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Rollie Vincent
JETNET iQ Creator/Director



Straighten Up and Fly Right

In the early 1940s, the world was at war. Today, it feels like we may be on the edge of another. It is impossible to know whether efforts will succeed to contain the Russia-Ukraine war from escalating into full-scale global conflict. While they together represent less than 1% of the world B&GA fixed-wing turbine fleet, more than 40% of Russian- and Ukrainian-based aircraft were delivered new within the last 10 years; amongst the business jet fleet, better than 9-in-10 are mid-size or larger aircraft. We also know that these numbers underrepresent the gravity of the situation, given the preponderance of off-shoring, especially of high-value assets like private aircraft.

Amid the ravages of a world war eighty years ago, 23-year-old Nathaniel Adams Coles and his fledgling jazz trio reached #1 on the Harlem Hit Parade. In 1943, the unforgettable *Straighten Up and Fly Right* brought the sounds of Nat King Cole to the radio waves. His records would go on to sell a remarkable 50 million copies within his all-too-brief 45-year life.

Times change, but progress is part of our human DNA. Business jet origins can be traced back about 65 years to the development of the Lockheed Jetstar. Gracing the skies in 1957, it ironically flew the same year as Sputnik 1, a satellite that triggered the Space Race and an escalation of the Cold War. Beyond its technological achievements, Sputnik was an alarm bell that rallied Western allies into high gear. Investment, innovation, and ingenuity came together over the next 12 years to put Man on the Moon, culminating a remarkable series of military and civil aerospace breakthroughs that are the foundation for today's industry.

In the acceleration out of the COVID pandemic, some are saying that business aviation has entered its Golden Age. And why not? Business aircraft demand signals – strong sales, pricing,

and backlogs – are as clear as Sputnik's *beep-beep-beep* radio pulses. Our industry is struggling to keep up with demand and quickly ramp up new aircraft production.

“Business aircraft demand signals – strong sales, pricing, and backlogs – are as clear as Sputnik’s beep-beep-beep radio pulses.”

Simultaneously, we seemingly cannot procure enough pre-owned aircraft inventory to satiate the needs and desires of customers, many of whom are new to the market. It is hard to believe that as recently as April 2020 we were shuttering factories and offices, furloughing staff, and wondering how to properly fit masks to our faces. Collapsing demand, spiraling aircraft valuations, empty airports. Compared to that, is it any wonder that some say we are in a Golden Age? What a difference a couple of years makes.

In aviation, increased turbulence implies the need for increased vigilance. In dynamic conditions, aviators are trained to “fly the six-pack” to ensure the safety and success of the mission. At the end of the day, Golden Ages are things to read about in history books. Today, it seems that our time is better invested elsewhere. It is a golden time to tighten our seatbelts, monitor the dynamic conditions, and reassess our flight plans for 2022. Supply chain tensions, insidious inflation, an enduring pandemic, and now war in the Ukraine should have us setting aside the celebratory champagne. Better yet to stay focused on the key indicators we know will serve us well as we navigate through these dynamic times.



Outlook

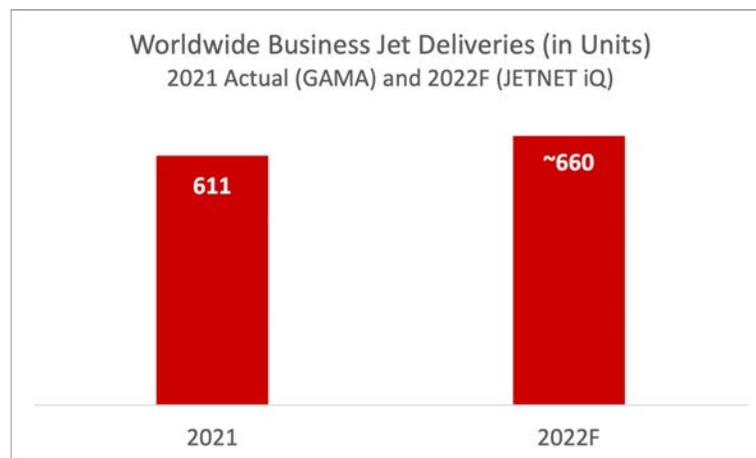
Month 3 of the new year is well underway – that’s 17% of the way towards year-end already. The good news we hear from many corners of the industry is that the momentum that provided us with tailwinds at year-end has been continuous through the first two months of 2022. Reports of record levels of transaction activity continue, with orders for new aircraft for production slots in 2023 and even 2024 (!) now amongst the deals being negotiated. Did we say what a difference a few quarters make?

