JETNET iQ PULSE

>> APRIL 7, 2020

Meeting a Need

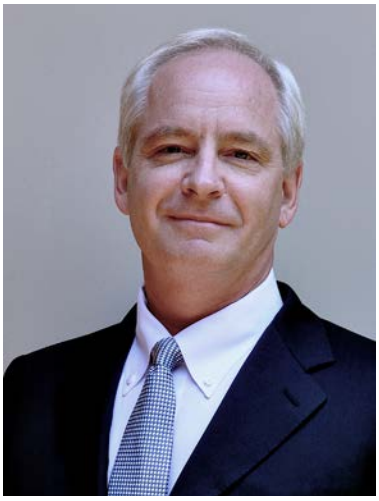
If the awful unfolding of the now-global coronavirus pandemic wasn't bad enough, the profound implications on people's ways of life – and, shockingly, even their death – have come into the sharpest focus for so many people worldwide. While many of our friends in the airline industry have undoubtedly been proud in the past to echo IATA's proclamation that "Aviation is the business of freedom," the current state of industry affairs is unprecedented, with grounded fleets, silenced airport hubs, shuttered facilities, and furloughed employees. Tight restrictions on air passenger travel, imposed to restrict the spread of COVID-19, are well intended but have come far too late to put much of a damper on the expansion of the deadly disease to (at last count) more than 180 countries. Limitations on public gatherings of as few as 10 people, school and business closings, and public health warnings about the need for social distancing and near-constant hand-washing have become commonplace to blunt an invisible viral contagion unlike our generations have ever seen.

The rules of the game have clearly changed. This is an unprecedented time for all sectors of civil aviation – a time when "community" is being tested as never before.

"the rules of the game have clearly changed."

As an industry, business aviation will evolve in the face of challenges that we have never before experienced. Like life, the game will go on, and for the best prepared, it is reassuring to know that we are largely in control of the way we react to our new circumstances. The key is to be prepared and aware. With the back-to-back cancellation of every key industry gathering in recent weeks, business aviation leaders have not lost their insatiable appetite for market and competitive intelligence. It's never a good time to fly without instruments in bad weather, and today the storm clouds are billowing. Leveraging our core competencies in aviation market research, strategy, and forecasting, we are proud to launch **JETNET iQ Pulse**. We trust that you will find insights here you need to safely and intelligently navigate the skies ahead.

Rollie Vincent
JETNET iQ Creator/Director



Outlook and Forecast

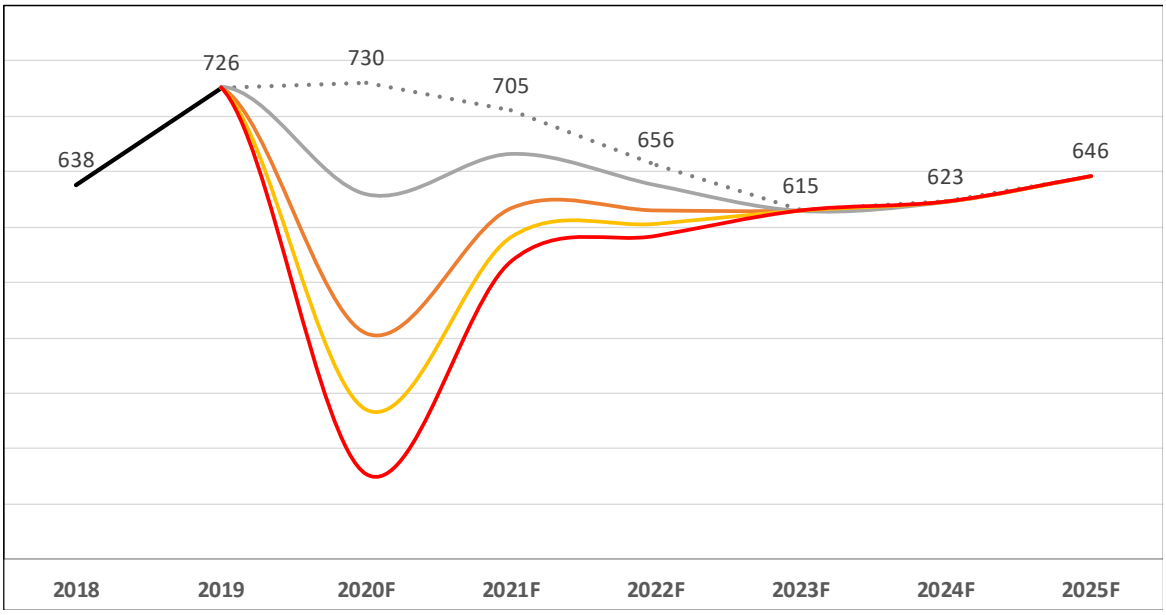
The COVID-19 crisis is already the most fundamental shock – the Black Swan of swans – to ever get sucked into the engine of business aviation. As with any serious mid-air impact, the procedure to follow is clear: put the airplane on the ground safely and immediately to mitigate additional risk. Assess the damage and either develop and execute a plan for repair and return to flight, or scrap the bird and book the write-off. At an industry level, these are fundamental and even existential questions. In the aftermath of COVID-19, does the business aviation industry survive and recover from this shock? If so, what will the recovery look like? Will we return to levels of demand we have seen in the past, and if so, when?

