft for the civilian market. Maximum passenger counts range from four in the 505 to 16 in the 525. The company is also developing a series of unmanned aerial vehicles called Autonomous Pod Transports (APT) for cargo delivery.

## BOEING

**Founded:** 1916 **HQ:** Arlington, Virginia

**Top executive:** Dave Calhoun, president and CEO

**Employees:** 141,000 **Info:** boeing.com, (312) 544-2000



The Boeing Company is a defense and aerospace manufacturing organization and one of the largest defense contractors in the world based on dollar value. It has operations in 65 countries and maintains offerings across the aerospace realm, manufacturing aircraft, rotorcraft, rockets, satellites, and communications equipment for civilian and military clients.

Lumber industrialist William Boeing founded the company in 1916 in Seattle. Originally named the Pacific Aero Products Co., it designed its first aircraft in the same year: the B&W Seaplane (named for its joint development by Boeing and Conrad Westervelt). The company was renamed Boeing Airplane Company in 1917 and Boeing Airplane & Transport Corporation in 1928.

By the close of the 1920s, Boeing had found success in the aerospace market and purchased several aircraft makers, such as Sikorsky Aviation, Pratt & Whitney, Avion, Chance Vought, and Hamilton Metalplane. Following these acquisitions, Boeing Airplane & Transport Corporation became United Airplane & Transport Corporation. The venture lasted until 1934 when regulatory mandates forced the separation of air transport and aircraft manufacturing. Three major groups emerged from the disbanding of the United Airplane &

Transport Corporation: Boeing Airplane Company, United Aircraft, and United Airlines. United Aircraft would eventually become United Technologies.

Boeing became one of the largest aerospace companies in the world after its merger with McDonnell Douglas in 1997. In 2018, Boeing completed its largest acquisition since 1997 with the \$4.25 billion purchase of aerospace parts distributor KLM.

Boeing's civil aircraft offerings include the 737, 747, 767, 777, and 787. The 737 has been a bestseller since its first flight in 1967, with more than 10,500 deliveries to date. The company's civilian aircraft division, Boeing Commercial Airplanes, also produces the Boeing Business Jet (BBJ) series. Narrowbody models of the BBJ are based on variants of the 737, while widebody models include offerings based on the 747, 777, and 787 platforms. These aircraft compete primarily with the Airbus Corporate Jets line.

## BOMBARDIER

**Founded:** 1942 **HQ:** Montreal

**Top executive:** Éric Martel, president and CEO

**Employees:** 15,800 **Info:** [bombardier.com](http://bombardier.com), (514) 861-9481

A standalone business jet manufacturer since January 2021, Bombardier manufactures and supports Challengers and Globals, spanning the super-midsize to ultra-long-range jet categories.

In 1942 Joseph-Armand Bombardier, a Canadian inventor and entrepreneur,



established a company to market his "snow vehicle," or snowmobile. Four decades later, in 1986, Bombardier expanded into aerospace, acquiring Canadair, which had developed the Challenger 600 series business jet (which begat Canadair Regional Jets). In 1989, Bombardier bought Northern Ireland's Short Brothers; in 1990, it acquired Learjet Corporation, whose midsize Learjet 60 first flew later that year; and in 1992, it purchased a majority stake in De Havilland Aircraft of Canada. The first member of its ultra-long-range Global family, the Express, flew in 1996, followed by the Challenger 300 in 2001.

In 2014, amid parent-company losses, Bombardier Business Aircraft became a Bombardier Aerospace division, as did the conglomerate's commercial aircraft business. In 2017, Bombardier partnered with Airbus to market its resource-draining C Series commercial jets, and the following year it sold the Q Series commercial turboprop program and its Business Aircraft Training division to focus on business aircraft, aerostructures, and other transportation-segment opportunities.

In December 2018, the flagship Global 7500 entered service. More than 4,700 Bombardier business aircraft are now in operation worldwide.

The company's business jets include Challengers (CL350 super-mid, CL650

large cabin); and ultra-long-range Globals (Global 5500, 6500, 7500, 8000). (The Global 8000 is a faster and longer-range version of the 7500.) The company continues to provide product support for the discontinued Learjet line. A revised version of the Challenger 350, the Challenger 3500, will begin deliveries in the second half of 2022.

Bombardier-owned and -authorized service facilities and mobile response teams provide global assistance from AOG recovery to major repairs, overhauls, and interior refurbishments. The company also buys, takes in trade, and sells preowned Bombardier aircraft.

## CIRRUS

**Founded:** 1984 **HQ:** Duluth, Minnesota

**Top executive:** Zean Nielsen, CEO

**Employees:** 2,100 **Info:** [cirrusaircraft.com](http://cirrusaircraft.com), (218) 529-7200



Cirrus manufactures the SR line of piston-powered single-engine aircraft and the SF50 series of single-engine fanjet aircraft. The company is owned by the China Aviation Industries General Aircraft (CAIGA) division of state-owned AVIC.

## DAHER

**Founded:** 1863 **HQ:** Orly, France

**Top executive:** Didier Kayat, CEO

**Employees:** 9,500 **Info:** [daher.com](http://daher.com), 33 (0) 1 49 75 98 00



Daher is a diversified aircraft manufacturing, aerospace equipment and systems, and logistics and supply-chain-services company that can trace its

# The Intelligent Solution to Fractional Ownership Now Makes More Sense than Ever



 **PlaneSense**<sup>®</sup>

SPECIAL ADVERTISING INSERT 2022

The fractional aircraft ownership community has changed dramatically in the nearly 30 years since PlaneSense introduced its "intelligent solution" for shared ownership, built on a unique and compelling value proposition and the then-new Pilatus PC-12 single-engine turboprop platform.

"Nobody knew these airplanes," recalled PlaneSense, Inc. founder and CEO George Antoniadis, describing his decision to build the fractional program around the Swiss aircraft as "a leap of faith." But Antoniadis—an air transport-rated pilot who holds an MBA from Harvard and an electrical engineering degree from Zurich's Federal Institute of Technology—recognized the potential revolution that the big, modern, and comfortable turboprop represented for the fractional arena.



Since PlaneSense launched in 1995, major fractional brands have ridden booms and survived near collapses and ownership programs large and small have come and gone. With its all-Pilatus fleet, meanwhile, Antoniadis' company has followed its founding vision and values, consistently growing while forging unrivaled client loyalty and creating a legacy of stability, longevity, and trust.

Now, amid an unprecedented surge in demand, supply-chain disruptions, and increasing attention to sustainability, the PlaneSense vision and values resonate more strongly than ever, amplified by the completion of a slate of major service initiatives. Among them: the addition of the PC-24 light jet to the company's fractional fleet; installation of high-speed Wi-Fi aboard all its aircraft; and expansion to full Continental U.S. service coverage with the elimination of the last out-of-area fees.

Like many flight providers, PlaneSense has been challenged by the current environment. In early 2022, it deferred sales of

new shares through the end of the year to focus on meeting commitments to existing clients, while adding infrastructure for planned growth. That included expanding staff by 25 percent since the pandemic began and creating a maintenance center in Las Vegas to support West Coast operations. Now, with sales of shares in the PC-12 and PC-24 set to resume in the fourth quarter, Antoniadis took time during a rare non-travel day to talk about what he sees as the keys to the program's success and what the company is doing to maintain its edge.

### A PLATFORM, AND A VALUE PROPOSITION

Today, the PC-12 and the PC-24 are among the most coveted business aircraft, either turboprop or jet, whether for on-demand access, or to purchase new or preowned. Yet Antoniadis believes the PlaneSense value proposition is as important to the program's success as the aircraft its clients fly on. The proposition is built on three pillars: service, flexibility, and cost efficiency, and team members "have a passion to deliver" on all three, he said.

The world-class PlaneSense service is highly attentive and personalized. "Our goal is to excel in long-term relationships," said

Antoniadis, and the company keeps "a razor-sharp focus on clients' needs."

Flexibility comes from the ability of the PC-12, and now the PC-24, "to get people closest to their destinations,"

with performance that opens access to thousands of airports that most business jets cannot use.