Aircraft brokers and dealers continue to strain to find flyable hardware for their needy want-to-be buyers, as prices and valuations test new highs. Buyer’s guide-type values, a permanent subject of bemused head-scratching amongst our industry’s alpha sales leaders, are under scrutiny as much as ever, as record levels of transactions continue to provide plenty of data to work with. With buyer needs – and let’s not forget desires – well in excess of available new and pre-owned inventory, scarcity is driving ever-higher deal valuations. While finding off-market aircraft has become quite the art and science in the broker / dealer community, the lack of young, attractive, well-maintained aircraft is a global phenomenon. The shopping list of requirements might include the following: Matterhorn white with thin-striped exterior, tasteful beige interior, zero damage history, clean logbook, matching hours on the motors, always hangered, with a country of registration that doesn’t require referencing a look-up table of acronyms. These aircraft are as rare today as an undamaged Antonov AN-225 Mriya, or a wannabee OEM with a low-cost all-electric eVTOL design and believable business plan.

After 61 days and our 1st shock of the New Year – the Russian invasion of Ukraine, catastrophic fighting, and a bevy of sanctions aimed at stifling the aggression – thoughts of supply chain woes, price inflation, and securing “safety stocks” are clouding aircraft delivery forecasts just as the civil aviation manufacturers look to ramp-up production. Russia’s VSMPO-AVISMA is the world’s largest producer of a vital commodities – titanium and titanium alloys for the global aerospace industry. Aircraft and aero-engine applications for the materials have grown rapidly given their unmatched weight, strength, durability, and corrosion resistance characteristics. Whether B&GA producers have secured adequate stocks to ramp up production in the near term remains to be seen, especially as our friends in Seattle and Toulouse accelerate their production lines of 150+ seat commercial airliners.

At our end of the civil aircraft market, we expect business jet and turboprop unit deliveries to increase modestly in 2022 over last year’s GAMA shipments* numbers. At this point in time, we are forecasting ~660 new twin-engine business jet deliveries in 2022, up a respectable 8% YOY. We will review this forecast and update it as we have more clarity about the speed at which supply chains are rebounding. Demand by most measures has accelerated quickly – but supply chain constraints and the timing of production ramp-up activities across multiple OEMs and programs are restraining our forecasts.

2021 Business Jet Deliveries and 2022 JETNET iQ Forecast



*Source: GAMA 2021 General Aviation Aircraft Shipment Report, February 23, 2022; excludes Cirrus single-engine jets and Airbus / Boeing airliner business jets.

Business Conditions

GDP

The Economist's **GDP growth forecasts** for 2022 are: U.S. +3.4%, Euro Area +3.9%, U.K. +4.3%, Mexico +1.9%, Brazil +0.3%, Canada +3.8%, China +5.2%, Russia +2.5%, and Australia +3.3% (as of Feb. 26, 2022)



Business jet cycles (take-offs and landings) in December 2021 were up by 23% YOY for U.S. Part 91, up by 29% YOY for U.S. Part 91K, up by 37% YOY for U.S. Part 135, and up by 27% for European EASA 145 operations



Dow Jones Index (U.S.) was up 8%,
FTSE 100 (U.K.) was up 12%,
CAC 40 (France) was up 14%, and
DAX 30 (Germany) was up 3% YOY on Feb. 28, 2022



U.S. Index of **Consumer Sentiment** was 62.8 in Feb. 2022 vs. 67.2 in Jan. 2022 and 76.8 in Feb. 2021 YOY;
Euro Area **Economic Sentiment Indicator** was 114.0 In Feb. 2022 vs. 112.7 in Jan. 2022 and 100.0 in Mar. 2021 YOY



U.S. unemployment rate (seasonally adjusted) was 4.0% in January 2022 representing 6.5 million unemployed, down from 6.4% in January 2021 representing 10.2 million unemployed



U.S. **Purchasing Manager Index** (Manufacturing PMI) was 58.6 in Feb. 2022 vs. 57.6 in Jan. 2022 and 60.8 in Feb. 2021;
Euro Area **Business Climate Indicator** was 1.80 in Feb. 2022 vs. 1.80 in Jan. 2022, and -0.2 in Feb. 2021