On the **demand side**, the fundamental drivers of new business jet sales – GDP growth, stock indices, oil prices, corporate profits, wealth creation, international trade, capital investment, business and customer confidence – have basically tanked, as key economies plunge into recession. With a strong U.S. dollar discouraging international sales despite unheard-of low interest rates, investors and business leaders are primarily focused on capital preservation, not that next new aircraft.

On the **supply side**, new or refreshed business jet models and offer prices are clearly alluring, but trade-in valuations are down, continuing to discourage sales as they have in most of the post-2008 recession recovery period. Air travel restrictions, supply chain and production disruptions, and factory furloughs are already widespread and are set to worsen as the full force of COVID-19 pummels life in the national economies vital to civil aerospace production – including the U.S., Canada, Brazil, Mexico, U.K., France, Germany, Italy, Switzerland, Japan, and many others.

As forecasters and on behalf of our many customers, we have already run multiple scenarios to assess the likely impacts of the COVID-19 shock on new business jet deliveries, particularly in 2020 and over the next 3-5 years. Our latest forecast created in December 2019 included 730 shipments in 2020, essentially flat with 726 new business jet shipments in 2019 as reported by GAMA (General Aviation Manufacturers Association) in February 2020, excluding single-engine business jets and twin-aisle airliners. We have run various scenarios to model the impacts of the COVID-19 crisis based on a range of assumptions about sold-to-unsold delivery positions by OEM, announced and additional production furloughs, and other factors. At this point in time, we believe that new business jet deliveries are likely to be down by as much as 40-50% YOY in 2020, with recovery to the prior forecast trend line unlikely before 2023 at the earliest. For additional information on this forecast and/or our other research, please contact us.

JETNET iQ Business Jet Delivery Forecast Scenarios (in Units)

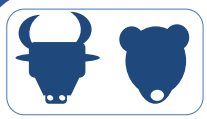


COVID-19 Impacts

GDP

Initial estimates of U.S. and Euro Area **GDP growth** for 2020 are -2.9% and -0.3% respectively, down from 2.3% and 1.2% YOY

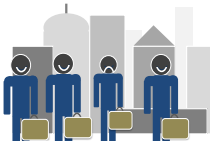
U.S. **business jet cycles** (take-offs and landings) in March 2020 were down 43% for Part 91 and down 26% for Part 135 YOY



The **Dow Jones** was down 24% from January 2 to March 31, 2020; **FTSE 100** (London) was down 25% over same period

U.S. and Euro Area **consumer confidence** was down sharply by 11.9 points and 8.9 points respectively in March 2020 vs. February

U.S. **jobless claims** were up 10 million in the 2nd half of March 2020, 5.4x faster than ever recorded in a 2-week period



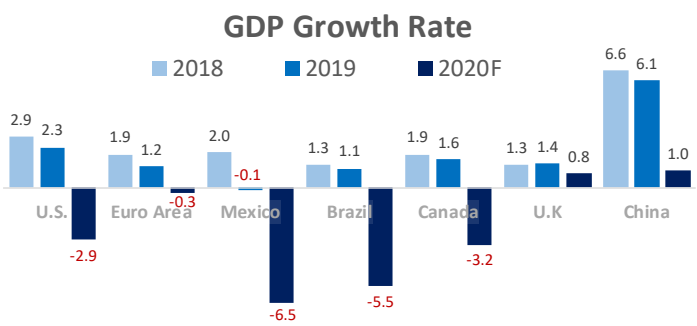
U.S. and Euro Area **business confidence** dropped by 1.5 points and by 8.9 points respectively in March 2020 vs. February