The cost-efficiency pillar rests on having "the most economical aircraft in its class" in both the six-place Pilatus turboprop and the eight-place jet, combined with the fleet optimization enabled by PlaneSense's unparalleled experience with the platforms, as the world's largest civilian operator of both models.

"I call it the double economy of scale," Antoniadis said. "You're buying only as much aircraft as you need, but the whole asset shows up—that's the first economy. The second economy is our system: the assets are highly utilized, keeping the operating costs per hour extremely low and the overhead costs minimal."

These pillars are what Antoniadis believes makes PlaneSense the intelligent solution for shared ownership. "You can walk away at the end of the flight and pat yourself on the back, knowing you chose the right program."

### RELATIONSHIPS, NOT TRANSACTIONS

The three pillars are also the foundation for the stability, longevity, and trust that characterize the company's relationships—not only with clients, but with team members and key partners, as well.

"We are relationship-focused, not transaction-focused," Antoniadis emphasized. He noted that PlaneSense does not offer a "most-favored-nation" contract clause that guarantees a client

*PlaneSense operates two maintenance facilities to ensure quality and consistency across the fleet.*

the lowest available terms, simply because equal terms for all is a core company principle. "You don't need to be looking behind your back to see who got a better deal," he said. "We commit that the transaction we're entering with you is fundamentally the same as the previous one, and the next one."

Illustrating the trust and stability that it engenders, even with the large growth in their numbers over the past decade, almost one-quarter (24 percent) of the company's clients have owned PlaneSense shares for 10 years or longer. Some original shareowners remain with the program, and today the children and even grandchildren of some of them own shares as well, Antoniadis noted with both astonishment and pride.

Of course, excelling at long-term relationships requires meeting clients' evolving needs, such as desires "for more capacity and speed," which led the company to become the launch customer for the PC-24 twinjet, Antoniadis recounted.

Introduced in 2014, the PC-24 light jet offers outsize performance and advanced features that prompted Pilatus to proclaim it the "Super Versatile Jet." It's worth recalling that when the order book opened at the European Business Aviation Convention and Exposition that year, the first two years of production—84 PC-24s—sold out before the show ended. PlaneSense ordered six and inaugurated service with Serial #101, the first ever PC-24, in 2018. By the end of 2022, the fleet will include 11 PC-24 jets.



An emphasis on relationships is also reflected internally. "I like that we have a family feeling," Antoniadis said, noting that a significant number of the staff "have enjoyed working here for 20-plus years."

Pilots, meanwhile, have a choice of more than 40 locations to base from, where they can live the lifestyle that suits them best.

"Our team members are people, with names, families, and

*George Antoniadis,  
President & CEO,  
founded PlaneSense  
in 1995 with a desire to  
provide better solutions  
for private flights.*



aspirations, and we make sure that all of them are valued for who they are," he said.

The same approach applies to key suppliers. "Instead of spending energy trying to eke out a better deal somewhere, we spend it on creating deep relationships," Antoniadis said.

### ONE SOLUTION FOR ALL

Though some business aircraft travelers consider fractional ownership out of reach, Antoniadis believes PlaneSense changes the calculus, making it the best option even for many who have jet cards, use charter, or own an aircraft outright—not only for current fractional customers seeking a smarter solution.

As for whole aircraft ownership, "It's terribly cost-inefficient, unless you fly 300, 400 hours a year," he noted. Meanwhile, chartering one's aircraft out to generate offsetting revenue "creates a barrier to your own use," he said. "The reason you own a whole airplane is so that you can fly whenever you want. Once others are using the plane, you're removing that flexibility from yourself."

For jet card customers, PlaneSense "might be a higher upfront investment, but if you calculate the entire cost, it's much more economical," Antoniadis said. Moreover, while a blizzard of blackout dates and restrictions can impact costs and access at many card programs, "We have far fewer restrictions than average," he said.

Another distinction between PlaneSense and jet card programs: "It's a different kind of interaction and service," Antoniadis said. "PlaneSense is an extension of your coming home."

And for customers who currently charter and those new to business aviation, "Why compromise?" he asked rhetorically. "Come to the best service solution, which also turns out to be one of the most cost effective over time."

*With safety and quality at  
the forefront of its operations,  
PlaneSense developed a  
robust in-house training  
program for pilots and  
maintenance technicians.*



### THE TOOLS FOR TOMORROW

Going forward, PlaneSense will remain true to its vision and values, Antoniadis said. "We believe in organic growth, and in constantly improving the value of the program for our clients, which results in more clients." Toward that end, he continued, "The more things we can control that are core to our business, the better we can improve the program."

That's why, with safety at the heart of PlaneSense's operations, the company trains all its pilots and maintenance technicians in-house, he said.

"We have more experience with these airplanes than anyone, so we believe we can train our pilots and technicians better than anyone."



#### The PlaneSense leadership team.

(left to right)

- Mike Baur, VP Business Development & Strategy
- Robyn Moses-Harney, VP Human Resources
- Jim Citro, CFO & Treasurer
- George Antoniadis, President & CEO
- Gary Arber, VP & General Counsel
- Todd Smith, Director of Air Worthiness, VP Atlas Aircraft Center
- Kevin Gordon, VP Flight Operations
- Dave Verani, VP Sales & Marketing
- Mandar Pendsé, Chief Information Officer

For nearly three decades, the constant exchange between Pilatus Aircraft and PlaneSense has resulted in an incredible knowledge base, which is the foundation for training, maintenance, and safety initiatives at PlaneSense.

The pilot training center at the company's Portsmouth, New Hampshire headquarters is equipped with customized flight training devices commissioned from FlightSafety International (FSI), and a

full-motion PC-12 NGX simulator for the facility is under construction.

Full maintenance operations have been part of the service strategy since the company's inception in 1995. To ensure quality and safety, the majority of maintenance is performed by highly trained technicians at the expansive, state-of-the-art hangar at the company headquarters in Portsmouth, NH as well as a second facility in Boulder City, NV, added in 2021 to service the increasing flight volume in the Western U.S. and supplement the workload normally handled by Portsmouth.

In addition to robust in-house training, A&P maintenance technicians take part in training through the individual manufacturers, including Pilatus.

Meanwhile, to create the next step change in efficiency, the company is developing with thought leaders from MIT an optimization tool that amalgamates big data on aircraft, clients, crews, schedules, and other operational keystones, processed through AI analysis. Initial implementation of this project, which began in 2020, is expected by year's end.

Technology is also helping PlaneSense to meet changing client expectations, though those expectations haven't necessarily evolved in ways Antoniadis would have predicted.

"My stated goal when we started the company was that a human would always answer the phone, and it wouldn't ever take more than four rings," he said of his customer service policy. But today, he observed, "People prefer to press soft buttons on their cell phones and not talk to anyone. It does take away from the human touch that I have always thought is so important, but that's the new status quo. So, we're constantly developing enhancements on our app and portal so clients can do more that way."



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[sales@planesense.com](mailto:sales@planesense.com)

aviation roots back to 1911 with the founding of the Morane-Saulnier Aircraft Company. It produces the Kodiak and TBM lines of single-engine turboprops and manufactures components for other airframers.

## DASSAULT

**Founded:** 1929 **HQ:** Paris

**Top executive:** Éric Trappier, chairman and CEO

**Employees:** 12,400 **Info:** [dassault-aviation.com](http://dassault-aviation.com),  
+33 (0) 1 47 11 40 00

Dassault Aviation, a division of France's Dassault Group, manufactures Falcon business jets, known for their performance, efficiency, and technically advanced systems, as well as military aircraft such as the Rafale fighter and ancillary aerospace products including fly-by-wire flight control systems.



Founded by aeronautical engineer Marcel Dassault (née Bloch) in 1929, the company had a rich history of military and civil aircraft production before it entered the business aviation market, but it abandoned its first design, 1954's Méditerranée twinjet, for cost and fuel-consumption reasons. Acting on Charles Lindbergh's recommendation, Pan Am founder Juan Trippe ordered 40 Falcon 20 twinjets, Dassault's first production business jet, for U.S. distribution, with deliveries commencing in 1965. To provide factory support for its jets, Dassault established what is now Dassault Falcon Service in 1967.