Transactions of pre-owned business aircraft in Jan.-Dec. 2021 were 3,144 jets and 1,671 turboprops, up 13% and up 24% YOY (JETNET as of Feb. 27, 2022)



Business aircraft deliveries in 2021 were 705 jets (including Cirrus and Boeing / Airbus single-aisle) and 388 turboprops (Source: GAMA)

Mood of the Market

After 10 full years of tracking and with more than 20,000 inputs from the business aircraft owner / operator community, it is fair to say that JETNET iQ's proprietary market sentiment indicators are amongst the "six-pack" of metrics that we monitor continuously. Through the end of February 2022, the mood of the worldwide business aircraft owner / operator community remains in very positive territory, reaching +64.1% in Q1 2022 as we continue to gather data on our way to 500 quarterly responses. Results are on track to remain relatively stable and at high levels for the 4th consecutive quarter. Our market sentiment indicator presented below is that of worldwide "Net Optimism" – it measures the difference in the percentage of respondents who believe that we are

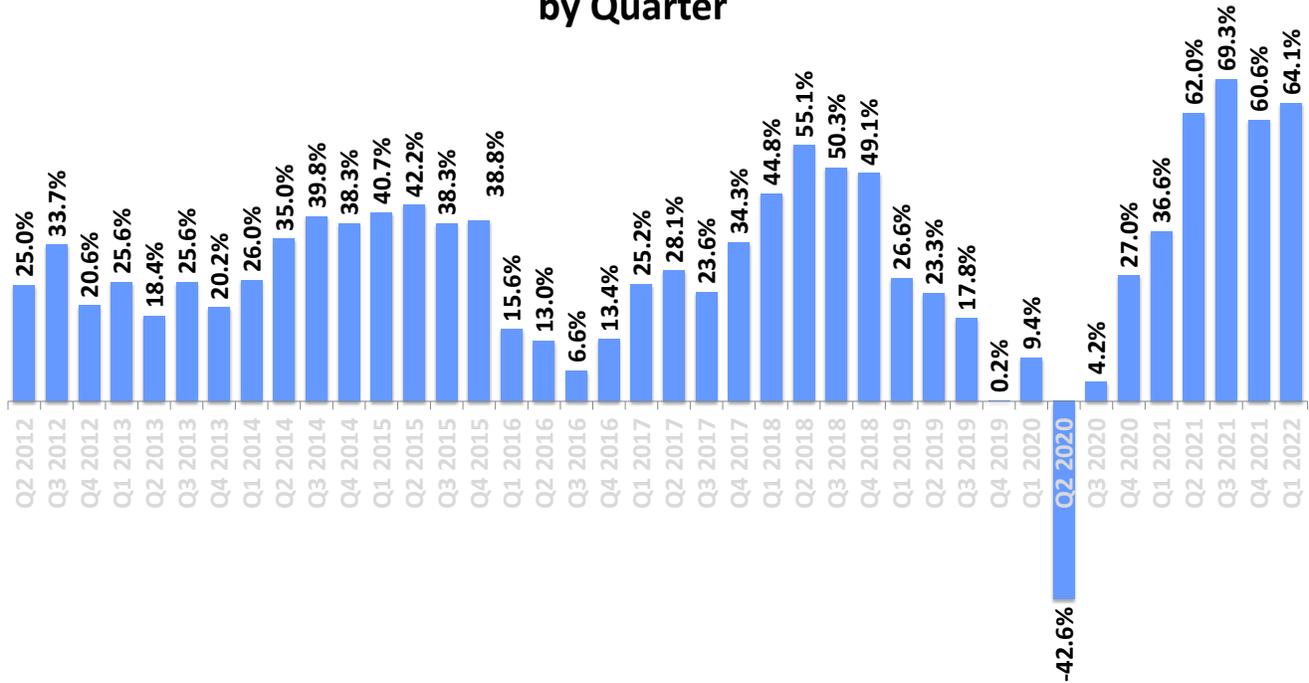
past the low point in the current business cycle less those who believe we have not yet reached the low point.

Globally, "Optimists" are outnumbering "Pessimists" by a factor of 5.2-to-1 so far in Q1 2022, a strong indicator but substantially lower than the ~9-to-1 result registered in Q3 2021. As COVID-19 restrictions ease in many of business aviation's key country markets, there is hope that the worst of the pandemic is now behind us. Results to date in Q1 2022 are through February 27 and likely do not yet fully reflect developments in the Ukraine nor their spin-off implications. For that, please stay tuned!