Transactions of pre-owned business jets in January-February 2020 were flat YOY

OEMs: Textron, Bombardier, Embraer, and GE commenced production furloughs; we estimate that new jet deliveries could be down by as much as 40-50% in 2020 YOY

The Economy

Economic Growth



Although the full extent of the devastating impact of COVID-19 on the world economy is still evolving, GDP growth forecasts and stock market indices have fallen sharply in 2020.

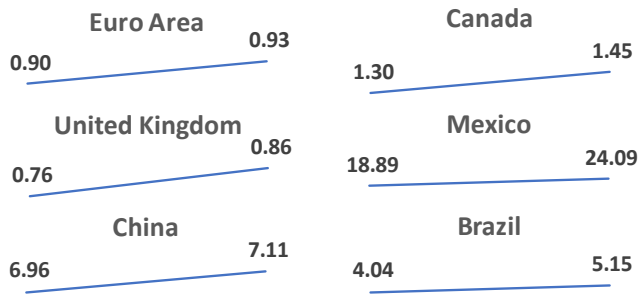
The U.S. dollar has strengthened YTD against local currencies in key markets where most business aircraft are based. This is particularly the case against the Mexican peso and Brazilian real, which are the #2 and #3 country markets for business jets after the United States.

COVID-19 is now expected to trigger a global economic recession, putting an end to business aviation's long, slow and unsteady recovery in the post-2008 period. A recovery in stock prices in late March 2020 was the result of an unprecedented $2 trillion stimulus package signed into law by the U.S. government on March 27.

Exchange Rate

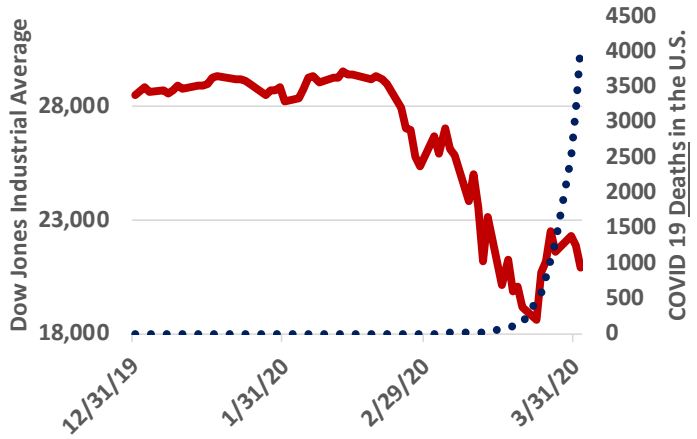
Exchange Rates vs USD	3/27/20	1 Month Ago	% Change	1 Year Ago	% Change
Euro Area	0.90	0.92	*-1.7%*	0.89	*1.7%*
United Kingdom	0.81	0.77	*5.2%*	0.76	*6.7%*
Canada	1.41	1.33	*5.9%*	1.34	*4.8%*
Mexico	23.41	19.05	*22.9%*	19.34	*21.0%*
Brazil	4.76	4.39	*8.5%*	3.96	*20.3%*
China	7.09	7.01	*1.2%*	6.73	*5.5%*

Foreign currency units per U.S. Dollar
January 1, 2020 – March 20, 2020
Increase indicates stronger U.S. Dollar

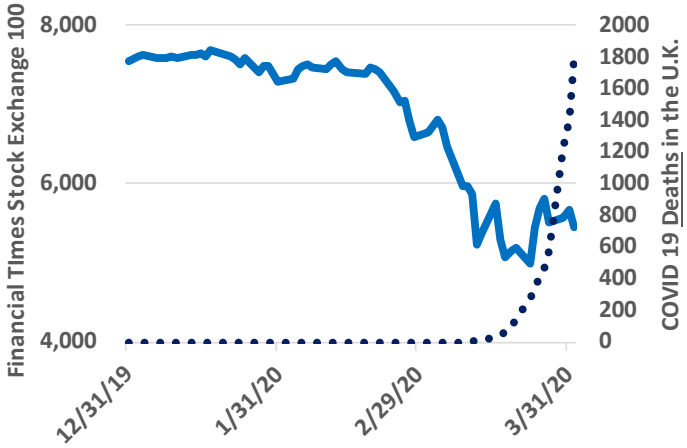


COVID-19 vs. the Stock Market

DJIA Versus COVID-19
Deaths in the U.S.