Federal Express launched its delivery service in 1972 with a Falcon 20 fleet, and Dassault and Pan Am jointly formed Falcon Jet Corp. to service and sell Falcons that same year. The Falcon 50, Dassault's first production trijet and first civil aircraft with a composite control surface (the aileron), was certified in 1979, and the following year Dassault acquired Pan Am's stake in Falcon Jet Corp. (renamed Dassault Falcon Jet Corp. in the mid-1990s). The 900 trijet series entered service in 1986, and the Falcon 2000 midsize twinjet joined the fleet in 1995, with both aircraft undergoing upgrades under new model designations in the years since.

Using its own CATIA system—now the industry standard—Dassault began designing aircraft exclusively on 3D CAD/CAM computers in 2000. Business aviation revenues exceeded military sales for the first time in 2005.

The ultra-long-range Falcon 7X trijet, the first fly-by-wire business jet, entered service in 2007, and its enhanced flight vision system was certified in 2010. The follow-on, longer-range 8X entered service in 2016. Falcon unveiled a super-midsize Falcon 5X in 2013, but it canceled the program in 2017 due to development problems with the Snecma Silvercrest engines. In 2018, the airframer debuted the derivative Falcon 6X, slated for service entry in 2023. The company introduced a new flagship, the large-cabin, long-range Falcon 10X twinjet, in 2021. Deliveries of that aircraft are expected to begin in 2025.

Dassault's product line includes the Falcon 2000LXS super-mid twinjet, Falcon 900LX large-cabin trijet, and Falcon 7X and 8X ultra-long-range trijets. The company has service centers and satellite facilities in the U.S., France, Italy, Brazil, and Africa.

## EMBRAER EXECUTIVE JETS

**Founded:** 1969 **HQ:** São Paulo

**Top executive:** Francisco Gomes Neto, president and CEO

**Employees:** 18,000 **Info:** [embraer.com](http://embraer.com), +55 12 3927 1000

A division of Embraer, the Brazilian aircraft manufacturer, Embraer Executive Jets produces business jets spanning the light- to large-cabin categories.

Seeking to expand beyond its civil and military markets, Brazil's Empresa Brasileira de Aeronáutica (Embraer) embarked in the mid-1990s on a business jet development program, and in 2000 the airframer introduced the Legacy 600. Based on Embraer's ERJ 145 regional jet, the Legacy 600 entered service in 2002, and with prospects bright, the company established Embraer Executive Jets (EEJ) in 2005 and introduced the clean-sheet Phenom 100 VLJ and Phenom 300 light jets that same year. The flagship Lineage 1000, a 19-passenger derivative of its E190 airliner, debuted in 2006.

EEJ brought fly-by-wire to midsize jets with the launch of the Legacy 450 and 500 in 2008, and it opened service centers in Mesa, Arizona, and Fort Lauderdale, Florida, that same year. The Legacy 650, an upgraded, longer-range derivative of the Legacy 600, debuted in 2009. A vote of confidence came in 2010 with a firm order from fractional fleet operator NetJets for 50 Phenom 300s and options on an additional 75—a deal worth more than \$1 billion.

EEJ began assembling Phenom 100s at a new facility in Melbourne, Florida, in 2011; it brought the assembly of Phenom 300s to the site in the same year and started making Legacy 450/500s there in 2016.

A fleet-refreshment program began the Lineage 1000E (Enhanced), with upgraded cabin, cockpit, and range (2013); the Phenom 100E, with multi-function spoilers (2014) and 100EV (Evolution), with upgraded powerplant and avionics (2016); the Legacy 650E, adding synthetic vision and auto-throttle (2016); and the Phenom 300E, with new interior and avionics (2017). Meanwhile, fractional fleet operator Flexjet introduced the Phenom 300 to its program in 2014, and added the Legacy 450 and 500 in 2016.

Embraer announced that it was discontinuing its Legacy 450, 500, and 650, as well as the Lineage 1000, in 2020. Current production business aircraft include the 100EV, 300E, the midsize Praetor 500, and the super-midsize Praetor 600.

Embraer spun off its Eve eVTOL division as a separate, publicly traded company in 2022 after accumulating potential orders for 1,700 aircraft valued at more than \$5 billion.



## GULFSTREAM

**Founded:** 1958 **HQ:** Savannah, Georgia

**Top executive:** Mark Burns, president

**Employees:** 13,000 **Info:** gulfstream.com, (800) 810-4853

Gulfstream Aerospace focuses on the large-cabin market, manufacturing business jets capable of intercontinental operations. The company, a division of U.S. defense contractor General Dynamics, also provides sales and refurbishment services for preowned Gulfstream aircraft.



The company was established in 1958 as an outgrowth of Grumman Aircraft Engineering Co., which developed the Gulfstream I, a 12-passenger turboprop business aircraft. The success of that model led to the jet-powered Gulfstream II. In 1966, Grumman moved its civil-aircraft production to Savannah, Georgia; and in 1978, the Gulfstream line and Savannah plant were purchased by American Jet Industries, headed by Allen Paulson, and its name changed to Gulfstream American.

In the 1980s, the GIII came to market; the company's name changed again, this time to Gulfstream Aerospace; Chrysler bought the company; and the Gulfstream IV was introduced. At the end of the 1980s, Paulson repurchased Gulfstream with private equity firm Forstmann Little & Co. The 1990s brought Gulfstream's first sales contract with NetJets, the introduction of the GV, and in 1999, the company's purchase by General Dynamics.

In the 2000s, Gulfstream bought Galaxy Aerospace, developing its mid-size jets into the G100 and G200, and purchased its first service facility outside the U.S. Gulfstream also introduced the G550 and G650 and brought enhanced vision systems and internet connectivity to business aircraft. This decade saw the introduction of the 650ER and the G500 and G600 super-midsize jets.

The product line includes the G280, a super-midsize model introduced in 2008 with 3,000-nautical-mile range; G500/600, a pair of long-range jets introduced in 2014 that feature the Symmetry flight deck and fly-by-wire flight controls; and 650ER, the current flagship ultra-long-range jets, with 7,500-nautical-mile range.

Work continues on testing Gulfstream's largest aircraft, the G700, which is slated to enter service in early 2023. The airframer announced the G700 in 2019. The G700 has the same fly-by-wire flight controls with active control sidesticks as the G500/G600 and the Honeywell Epic-based Symmetry avionics suite, with multiple touchscreen displays.

In 2021, Gulfstream revealed two additions to its family of large-cabin jets: the G800 and the G400. The G800, which will ultimately replace the G650ER as the airframer's longest-range jet, stretches its predecessor's—as well as the G700's—range by 500 nautical miles, to 8,000 nautical miles. It retains the fuselage dimensions of the G650 line while receiving a host of updates from the G700, including the Symmetry touchscreen flight deck with active control sidesticks, interior elements, wings, and Rolls-Royce Pearl 700 engines. Scheduled to enter service in early 2025, the new G400 offers a range of 4,200 nautical miles and fills a niche held by the G450, which ceased production in 2018. It will be appointed similarly to the G500 and G600 but will have a shorter fuselage and a different variant of the Pratt & Whitney PW800 engine—the PW812GA.

Gulfstream operates a global network of service centers for maintenance and repairs. It refurbishes its aircraft interiors at a purpose-built facility in Savannah.

## HONDA AIRCRAFT

**Founded:** 2006 **HQ:** Greensboro, North Carolina

**Top executive:** Hideto Yamasaki, president and CEO

**Employees:** 1,500 **Info:** hondajet.com, (336) 662-0246

Honda Aircraft Company manufactures the HA-420 HondaJet. The aircraft was first delivered in 2015 and by 2017 was the world's most-delivered light jet. The current iteration of the aircraft is the HondaJet Elite S. The twinjet features a patented over-the-wing engine mount as well as turbofans that the airframer's parent, Japan's Honda Motor Company, developed in partnership with General Electric.

In 2021, Honda unveiled a concept for its next aircraft. The HondaJet 2600 would be a larger light jet with a transcontinental range of 2,625 nautical miles and a midsize-jet cabin that seats up to 11 passengers.



The design is similar to that of the original HondaJet HA-420, with the over-the-wing engine mounts. Performance goals include a maximum cruise speed of 450 knots and a maximum altitude of 47,000 feet. For the HondaJet 2600, the fuselage will be more oval-shaped, increasing headroom and shoulder space at seats.