Business Aircraft Owner / Operator Sentiment

JETNET iQ Global Business Aviation Surveys (with Q1 2022 Survey in progress)

Overall Worldwide Net Optimism by Quarter



Source: JETNET iQ Global Business Aviation Surveys; Q1 2022 Survey in progress (298 business aircraft owners / operator respondents or ~60% complete to date; survey completion is expected by the end of Q1 2022); scale is +100 to -100%

Pre-Owned Business Aircraft Inventory For Sale – Jets and Turboprops

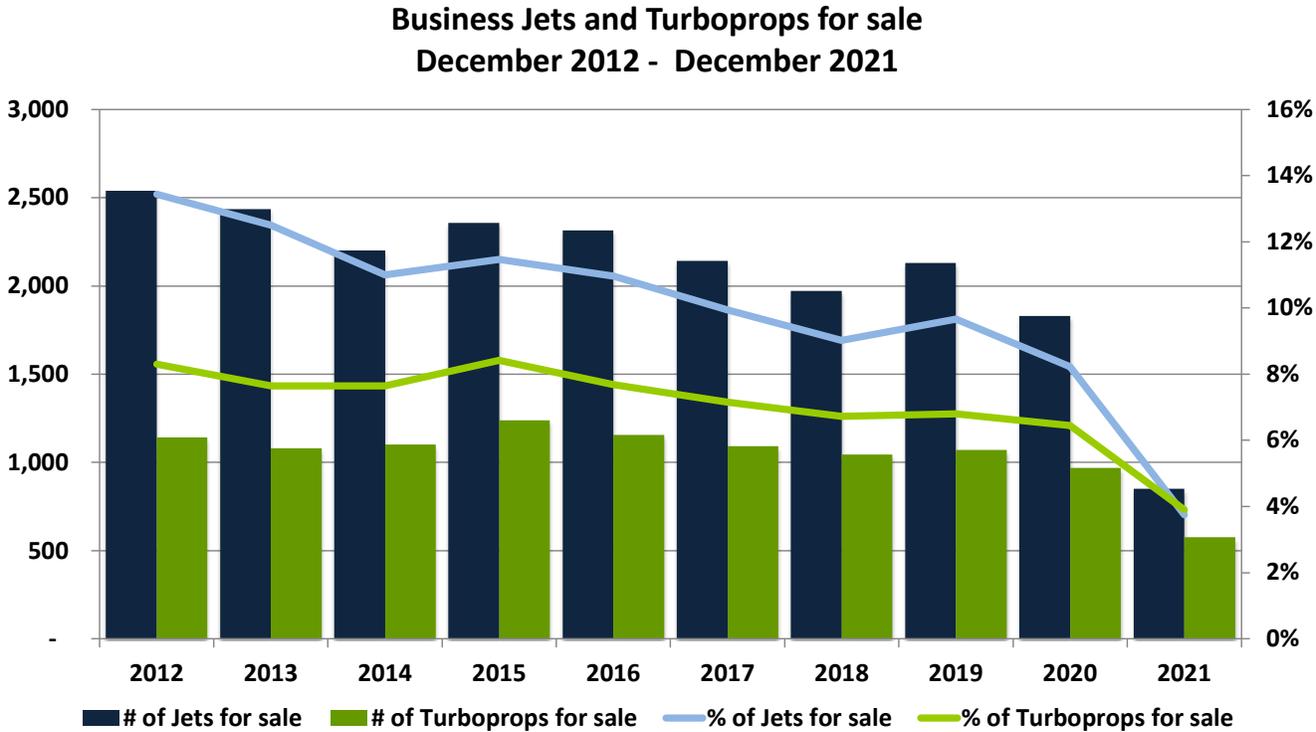
While it may feel like a Golden Age for those whose job it is to sell aircraft, the reality is more nuanced. Quality pre-owned aircraft are difficult to find and even more difficult to acquire for resale. Prices for relatively young and low-time aircraft have, reportedly and in some cases, begun to exceed what the original owners paid factory-new. While this might give comfort to buyers from a few years ago who can now say that they clearly bought at “the right time,” the fact of the matter is that finding a like-kind replacement in the market today may see them waiting in line for quite some time.