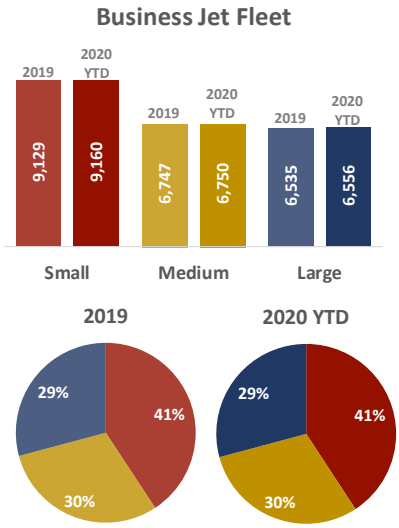
FTSE 100 Versus COVID-19
Deaths in the U.K.



Fleet and Deliveries

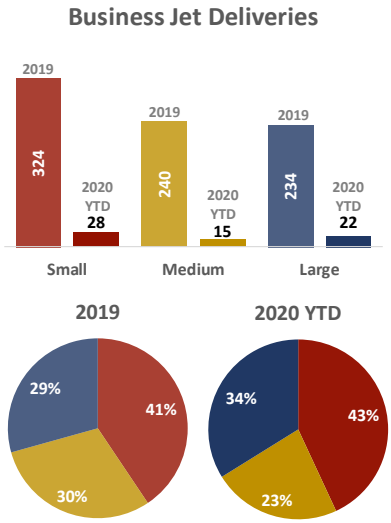
Business Jet Fleet

2020 YTD = April 1, 2020 YTD



Business Jet Deliveries

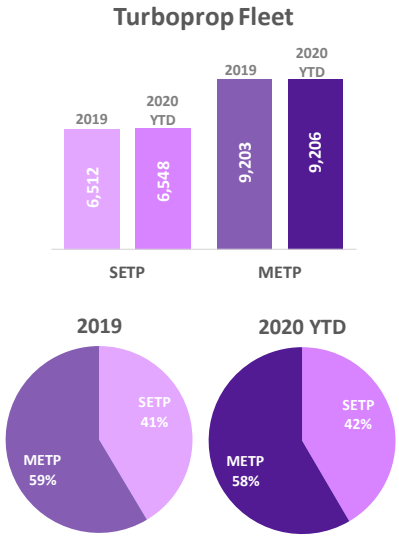
2020 YTD = April 1, 2020 YTD



Worldwide deliveries of business jets and turboprops are off to a comparatively slow start in 2020, with just 65 jets and 37 turboprops shipped in Q1 2020, according to JETNET records updated through early April. Production furloughs at Textron Aviation, Bombardier, and Embraer announced for the March-May period are amongst the early signs of what is likely to be a very sharp downturn in new aircraft delivery volumes in 2020.