Besides producing the HA-420 HondaJet, the company offers HondaJet maintenance and upgrades at its Greensboro factory maintenance facility.

## LEONARDO

**Founded:** 1948 **HQ:** Rome

**Top executive:** Alessandro Profumo, CEO

**Employees:** 50,400 **Info:** leonardo.com, +39 06 324731



Leonardo is a multinational aerospace and defense organization. It is one of the world's largest global defense contractors and manufactures a wide variety of rotorcraft and fixed-wing aircraft for both civil and military applications.

Formerly Finmeccanica, Leonardo was founded in 1948 as the mechanical engineering division of the Italian government-run Istituto per la Ricostruzione Industriale (IRI). Agusta represented the rotorcraft branch of the business, which began developing and manufacturing helicopters in 1952 under license from Bell.

Agusta first flew the A109 in 1976. A lightweight, twin-engined utility helicopter, the A109 has proven to be the company's bestseller and is still manufactured today.

Leonardo's legacy companies underwent frequent reorganizations, mergers, and divestments from 1960 through the 1980s. In 1992, Agusta became a partner in NHIndustries, a joint venture between Eurocopter and Fokker. This trio went on to develop the NH-90 helicopter. In 2000, Finmeccanica and British manufacturer GKN agreed to merge their rotorcraft production branches (Agusta and GKN-Westland Helicopters), forming AgustaWestland. The venture was originally a 50/50 merger, but Finmeccanica acquired GKN's share in 2004, becoming the sole owner of the AgustaWestland brand.

Finmeccanica was restructured into seven business units in 2014 and changed its name to Leonardo on Jan. 1, 2017.

Leonardo produces the AW109S, AW119Kx, AW139, AW169, AW189, and AW101 for civilian applications. It is developing the AW609 civil tiltrotor and the AW09 single-engine helicopter. The AW09 is the former Kopter SH09. Leonardo purchased Kopter in 2020. Leonardo also manufactures a variety of military helicopters, including the TH-73A for the U.S. Navy and the MH-139A for the U.S. Air Force (with Boeing).

Leonardo, which operates from more than 150 global locations, has a large helicopter assembly, support, engineering, and training facility in Philadelphia.

## MD HELICOPTERS

**Founded:** 1955 **HQ:** Mesa, Arizona

**Top executive:** Brad Pederson, CEO

**Employees:** 250 **Info:** mdhelicopters.com, (480) 346-6300

MD Helicopters traces its roots back to 1955 when the Hughes Tool Company's Aircraft Division began studying and developing light helicopters. After more than six decades and a series of mergers and divestments, it was recapitalized as an independent company in 2005. Since then, the light rotorcraft manufacturer has grown its global fleet presence to more than 2,500 operational aircraft.

Early civilian rotorcraft produced by the Aircraft Division included the Hughes 269, 300, 500, and 530F. After successes in the civil and military rotorcraft domains, the AH-64 Apache attack helicopter chiefly among them, Hughes sold its helicopter division to McDonnell Douglas in 1984. In 1997, McDonnell Douglas and Boeing merged their businesses, becoming the Boeing Company.

Only two years later, in 1999, Boeing sold the commercial rotorcraft lines formerly produced by McDonnell Douglas to MD Helicopter Holdings, an umbrella company of Dutch RDM Holding. While Boeing retained production of the AH-64 and rights to the NOTAR no tail rotor system, MD Helicopter Holdings now owned production of the MD 500E, 530F, 520N, and 600N, as well as the MD Explorer series of twin-engine rotorcraft.

In July 2005, Lynn Tilton, the founder and then-owner of Patriarch Partners, acquired MD Helicopter Holdings. That same year, MD Helicopters was officially recapitalized, with a headquarters in Mesa, Arizona.

In early 2020, Tilton relinquished control of MD Helicopters and other portfolio companies of Patriarch Partners following rulings by a Delaware bankruptcy court. MD filed for Chapter 11 bankruptcy in March 2022. It emerged from bankruptcy in September when a new company, majority owned by bond insurer MBIA, acquired its assets. The new company will reportedly focus on rebuilding product support for all its models while ramping up production of its 500 series of single-engine helicopters.



## NEXTANT AEROSPACE

**Founded:** 2007 **HQ:** Cleveland

**Top executive:** Kenneth C. Ricci, chairman



**Employees:** 1,600 **Info:** [nextantaerospace.com](http://nextantaerospace.com), (216) 261-9000

Nextant Aerospace specializes in the remanufacturing of business jets and turboprops.

The company introduced the 400XT, an upgraded Beechjet 400A/XP (Hawker 400), in 2010. The type was certified by the FAA in 2011, and the first Nextant 400XT was delivered in 2013. That year, Nextant also launched the G90XT program, a tip-to-tail remanufacturing of Beechcraft King Air C90 twin-engine turboprops. The remanufactured aircraft first flew in 2015 and received final FAA certification in 2018. Nextant launched the 604XT, a program to upgrade the large-cabin Bombardier Challenger 604, in 2017. The first deliveries were in 2018.

Nextant also provides service to military customers with cockpit upgrades and associated support equipment for USAF T-1A and T-6 trainers and USN C-26 aircraft.

## PIAGGIO AEROSPACE

**Founded:** 1884 **HQ:** Villanova d'Albenga (Savona), Italy

**Top executive:** Vincenzo Nicastro, extraordinary



commissioner (appointed by the Italian government)

**Employees:** 950 **Info:** [piaggioaerospace.it](http://piaggioaerospace.it), (561) 253-0104

Piaggio began producing aircraft engines and airframes in 1915.

It entered into a partnership with Gates Learjet in 1983 to begin the development of the twin-engine pusher-propeller turboprop P.180 Avanti. Learjet withdrew from the project in 1986, and the aircraft received FAA certification in 1990. As of December 2020, Piaggio had built approximately 250 copies of the model. The aircraft is on its third iteration, which is called the EVO. It has a maximum speed of 402 knots at 41,000 feet.

The company was declared insolvent in 2018 and currently operates under special administration while it attempts to find a buyer.

## PILATUS AIRCRAFT

**Founded:** 1939 **HQ:** Stans, Switzerland

**Top executive:** Markus Bucher, CEO

**Employees:** 2,000 **Info:** [pilatus-aircraft.com](http://pilatus-aircraft.com), (800) 745-2887 (U.S.), +41 41 619 65 80

Pilatus Aircraft began manufacturing military training airplanes in the 1940s and launched the legendary PC-6 Porter short-takeoff-and-landing aircraft in 1960. Today, the company is best known for its turboprop military trainers and its PC-12 single-engine business and utility turboprop, which entered service



in 1994. Pilatus has since delivered 1,900 of the aircraft, whose newest iteration, the PC-12 NGX, features a more powerful Pratt & Whitney Canada PT6E-67XP engine, single-lever power control, and larger cabin windows.

In 2018, the company began deliveries of its twin-engine PC-24 Super Versatile Jet, an aircraft capable of using unimproved airfields and hauling outsized cargo, thanks to an oversized rear cargo door and flexible cabin layout. By January 2021, Pilatus had delivered 100 of the aircraft.

## PIPER AIRCRAFT

**Founded:** 1927 **HQ:** Vero Beach, Florida

**Top executive:** John Calcagno, president and CEO

**Employees:** 562 **Info:** [piper.com](http://piper.com), (877) 879-0275

Piper is still perhaps best known for building more than 25,000 of its simple and inexpensive piston single-engine, two-seat Cubs between 1936 and 1947. The iconic yellow fabric, "tail-dragger" landing gear aircraft distill the essence of pure "stick and rudder" flying in its most basic form.

Today, the company builds a full line of piston single and twin-engine aircraft. Those models include piston singles Pilot 100i, Archer, and pressurized



M350 and piston twins Seminole and Seneca. Piper also builds two models of turboprop singles based on the M350 fuselage, the M500 and M600/SLS. The six-seat M600/SLS cruises at 274 knots and is equipped with advanced avionics including the Garmin Autoland system, called HALO, which can automatically land the aircraft in the event of pilot incapacitation.