We have not witnessed a tighter market for pre-owned business aircraft in the more than 25 years that JETNET has been gathering and analyzing this information. As of late February 2022, there were just 706 business

jets listed for sale in the JETNET database (3.1% of the fleet), and just 48 of these aircraft (6.8% of the total) were delivered new in the last 5 years. For buyers seeking a late-model Phenom, Falcon, Challenger 350, and many other popular models, the good folks on the streets near Teterboro, NJ, have some wise counsel: “You can fuhgeddaboutit!”

The marketplace is even tighter in the business turboprop segment, where only 3.0% of the fleet was listed for sale in late February 2022; just 28 of the for-sale aircraft were delivered new in the prior 5 years. Facing these marketplace conditions, would-be buyers are advised to tighten their seat belts and beware of the potential wind shear – the seller’s market continues!

Business Jets and Turboprops For Sale – Number of Aircraft and % of Installed Fleet December 2012 - December 2021



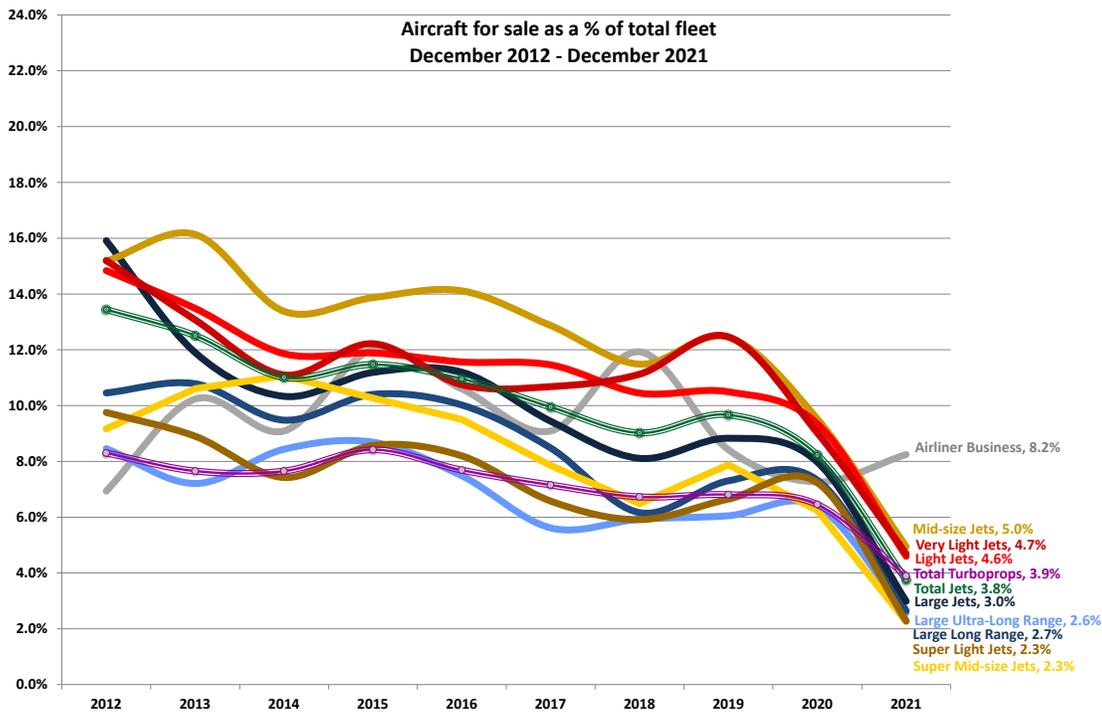
Source: JETNET / JETNET IQ analysis

Pre-Owned Business Aircraft Inventory For Sale by Size Category

Available pre-owned business aircraft inventory dropped into the 3-4% range across most aircraft size categories by the end of 2021, an unprecedented development that is driving up prices and solidifying residual values. The only aircraft that do not appear to be following this market trend is the Airliner Business Jet segment, a group of aircraft at the top of the market that has a particular appeal to head-of-state

and ultra-wealthy customers. The hoped-for release of fresh inventory with the long-awaited rebound of corporate flight operations – in the U.S. known as Part 91 – has either yet to occur or has had little to no noticeable impact on market pricing or availability. With new production expected to be up modestly in 2022, inventory is likely to remain extremely tight throughout the year.