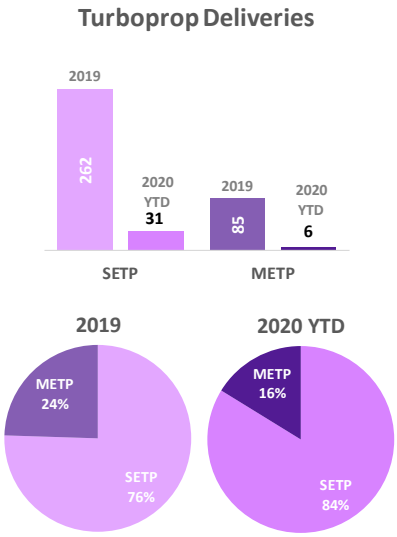
Turboprop Fleet

2020 YTD = April 1, 2020 YTD



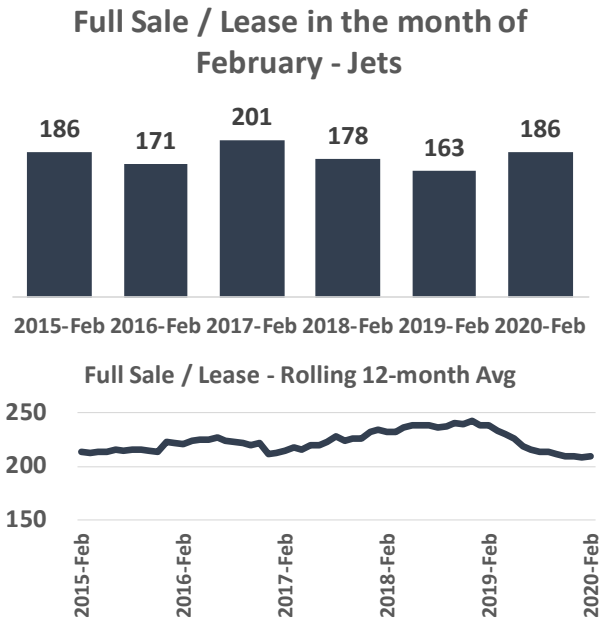
Turboprop Deliveries

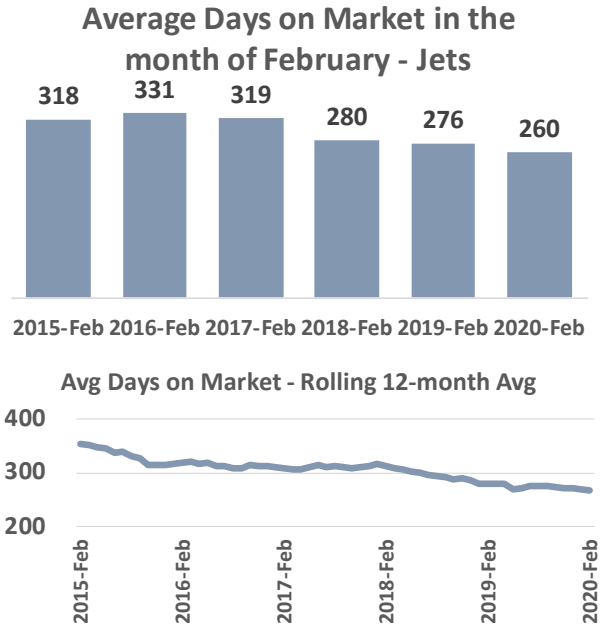
2020 YTD = April 1, 2020 YTD



Transactions

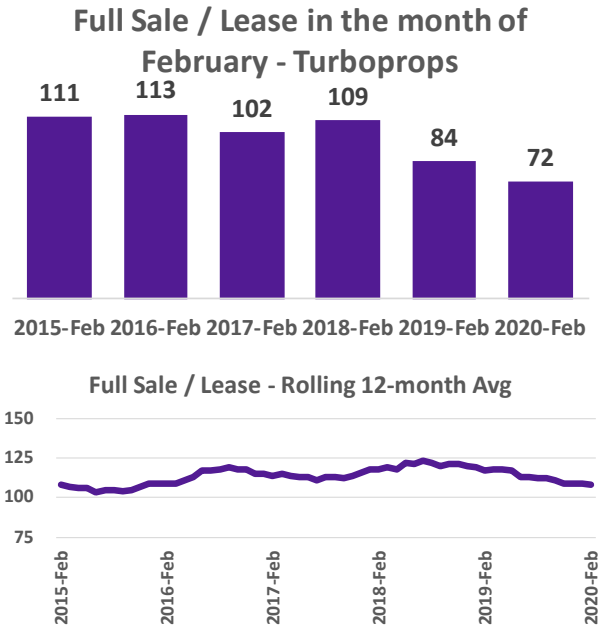
Business Jet Transaction

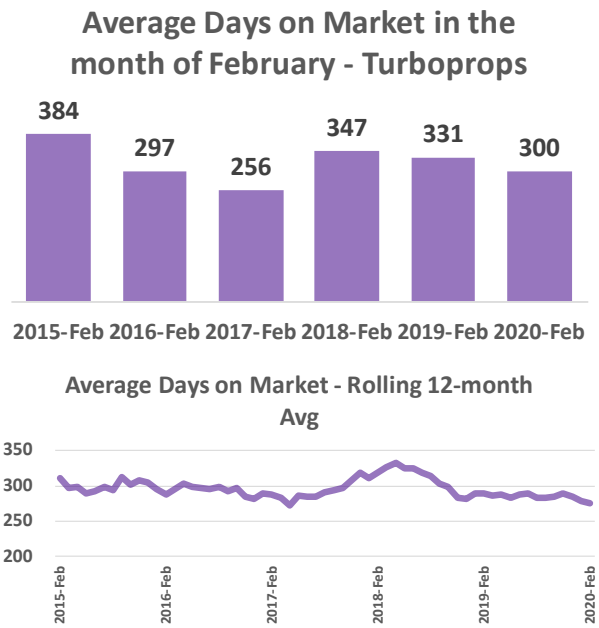




Through the first 2 months of 2020, pre-owned business jet transactions were flat YOY while turboprop volumes were down 8%. Transaction velocity (as measured by Days on Market for pre-owned aircraft that are finding retail buyers) has