The company is currently owned by the Brunei Ministry of Finance. Hassanal Bolkiah, the Sultan of Brunei, is an accomplished pilot who flies his own Boeing 747.

## SIKORSKY

**Founded:** 1925 **HQ:** Stratford, Connecticut

**Top executive:** Paul Lemmo, president

**Employees:** 15,000

**Info:** [lockheedmartin.com/en-us/capabilities/sikorsky.html](https://lockheedmartin.com/en-us/capabilities/sikorsky.html), (203) 386-4000

Lockheed Martin acquired Sikorsky for \$9 billion in 2015, largely for its military helicopter programs, including the ubiquitous UH-60 series of Black Hawk models, and the promise of lucrative future military programs including the CH-53K heavy-lift helicopter and the U.S. Army's Future Long-Range Attack and Assault (FLRAA) and Future Attack Reconnaissance Aircraft (FARA).

Production of existing civil models, the S-76D medium twin and the S-92A heavy twin, has languished due to a combination of corporate resourcing priorities, U.S. regulatory changes, and market forces. Sikorsky made the strategic decision not to bring the S-76D into compliance with new FAA crashworthy fuel tank standards, essentially ending its ability to sell that aircraft in the U.S. market and effectively ending its production. Meanwhile, long-promised upgrades for the S-92A have been slow in coming, thanks to the recent weakness of the offshore energy market, which reduced customer demand. Sikorsky delivered just four new S-92As in 2021 and announced the closure of its Coatesville,



Pennsylvania plant, which had been the hub of its civil helicopter production. The company thinks S-92A production could eventually rebound and after product improvements for the helicopter, now slated for 2026, are incorporated.

## TEXTRON AVIATION

**Founded:** 2014 **HQ:** Wichita, Kansas

**Top executive:** Ron Draper, CEO

**Employees:** 9,500 **Info:** [txtav.com](https://txtav.com), (316) 517-6000

Textron Aviation was created in 2014 when parent company Textron, the owner of Cessna Aircraft, acquired the Beechcraft and Hawker brands. As a result of the acquisition, the manufacture of Beechcraft- and Hawker-branded business jet aircraft was permanently discontinued.

When Cessna was established as the Cessna-Roos Company in 1927, co-founder Clyde Cessna had already launched several failed aircraft manufacturing ventures (in partnership with fellow aviation pioneers Walter Beech and Lloyd Stearman, among others). The business began to achieve success only after nephews Dwane and Dwight Wallace bought out Clyde in 1935.

Cessna's first business jet, the Citation I (Cessna 500), which the airframer created to compete with the Learjet, first flew more than 50 years ago, in 1969. A decade later, Citations were the bestselling business jets in the world. In the 1980s, under CEO Russell Meyer, Cessna pioneered aircraft leasing and fleet sales.

In 1985 General Dynamics bought Cessna, which it then sold to Textron in 1992. (General Dynamics bought Gulfstream Aerospace in 1999.) Cessna



became a Textron Aviation brand in 2014. (Beechcraft also became a Textron Aviation brand that year, and Bell, formerly Bell Helicopter, is now part of Textron, as well.)

Cessna sells seven models, ranging from the small-cabin Citation M2 to the super-midsize Citation Longitude. The twin-engine utility SkyCourier turboprop received FAA certification in March, with the first delivery to launch customer FedEx taking place shortly thereafter. The single-engine Denali turboprop has been moved to the Beechcraft brand. Since they entered service in 1973, more than 7,000 Citations have been produced. The Citation X/X+, which ended production in 2018, held the distinction of being the world's fastest civilian production aircraft.

Beechcraft manufactures the G36 Bonanza single-engine piston aircraft, the piston twin-engine G58 Baron, and twin-engine King Air model 260 and 360 turboprops. It also assembled the T-6 Texan II single turboprop trainer for the U.S. military. Its new Denali single-engine turboprop made its first flight in 2021. Certification is expected in 2023.

In March 2022, Textron bought European electric aircraft maker Pipistrel for a newly created business unit called Textron eAviation, which will focus on the development of electric and hybrid-powered aircraft. **BJT**

# AIRCRAFT



As soon as its first owner departs from the manufacturer's delivery center, a new airplane technically becomes used (or preowned). For various reasons, however, 10 years after an aircraft's final production date is generally considered the milestone separating "newer" used business aircraft from "older" ones.

In deciding which aircraft to cover, we went well past this 10-year mark to provide information on certified business airplanes and helicopters manufactured since 2000. This means our list includes some models built before that year, as long as they were still being produced as recently as 2000. As a rule, a long production run is indicative of a successful aircraft.

Visit [bjtonline.com/aircraft](http://bjtonline.com/aircraft) for an interactive version of these listings.

Our thanks to Conklin & de Decker, which provided nearly all of the production, specifications, and performance data for this directory, as well as cost figures.

## PRICING

Cost figures represent the manufacturers' list prices for current or most-recently produced models.

## PASSENGER SEATING

The typical passenger seating on the aircraft is not the maximum certified seats. These numbers may vary for different operations (corporate, commercial, EMS, etc.).

## CABIN DIMENSIONS

Cabin volume is the interior volume, with headliner in place, without seats or other furnishings. Cabin width, height, and length are based on a completed interior. Width and height are the maximum within that cabin space. In "cabin-class" aircraft, the length is measured from the cockpit divider to the aft pressure bulkhead (or aft cabin bulkhead, if unpressurized). For small-cabin aircraft, the distance is from the cockpit firewall to the aft bulkhead.

## RANGE

For jets and turboprops, unless otherwise indicated, it's the maximum IFR range with four passenger seats occupied, using the NBAA IFR alternate fuel reserve calculation for a 200-nautical-mile alternate. For helicopters, it's the VFR range with all passenger seats occupied.

## PRODUCTION STARTED/ENDED

Year of the first delivery to the year of the last serial-number delivery.

N.A.=Not Available

# JETS



**Price**  
(\$ millions)



**Production**



**Cabin**



**Range**  
(nm)

## AIRBUS

	Price (\$ millions)	Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	Range (nm)
ACJ318 Elite	\$77.4	2005	N.A.	19	5,300	7.3	12.1	70.9	6,360
ACJ319	\$82.0	1998	In Production	19	5,843	7.3	12.1	78.8	6,360
ACJ320	\$85.0	1989	In Production	19	6,825	7.3	12.1	91.0	6,360
ACJ321	\$115.0	1997	In Production	19	8,547	7.3	12.1	113.8	N.A.
ACJ330-800	\$285.0	2014	In Production	25	N.A.	7.9	17.3	147.8	10,400
ACJ330-900	\$366.5	2014	In Production	25	N.A.	7.9	17.3	165.2	9,900
ACJ350XWB	\$380.0	2019	In Production	25	N.A.	8.0	18.4	167.4	11,100
ACJ TwoTwenty	\$81.0	2021	In Production	18	5,210	6.9	10.9	77.9	5,650

## BEECHCRAFT (TEXTRON AVIATION)

	Price (\$ millions)	Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	Range (nm)
Beechjet 400A	\$6.7	1990	2003	7	305	4.8	4.9	15.6	1,318
Hawker 400XP	\$7.8	2004	2010	8	305	4.8	4.9	15.5	1,318
Hawker 750	\$13.3	2008	2011	8	551	5.8	6.0	21.3	2,081
Hawker 800XP	\$13.2	1995	2005	8	551	5.8	6.0	21.3	2,539
Hawker 800XPi	\$13.2	2005	2005	8	551	5.8	6.0	21.3	2,539
Hawker 800XPR	N.A.	2011	N.A.	8	551	5.8	6.0	21.3	2,825
Hawker 850XP	\$14.1	2006	2009	8	551	5.8	6.0	21.3	2,615
Hawker 900XP	\$16.1	2007	2012	8	551	5.8	6.0	21.3	2,825
Hawker 4000	\$22.9	2008	2012	8	746	6.0	6.5	25.0	3,177
Premier I	\$5.7	2001	2005	6	285	5.4	5.5	13.6	1,072
Premier IA	\$7.1	2006	2012	6	285	5.4	5.5	13.6	1,072