Business Jets For Sale as Percentage of Fleet by Size Category At Year End – From 2012 to 2021



Source: JETNET / JETNET IQ analysis

Pre-Owned Business Jet Transactions and Inventory

Pre-owned business jet transactions (retail sales and leases) in 2021 were the highest yet recorded by JETNET. Based on JETNET records updated through late February 2022, more than 3,100 jets changed hands in 2021, up 13% YOY and up 21% over 2019 levels. At the same time, pre-owned inventory fell sharply, ending the year at 855 aircraft, as the market continued to reflect near-opposite conditions to the last post-recession period in 2009. At the near-torrid rate of sales experienced last year, inventory-for-sale at the beginning of the year represented just over 3 months of coverage. Early indications from the

first 2 months of 2022 are that inventory levels declined a further 17% by the end of February, a difficult act to follow. Brokers and dealers have been able to sustain deal volumes with enticing offers in hand from prospective buyers for “off-market” aircraft. While this approach has kept the deal pipeline flowing through the pandemic period, short of higher production it is likely to become increasingly unsustainable as aircraft age and their maintenance cost exposure increases.

Business Jet Transactions and Inventory Trends At Year End - From 2006 to 2021

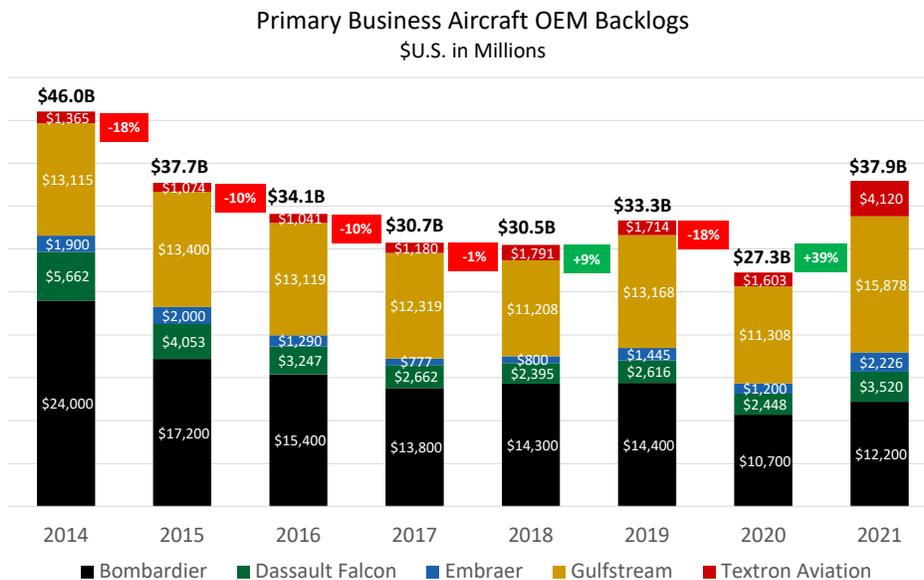
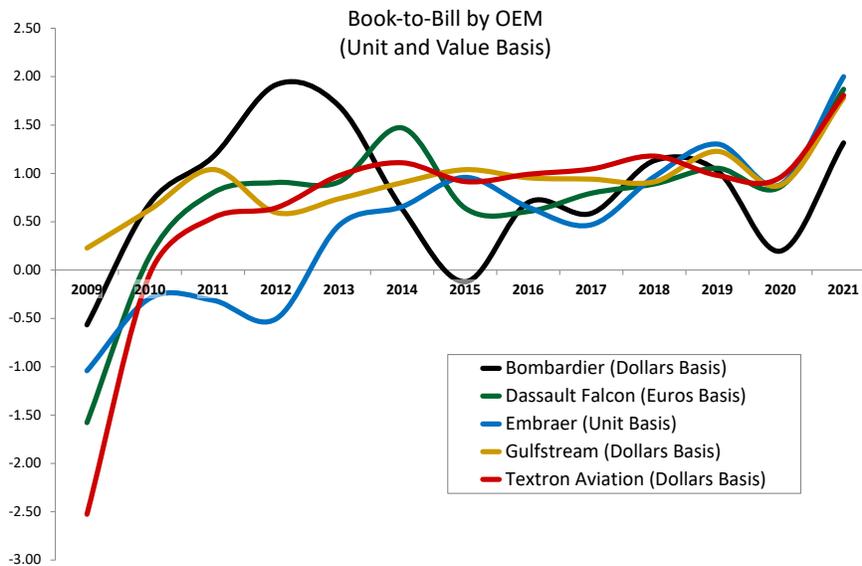