continued to accelerate, averaging about 250 days and 295 days for turboprops in January-February. Given that much of the impacts of COVID-19 were only felt in the U.S. market beginning in mid-March, these data largely do not yet reflect the impact of the coronavirus.

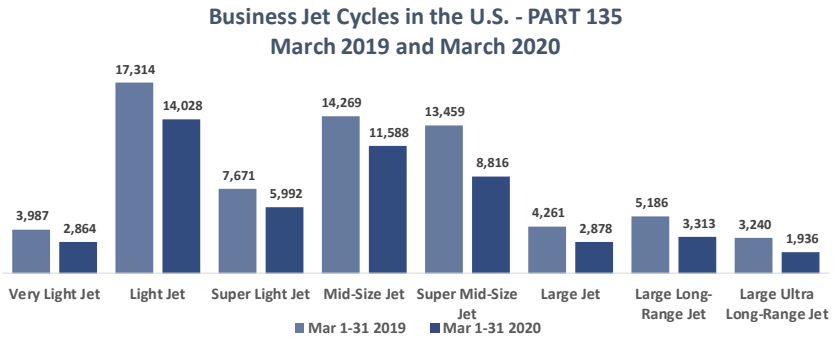
Turboprop Transactions

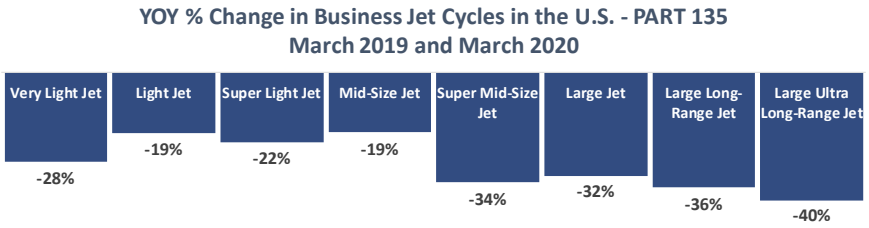




Utilization

Part 135 Operations

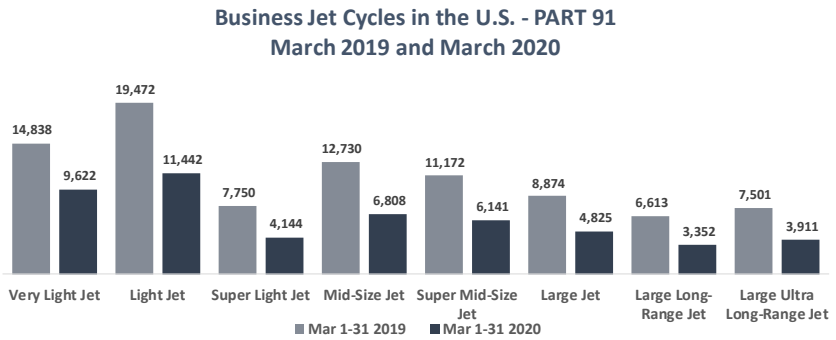


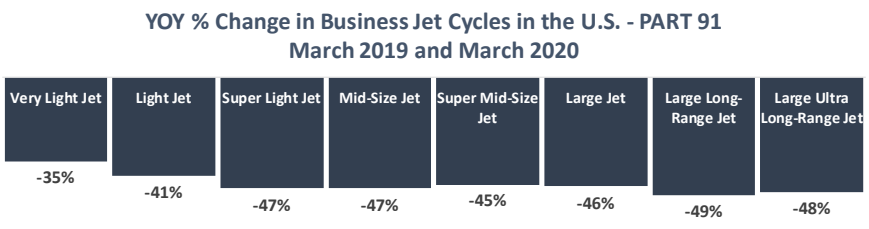


US Part 135	March 1-31, 2019	March 1-31, 2020	% Change YOY
Total Flights	69,518	51,508	-26%