## BOEING

	Price (\$ millions)	Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	Range (nm)
BBJ	\$71.4	1998	N.A.	19	5,396	7.0	11.5	79.2	6,230
BBJ 2	\$88.8	2001	N.A.	19	6,525	7.0	11.5	98.5	5,722
BBJ 3	\$96.5	2006	N.A.	19	7,290	7.0	11.5	107.3	5,722
BBJ Max 8	N/A	2018	In Production	25	N/A	7.1	11.5	98.3	6,640
BBJ Max 9	N/A	2020	In Production	30	N/A	7.1	11.5	107.2	6,515

## BOMBARDIER

	Price (\$ millions)	Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	Range (nm)
Challenger 300	\$21.0	2003	2014	8	930	6.1	7.2	23.7	3,220
Challenger 350	\$26.7	2014	In Production	8	930	6.1	7.2	23.7	3,356
Challenger 604	\$26.8	1996	2007	10	1,146	6.1	8.2	28.4	4,033
Challenger 605	\$21.0	2007	2015	10	1,146	6.1	8.2	28.4	4,063
Challenger 650	\$32.4	2015	In Production	10	1,146	6.1	8.2	28.4	4,000
Challenger 850	\$32.0	2006	2012	15	1,964	6.1	8.2	48.4	2,946
Global 5000	\$50.4	2005	2018	13	1,889	6.3	8.2	42.5	5,137
Global 5500	\$46.0	2019	In Production	12-17	1,889	6.2	8.0	40.8	5,900 (8 pax)
Global 6000	\$62.3	2012	2018	13	2,002	6.3	8.2	48.4	6,600 (8 pax)
Global 6500	\$54.0	2019	In Production	12-17	2,002	6.2	8.0	40.8	6,600



## JETS continued

	 <b>Price</b> (\$ millions)	 <b>Production</b>		 <b>Cabin</b>			 <b>Range</b> (nm)		
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	
<b>Bombardier (continued)</b>									
Global 7500	\$72.8	2019	In Production	14	2,637	6.2	8	54.4	7,700
Global Express	\$45.5	1999	2005	13	2,002	6.3	8.2	48.4	6,460
Global Express XRS	\$58.5	2005	2012	13	2,002	6.3	8.2	48.4	6,390
Learjet 31A	\$6.5	1991	2003	6	281	4.4	5.0	12.9	1,251
Learjet 40	\$8.0	2004	2007	6	369	4.9	5.1	17.7	1,631
Learjet 40XR	\$10.8	2005	2012	6	369	4.9	5.1	17.7	1,601
Learjet 45	\$10.3	1998	2007	8	415	4.9	5.1	19.8	1,889
Learjet 45XR	\$13.2	2003	2012	8	415	4.9	5.1	19.8	1,841
Learjet 60	\$12.6	1993	2003	7	447	5.7	5.9	17.7	2,134
Learjet 60XR	\$14.7	2007	2013	7	447	5.7	5.9	17.7	2,182
Learjet 70	\$11.3	2013	N/A	6	369	4.9	5.1	17.7	1,920
Learjet 75 Liberty	\$13.8	2013	2021	8	415	4.9	5.1	19.8	1,899



**Price**  
(\$ millions)



**Production**



**Cabin**



**Range**  
(nm)

### CESSNA (TEXTRON AVIATION)

	Price (\$ millions)	Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	Range (nm)
Citation Bravo	\$6.2	1997	2006	7	292	4.7	4.8	15.8	1,610
Citation CJ1	\$4.2	2000	2005	5	201	4.8	4.8	11.0	887
Citation CJ1+	\$5.2	2005	2011	5	201	4.8	4.8	11.0	1,022
Citation CJ2	\$5.7	2000	2006	6	248	4.8	4.8	13.6	1,331
Citation CJ2+	\$6.5	2005	2015	6	248	4.8	4.8	13.6	1,452
Citation CJ3	\$7.3	2004	2015	6	286	4.8	4.8	15.7	1,748
Citation CJ3+	\$8.3	2014	In Production	6	286	4.8	4.8	15.7	2,040
Citation CJ4	\$9.2	2010	In 2021	7	293	4.8	4.8	17.3	2,022
Citation CJ4 Gen 2	\$10.75	2021	In Production	10 (max)	293	4.8	4.8	17.3	2,165
Citation Encore	\$8.1	2000	2006	7	314	4.8	4.8	17.3	1,695
Citation Encore+	\$9.2	2007	2009	7	314	4.8	4.8	17.3	1,712
Citation Excel	\$10.3	1998	2004	7	422	5.7	5.5	18.5	1,786
Citation Latitude	\$16.7	2015	In Production	9	587	6.0	6.4	21.1	2,787
Citation Longitude	\$27.0	2019	In Production	8	N/A	6.0	6.0	25.0	3,422
Citation M2	\$4.7	2013	In Production	6	201	4.8	4.8	11.0	1,550
Citation Mustang	\$3.5	2006	2017	4	163	4.5	4.6	9.8	800
Citation Sovereign	\$17.8	2004	2013	9	571	5.7	5.5	25.3	2,920
Citation Sovereign+	\$17.9	2013	2021	9	585	5.7	5.5	25.3	3,095
Citation VII	\$11.4	1992	2000	7	422	5.7	5.5	18.4	1,742
Citation X	\$23.1	1996	2012	8	538	5.7	5.5	23.9	3,140
Citation X+	\$23.4	2014	2018	8	593	5.7	5.5	25.2	3,460
Citation XLS	\$11.3	2004	2009	8	422	5.7	5.5	18.5	1,871
Citation XLS Gen 2	\$15.5	2022	In Production	12 (max)	422	5.7	5.5	18.5	2,100
Citation XLS+	\$13.0	2008	2021	8	422	5.7	5.5	18.5	1,896

### CIRRUS

SF50 Vision/G2	\$2.75 (loaded)	2016	2021	4	170	4.1	5.1	11.5	1,200
SF50 G2+ Vision	\$2.98 (loaded)	2021	In Production	4	170	4.1	5.1	11.5	1,200

### DASSAULT

Falcon 7X	\$53.8	2007	In Production	12	1,506	6.2	7.7	39.1	5,754
Falcon 8X	\$57.5	2015	In Production	12	1,695	6.2	7.7	42.7	6,450
Falcon 50EX	\$21.4	1997	2007	9	569	5.9	6.1	23.5	3,366
Falcon 900B	\$26.2	1986	2000	12	1,270	6.2	7.7	33.2	4,000
Falcon 900C	\$31.6	1998	2005	12	1,270	6.2	7.7	33.2	4,000
Falcon 900DX	\$38.0	2005	2010	12	1,270	6.2	7.7	33.2	4,050
Falcon 900EX EASy	\$41.4	2003	2010	12	1,270	6.2	7.7	33.2	4,630
Falcon 900LX	\$43.8	2010	In Production	12	1,270	6.2	7.7	33.2	4,750
Falcon 2000	\$24.6	1995	2007	10	1,028	6.2	7.7	31.2	3,213
Falcon 2000DX	\$29.5	2008	2010	10	1,028	6.2	7.7	31.2	3,378
Falcon 2000EX EASy	\$30.2	2004	2009	10	1,028	6.2	7.7	31.2	3,878
Falcon 2000LX	\$32.9	2007	2013	8	1,028	6.2	7.7	31.2	4,079
Falcon 2000LXS	\$34.1	2013	In Production	8	1,028	6.2	7.7	31.2	4,046
Falcon 2000S	\$28.9	2013	In Production	10	1,028	6.2	7.7	31.2	3,539

### ECLIPSE AEROSPACE

Eclipse 500	N.A.	2006	2008	3	109	4.2	4.7	7.6	574
Eclipse 550	\$2.9	2013	2017	3	109	4.2	4.7	7.6	1,125

## JETS continued



**Price**  
(\$ millions)



**Production**

Year  
started

Year  
ended



**Cabin**

Pax  
(typical)

Volume  
(cu ft)

Height  
(ft)

Width  
(ft)

Length  
(ft)