Source: JETNET / JETNET IQ analysis

OEM Book-to-Bill and Backlog Performance

Aircraft manufacturers enjoyed a banner year in 2021, with a strong recovery in book-to-bill performance and impressive gains in firm order backlog levels. We estimate that backlog value at the “Big 5” OEMs increased by ~\$10.6B or 39% from the end of 2020 to the end of 2021, by far the industry’s best performance since before

the 2008/2009 Global Financial Crisis. Book-to-bills turned sharply upwards in 2021, pushing next-available delivery positions out to 12 months and beyond in many cases. With prices having firmed, OEMs are collectively in the best order and backlog condition they have experienced for the past 13-14 years.



Source: Company reports; JETNET IQ analysis and estimates

Straighten Up and Fly the Six-Pack

Pilots train continuously for emergencies. “Fly the plane” is one of the first lessons to learn when practicing for unexpected or unforeseen conditions. Today, it feels like we’re experiencing an endless series of strange and unsettling events. At times like these, it’s good to recall the messages from “Straighten Up and Fly Right,” the wonderful song by Nat King Cole and Irving Mills.

Based on a folktale, the song is about a buzzard who takes a monkey for a joyride in the sky. The buzzard plans to eat the monkey after making him dizzy with aerobatics, but the monkey anticipates the buzzard’s intentions, grabs him by the neck, and tells him to “straighten up and fly right.”

Clearly, the monkey does a brilliant job of balancing risk and reward. He knew what the buzzard had in mind, was prepared for a turbulent ride, and didn’t wait for the buzzard to make the next move. As we think about any lessons we can take away from this song, we might ask ourselves: Are we prepared to act.....or are we waiting for the next move?

As the COVID pandemic fades into history, business aviation is recovering and showing signs of real strength. Is our industry ready to respond effectively? Do we have what it takes to meet increased demand and take advantage of opportunities for organic growth? Do we understand which segments of the market are rebounding quickly and which segments are likely to expand more gradually over time?

It’s always easier to act when the facts are at hand. JETNET’s mission is providing up-to-the-minute aviation market information, and helping customers use data to make better business decisions. In our experience, making decisions without good data is never a good idea. With JETNET iQ, we extend our service offerings with business aviation market intelligence, analytics and forecasts.

Early in their training, pilots learn to scan and monitor the “six-pack” of primary instruments: attitude indicator, heading indicator, turn coordinator, airspeed indicator, altimeter and vertical speed indicator. Successful aviation businesses habitually monitor an analogous “six-pack” of essential metrics. Here are six we track closely in JETNET iQ:

Aircraft OEM Book-to-Bill Ratios – Orders (demand) divided by deliveries (supply), typically measured in dollars but sometimes in units.

Aircraft OEM Backlogs (Demand) – Unfulfilled orders for future delivery, typically measured in dollars or units.

Pre-Owned Aircraft Inventory (Supply) – Number of aircraft for sale, quality / age of these aircraft, days-on-market, number of months of market coverage based on recent transaction volumes.

Market Sentiment – The level of optimism or pessimism within the owner / operator community regarding the industry’s current situation with respect to the business cycle.

Purchase and Selling Probability – The likelihood that owners/operators will buy or sell a new or pre-owned aircraft in the next 12 months or the next 5 years.

Net Promoter Score (NPS) – Levels of customer satisfaction and loyalty that influence likelihood of future sales. This is a strong indicator that deserves more industry attention.

It’s fair to say that pilots are universally respected for their calm approach to handling stressful challenges in real time. As pilots, they understand that a calm demeanor is the result of intense preparation and access to good data while in flight. As an industry, we can apply these bedrock concepts to our own decision-making processes. Like the song says, “straighten up and fly right.” That advice feels especially valuable today.

About JETNET iQ

JETNET iQ is a business aviation market research, analysis and forecasting service consisting of three main elements:

- **JETNET iQ Reports** are the definitive analytical reference for business aviation, incorporating quarterly state-of-the-industry analyses, owner / operator surveys, and detailed delivery and fleet forecasts;
- **JETNET iQ Summits** are annual industry conferences providing unique data, insights and networking opportunities; and
- **JETNET iQ Advisory** provides customized research and analysis for clients on a project-by-project basis.