Business jet cycles (one takeoff and landing) are amongst the earliest indicators of the health of business aviation markets. Data are captured electronically in near real-time and provide initial insights into the impacts of COVID-19 on flight operations. In March 2020, business jet cycles dropped 26% YOY for U.S. Part 135 (commercial / charter) and 43% for U.S. Part 91 (non-commercial / private) operations. All business jet size categories were down in March 2020 vs. March 2019, led by the Part 91 large cabin and long-range segments. Much of the drop off in activity occurred in the 2nd half of the month, as demand fell precipitously.

Part 91 Operations

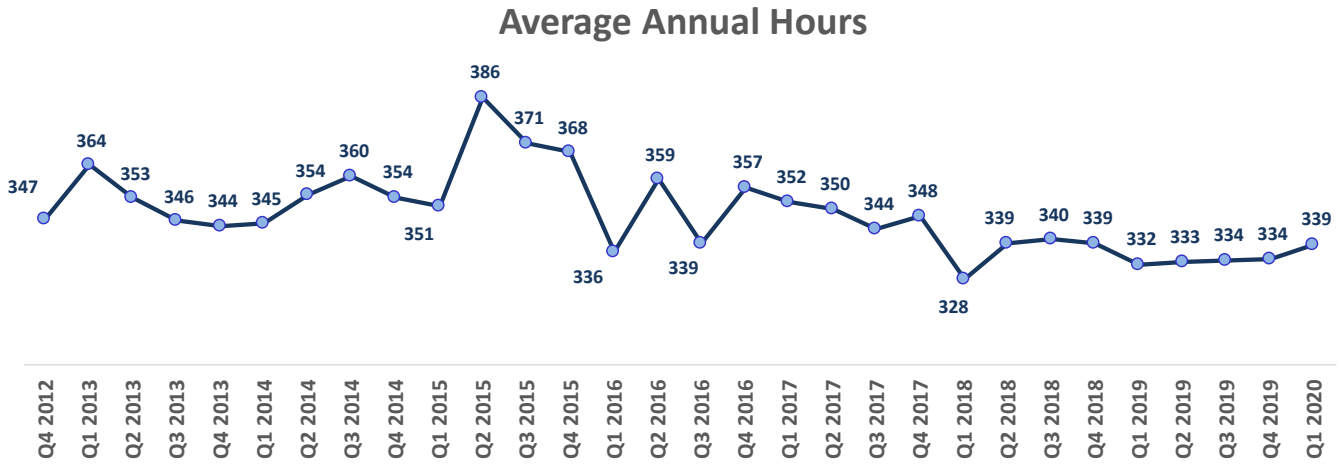




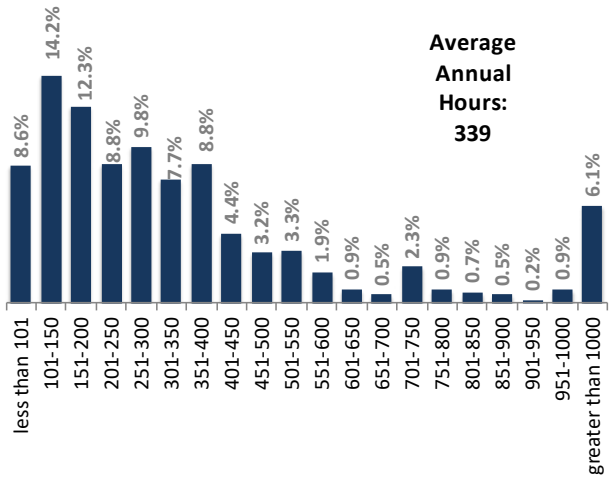
US Part 91	March 1-31, 2019	March 1-31, 2020	% Change YOY
Total Flights	90,053	51,379	-43%

Utilization (Survey)

Business Aircraft Utilization (Annual Flight Hours per Aircraft)
Q1 2020 JETNET iQ Survey