**Range**  
(nm)

### EMBRAER

Legacy 450	\$16.6	2015	2020	7	705	6.0	6.8	24.0	2,844
Legacy 500	\$20.0	2014	2020	8	705	6.0	6.8	27.5	3,095
Legacy 600	\$26.0	2002	2015	13	1,656	6.0	6.9	49.8	3,429
Legacy 650	\$31.6	2010	2017	13	1,656	6.0	6.9	49.8	3,919
Legacy 650E	\$25.9	2017	2019	13	1,656	6.0	6.9	49.8	3,919
Lineage 1000	\$53.0	2009	2013	19	3,914	6.6	8.8	84.3	4,554
Lineage 1000E	\$53.0	2013	2020	19	3,914	6.6	8.8	84.3	4,600
Phenom 100	\$4.1	2008	2013	5	212	4.9	5.1	11.0	1,045
Phenom 100E	\$4.3	2013	2017	5	212	4.9	5.1	11.0	1,178
Phenom 100EV	\$4.3	2016	In Production	5	212	4.9	5.1	11.0	1,178
Phenom 300	\$9.0	2009	2017	7	324	4.9	5.1	17.2	1,974
Phenom 300E	\$9.5	2017	In Production	7	324	4.9	5.1	17.2	1,811
Praetor 500	\$16.9	2018	In Production	7	705	6	6.9	24	3,340
Praetor 600	\$20.9	2018	In Production	8	705	6	6.9	27.6	4,018

### GULFSTREAM

GIV-SP	\$32.8	1992	2002	13	1,658	6.2	7.3	45.1	4,136
GV	\$43.1	1995	2002	13	1,812	6.2	7.3	50.1	6,500
G100	\$12.1	2001	2006	7	304	5.6	4.8	17.1	2,790
G150	\$15.7	2006	2016	7	521	5.8	5.8	17.7	3,018
G200	\$23.3	1999	2011	8	869	6.3	7.2	24.5	3,394
G280	\$24.5	2012	In Production	8	888	6.3	7.2	32.3	3,400
G300	\$25.5	2003	2004	13	1,658	6.2	7.3	45.1	3,774
G350	\$36.0	2005	2012	14	1,658	6.2	7.3	45.1	3,846
G400	\$32.5	2003	2004	13	1,658	6.2	7.3	45.1	4,136
G450	\$43.2	2005	2016	14	1,658	6.2	7.3	45.1	4,363
G500 (Old Model)	\$50.5	2003	2012	18	1,812	6.2	7.3	50.1	5,910
G500	\$43.5	2018	In Production	13	1,715	6.3	7.9	41.5	5,200
G550	\$61.5	2003	2021	18	1,812	6.2	7.3	50.1	6,820
G600	\$57.9	2019	In Production	19	1,884	6.2	7.5	45.2	6,500 (8 pax)
G650	\$64.5	2012	(now all G650ER)	18	2,421	6.4	8.5	53.6	7,000
G650ER	\$66.5	2014	In Production	18	2,421	6.4	8.5	53.6	7,500

### HONDA AIRCRAFT

HA-420 HondaJet	\$4.5	2012	2018	5	N/A	4.8	5.0	12.1	1,223
HA-420 HondaJet Elite	\$5.3	2018	2021	5	N/A	4.8	5.0	12.1	1,437
HA-420 HondaJet Elite S	\$5.4	2021	In Production	5	N/A	4.8	5.0	17.8	422

### NEXTANT AEROSPACE

Nextant 400XT*	N/A	2012	In Production	7	305	4.8	4.9	15.5	2,005
Nextant 400XTi*	\$5.2	2004	2016	7	305	4.8	4.9	15.5	2,013

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## JETS continued

	 Price (\$ millions)	 Production		 Cabin			 Range (nm)		
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)			
<b>PILATUS</b>									
PC-24	\$10.1	2017	In Production	8	501	5.1	5.6	23	2,000
<b>SYBERJET</b>									
SJ30	\$7.3	2006	2010	5	210	4.3	4.7	12.5	1,876

## TURBOPROPS

	 Price (\$ millions)	 Production		 Cabin			 Range (nm)		
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)			
<b>BEECHCRAFT (TEXTRON AVIATION)</b>									
King Air 250	\$6.3	2011	2020	6	303	4.8	4.5	16.7	1,051
King Air 260	N/A	2021	In Production	9	303	4.7	4.5	16.8	1,720
King Air 350	\$6.4	1990	2009	8	344	4.8	4.5	19.2	1,535
King Air 350ER	\$7.8	2008	2009	8	344	4.8	4.5	19.2	1,878
King Air 350i	\$7.4	2010	2020	8	344	4.8	4.5	19.2	1,535
King Air 350iER	\$8.4	2010	2020	8	344	4.8	4.5	19.5	2,238
King Air 360	N.A.	2020	In Production	11	344	4.7	4.5	19.5	1,806
King Air 360ER	N.A.	2020	In Production	15	344	4.7	4.5	19.5	2,692
King Air B200	\$5.3	1981	2008	6	303	4.8	4.5	16.7	1,164
King Air B200GT	\$5.9	2008	2013	6	303	4.8	4.5	16.7	1,164
King Air C90B	\$2.8	1992	2005	5	218	4.8	4.5	12.4	828
King Air C90GT	\$3.0	2006	2007	5	218	4.8	4.5	12.4	869
King Air C90GTi	\$3.4	2008	2010	5	218	4.8	4.5	12.4	869
King Air C90GTx	\$3.8	2010	2020	5	218	4.8	4.5	12.4	1,061
<b>CESSNA (TEXTRON AVIATION)</b>									
208 Caravan	\$2.0	1985	In Production	9	271	4.5	5.3	12.8	831
208B Grand Caravan	\$2.2	1990	2013	9	352	4.5	5.3	16.4	786
208B Grand Caravan EX	\$2.6	2013	In Production	9	352	4.5	5.3	16.8	738
<b>DAHER</b>									
TBM 700C2	\$2.7	2003	2006	5	143	4.1	4.0	10.0	1,024
TBM 850	\$3.4	2008	2013	5	143	4.1	4.0	10.0	1,171
TBM 900	\$3.9	2014	2015	5	143	4.1	4.0	10.0	1,730
TBM 910	\$3.9	2017	In Production	5	143	4.1	4.0	10.0	1,730



## TURBOPROPS continued

	 <b>Price</b> (\$ millions)	 <b>Production</b>		 <b>Cabin</b>			 <b>Range</b> (nm)		
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	
<b>Daher (continued)</b>									
TBM 930	\$3.9	2016	2019	5	143	4.1	4.0	10.0	1,730
TBM 940	\$4.1	2019	2022	5	143	4.1	4.0	10.0	1,730
TBM 960	\$4.5	2022	In Production	5	123	4.0	4.0	13.3	1,730
Kodiak 100 Series II	\$2.2	2008	2021	5	248	4.5	4.8	15.5	1,132
Kodiak 100 Series III	N.A.	2021	In Production	5	N.A.	4.7	4.5	15.9	1,720
Kodiak 900	\$3.5	2022	In Production	8	309	4.8	4.5	18.9	1,129

### EXTRA AIRCRAFT

Extra 500	\$1.7	2002	2015	5		4.1	4.6	13.6	1,588
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### PIAGGIO

Avanti Evo	\$7.4	2015	In Production	6	393	5.8	6.1	17.5	1,410
Avanti P180	\$6.4	1990	2005	6	393	5.8	6.1	14.9	1,300
Avanti P180 II	\$7.2	2014	2015	6	393	5.8	6.1	17.5	1,410

## TURBOPROPS continued

	 Price (\$ millions)	 Production		 Cabin					 Range (nm)	
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)		
<b>PILATUS</b>										
PC-12	\$3.4	1995	2008	7	356	4.8	5.0	16.9	1,604	
PC-12 NG	\$4.9	2008	2019	7	356	4.8	5.0	16.9	1,638	
PC-12 NGX	\$5.4	2019	In Production	7	356	4.8	5.0	16.9	1,803	
<b>PIPER</b>										
M500	\$2.2	2015	In Production	5	164	3.9	4.2	12.3	1,000	
M600	\$2.9	2016	In Production	5	165	3.9	4.2	12.3	1,812	
Meridian PA 46TP	\$2.2	2001	2015	5	106	3.9	4.2	12.3	1,000	
<b>VIKING AIR</b>										
DHC-6-400 Twin Otter	\$5.9	2010	In Production	19	581	4.9	5.3	18.5	485	