JETNET iQ Reports are available in various formats on a subscription basis, and are published regularly by JETNET LLC, 101 First Street, Utica, NY 13501 - **currently offered at 11 different levels**. JETNET iQ is a partnership between JETNET LLC of Utica, New York and Rolland Vincent Associates, LLC, of Plano, Texas.

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Since late 2010, JETNET has conducted quarterly surveys of the worldwide community of business aircraft owners and operators in order to gauge customer sentiment, brand perceptions, aircraft purchase, selling, and utilization expectations, and other factors. JETNET iQ Global Business Aviation Surveys are password-protected and by invitation-only. Potential respondents are drawn randomly from the JETNET worldwide database of business jet and business turboprop owners and operators; they are initially contacted by telephone and/or e-mail by JETNET's team of multilingual researchers. Target respondents include chief pilots, directors of aviation, and senior management. Each survey includes at least 500 respondents in 50 or more countries each quarter, and respondents closely reflect the worldwide distribution of the business jet and turboprop community.

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Appendix

Data sources:

Real GDP growth forecasts (2022): The Economist – February 26, 2022

<https://www.economist.com/economic-and-financial-indicators/2022/02/26/economic-data-commodities-and-markets>

Stock Markets:

Dow Jones Industrial Average: <http://ca.spindices.com/indices/equity/dow-jones-industrial-average>

London Stock Exchange (FTSE 100): <https://www.londonstockexchange.com/indices/ftse-100>

Euronext Paris (CAC 40): <https://live.euronext.com/en/product/indices/FRO003500008-XPAR>

Frankfurt Stock Exchange (DAX 30): <https://www.boerse-frankfurt.de/indices/dax?mic=XETR>

Initial Unemployment Claims: Bureau of Labor Statistics (U.S.); <https://www.dol.gov/ui/data.pdf>; “SA” = seasonally adjusted

Unemployment: Bureau of Labor Statistics (U.S.); <https://www.bls.gov/news.release/pdf/empisit.pdf>

Consumer Confidence: University of Michigan Survey of Consumers (U.S.); <http://www.sca.isr.umich.edu>

European Commission (Euro Area) – Economic Sentiment Indicator;

https://ec.europa.eu/economy_finance/db_indicators/surveys/documents/2022/bcs_2022_02_statistical_annex_en.pdf

Business Confidence: U.S. ISM Manufacturing PMI (U.S.)

<https://www.ismworld.org/globalassets/pub/research-and-surveys/rob/pmi/rob202202pmi.pdf>

Eurostat (Euro Area); https://ec.europa.eu/eurostat/databrowser/view/EI_BSCI_M_R2_custom_2201464/default/table?lang=en

Business aircraft fleet, deliveries, transactions, days-on-market (DOM), cycles, utilization: JETNET

Business jet shipments: GAMA

Survey results: JETNET iQ Global Business Aviation Surveys (Quarterly)

Photo / Image credits: Rolland Vincent Associates, LLC / JETNET iQ

Definitions and Abbreviations:

For the purposes of these Reports, business aircraft may be classified into 4 primary categories, reflecting propulsion, price, performance, and weight class differences. These categories are: Turboprops (Single-Engine Turboprops - SETP and Multi-Engine Turboprops - METP), Small Jets (Personal Jets, Very Light Jets, Light Jets), Medium Jets (Super-Light Jet, Mid-Size Jet, Super Mid-Size Jet), and Large Jets (Large Jet, Large Long-Range Jet, Large Ultra Long-Range Jet, Airline Business Jet). The “Personal Jet” category includes single-engine turboprop-powered models, today represented by the Cirrus Vision Jet.

B&GA: Business & General Aviation
EIS: Entry in Service
FBO: Fixed Base Operator (private air terminal)
FTSE: Financial Times Stock Exchange (London)
GAMA: General Aviation Manufacturers Association
GDP: Gross Domestic Product

HNWI: High Net Worth Individual
MTOW: Maximum Takeoff Weight
NGO: Non-Governmental Organization
OEM: Original Equipment Manufacturer
QOQ: Quarter over Quarter
QTD: Quarter to Date

S&P: Standard & Poor’s
TTM: Trailing Twelve Months
WHO: World Health Organization
YOY: Year over Year
YTD: Year to Date

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