## ROTORCRAFT

	 Price (\$ millions)	 Production		 Cabin					 Range (nm)	
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)		
<b>AIRBUS HELICOPTERS</b>										
AS332L1 Super Puma	\$21.7	1986	2011	12	479	5.1	5.9	22.3	406	
AS332L2 Super Puma	\$14.8	1993	2007	9	479	5.1	5.9	25.8	392	
AS350B2	\$2.4	1990	2014	4	61	4.3	5.4	6.6	312	
AS350B3 (2B)	\$1.9	1997	2008	4	61	4.3	5.4	6.6	300	
AS350B3 (2B1)	\$2.1	2008	2011	4	61	4.3	5.4	6.6	300	
AS355N TwinStar	\$2.5	1993	2006	3	106	4.3	5.4	6.6	320	
AS355NP TwinStar	\$3.9	2007	2014	4	61	4.3	5.4	6.6	315	
AS365N2 Dauphin	\$6.7	1990	2001	6	186	4.6	6.3	7.2	420	
AS365N3 Dauphin	\$8.6	1998	2010	6	186	4.6	6.5	7.2	354	
AS365N3+ Dauphin	\$10.5	2011	In Production	6	186	4.6	6.5	7.2	341	
BK117C1	\$4.1	1992	2003	8	147	4.2	4.9	6.7	221	
EC130B4	\$2.4	2000	2012	5	65	4.2	6.1	7.2	280	
EC135P1	\$3.4	1997	2004	5	100	4.2	4.7	5.9	254	
EC135P2	\$4.5	2004	2006	5	100	4.2	4.7	5.9	254	
EC135P2+	\$4.7	2006	2011	5	100	4.2	4.7	5.9	254	
EC135P2e	\$5.2	2011	2014	5	100	4.2	4.7	5.9	278	
EC135T1	\$3.5	1997	2004	5	100	4.2	4.7	5.9	262	
EC135T2	\$3.7	2004	2006	5	100	4.2	4.7	5.9	262	
EC135T2+	\$4.7	2006	2011	5	100	4.2	4.7	5.9	254	
EC135T2e	\$5.2	2011	2014	5	100	4.2	4.7	5.9	256	
EC145	\$8.7	2001	In Production	8	143	4.2	5.6	7.4	274	
H120	\$2.0	1997	In Production	4	54	4.1	4.4	7.5	240	

## ROTORCRAFT continued

	 Price (\$ millions)	 Production		 Cabin				 Range (nm)	
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)		Length (ft)
<b>Airbus Helicopters (continued)</b>									
H125	\$2.9	2011	In Production	4	61	4.3	5.4	6.6	300
H130	\$3.3	2012	In Production	5	65	4.2	6.1	7.2	268
H135 (P3)	\$5.5	2014	In Production	5	100	4.2	4.7	5.9	278
H135 (T3)	\$5.7	2014	In Production	5	100	4.2	4.7	5.9	256
H145	\$9.7	2013	In Production	8	143	4.2	5.6	7.4	260
H155	\$13.8	2003	In Production	6	225	4.4	6.7	8.4	373
H160	\$13.5	2021	In Production	12 (max)	257.8	N.A.	N.A.	N.A.	475
H175	\$16.8	2012	In Production	10	434	4.6	6.8	12.5	390
H215C1	\$18.4	2016	In Production	12	N/A	5.1	5.9	19.6	406
H215L1	\$18.4	2016	In Production	12	479	5.1	5.9	22.3	406
H225	\$27.9	2005	In Production	12	595	4.8	5.9	25.8	354
<b>BELL TEXTRON</b>									
206B3	\$1.4	1977	2010	3	54	4.2	3.9	3.3	270
206L4	\$2.6	1993	2017	5	73	4.2	3.9	5.0	253
407	\$3.1	1996	2011	5	84	4.2	4.8	5.0	293
407GX	\$3.0	2013	2017	5	84	4.2	4.8	5.0	337
407GX <sub>i</sub>	N/A	2018	In Production	5	84	4.2	4.8	5.0	337
407GXP	\$3.5	2013	2018	5	84	4.2	4.8	5.0	337
412EP	\$11.2	1994	In Production	6	208	4.4	8.0	8.6	337
412EP <sub>i</sub>	\$11.0	2013	In Production	6	208	4.4	8.0	8.6	312
427	\$4.3	1999	2010	5	102	4.2	4.6	5.8	325
429	\$6.4	2009	In Production	5	130	4.1	5.0	9.8	276
430	\$8.0	1996	2008	5	158	4.8	4.8	8.3	276
505 Jet Ranger X	\$1.5	2016	In Production	4	61	4.4	4.8	7.2	242
<b>ENSTROM</b>									
280FX	\$0.48	1985	Production Suspended	1	40	3.9	4.4	4.1	214
480	\$0.46	1994	2000	3	32	4.0	5.7	5.0	155
480B	\$1.2	2001	Production Suspended	3	32	4.0	5.5	5.0	165
F-28F	\$0.47	1981	Production Suspended	1	40	3.9	4.4	4.1	214
<b>LEONARDO</b>									
AW101	\$28.0	1994	In Production	10	970	6.2	8.2	21.3	466
AW109 Grand	\$6.4	2005	2010	5	178	4.2	5.3	7.7	360
AW109 GrandNew	\$5.5	2010	In Production	5	178	4.2	5.3	7.7	357
AW109 K2	\$3.8	1993	2003	5	125	4.3	4.7	5.4	75
AW109 Power	\$4.8	1997	2014	5	125	4.2	5.3	6.9	260
AW109 Trekker	\$5.0	2014	In Production	5	178	4.2	5.3	7.7	357
AW119 Ke	\$3.6	2007	2013	5	121	4.2	5.3	6.9	380
AW119 Koala	\$3.0	2000	2006	5	121	4.2	5.3	5.8	380
AW119 Kx	\$3.3	2013	In Production	5	121	4.2	5.3	6.9	380
AW139	\$11.0	2004	In Production	8	282	4.7	7.2	8.9	460
AW139 Enhanced	\$11.0	2016	In Production	8	282	4.7	7.2	8.9	460
AW169	\$8.0	2014	In Production	6	223	4.3	6.7	7.1	366
AW189	\$15.3	2015	In Production	8	396	4.7	8	11.41	600



Bell 429

## ROTORCRAFT continued

	 Price (\$ millions)	 Production		 Cabin			 Range (nm)		
		Year started	Year ended	Pax (typical)	Volume (cu ft)	Height (ft)	Width (ft)	Length (ft)	
<b>MD HELICOPTERS</b>									
MD500E	\$1.9	1983	In Production	3	51	4.4	4.5	3.5	174
MD500ER	\$1.9	1983	In Production	3	51	4.4	4.5	3.5	174
MD520N	\$2.6	1992	In Production	3	51	4.4	4.5	3.5	138
MD530F	\$2.5	1984	In Production	3	51	4.4	4.5	3.5	206
MD600N	\$2.9	1997	In Production	5	92	4.4	4.5	6.0	235
MD902 Explorer	\$7.2	1998	In Production	4	113	4.1	4.8	6.3	205
<b>ROBINSON</b>									
R22 Beta II	\$0.30	1997	In Production	1	N/A	4.0	3.6	4.3	161
R44 Cadet	\$0.34	2016	In Production	1	46	4.1	3.8	5.7	204
R44 Raven I	\$0.42	2003	In Production	3	46	4.1	3.8	5.7	204
R44 Raven II	\$0.53	2003	In Production	3	46	4.1	3.8	5.7	251
R66 Turbine	\$1.0	2010	In Production	3	50	4.3	4.5	6.7	260
<b>SIKORSKY</b>									
S-76C+	\$8.5	1996	2005	6	205	4.5	6.3	8.8	335
S-76C++	\$11.6	2006	2013	6	205	4.5	6.3	8.8	335
S-76D	\$15.0	2013	In Production	6	205	4.5	6.3	8.8	329
S-92	\$27.0	2002	In Production	10	685	6.0	6.4	19.2	439

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— author Salman Rushdie

### ACCIDENT REPORT



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*Nicholas J. Correnti*



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