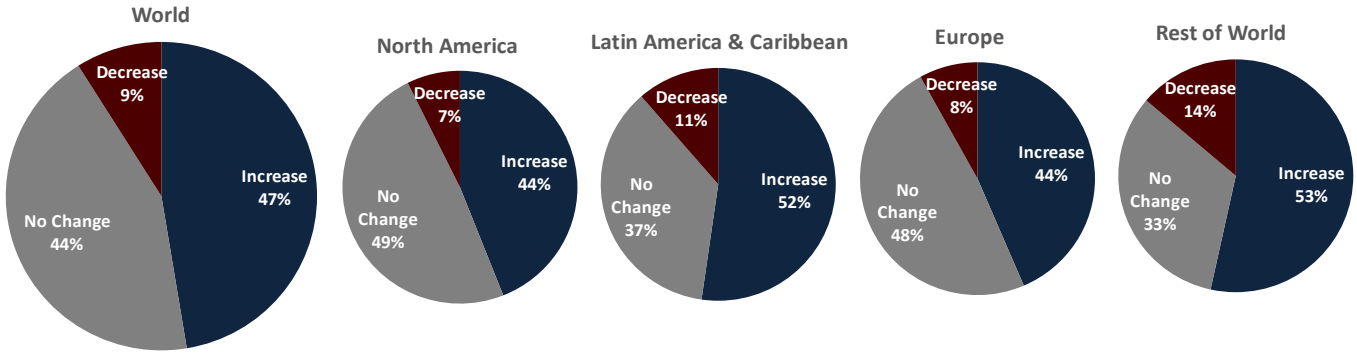
Flight Hour Distribution
Q1 2020 JETNET iQ Survey



JETNET iQ Surveys of business aircraft owners / operators have been fielded since late 2010. These proprietary surveys are password-protected and by invitation only, and provide rich insights into the opinions, preferences, and intentions of business aircraft customers. Through Q1 2020, JETNET iQ Surveys include more than 18,000 respondents from 130+ countries – the largest commercially available database of business customer sentiment in the industry.

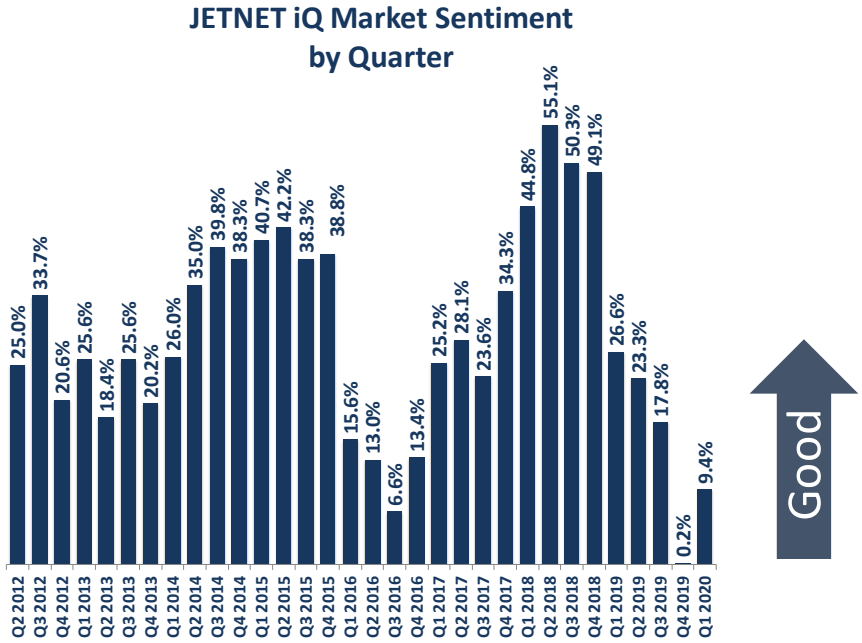
According to survey respondents, the average annual flight hours per fixed-wing turbine aircraft has ranged from 328 to 386 over the past several years. Over 50% of Q1 2020 respondents indicate that their aircraft flew 300 hours or less per year in the prior 12 months. Q1 2020 Survey respondents who were expecting average utilization to increase over the next 12 months outnumbered those expecting flight hours to decrease by about 5-to-1; these results reflect a relatively optimistic mood, although our survey was concluded in early March before the World Health Organization (WHO) recognized the COVID-19 outbreak as a pandemic on March 12.

Expected Utilization over the Next 12 Months
Q1 2020 JETNET iQ Survey



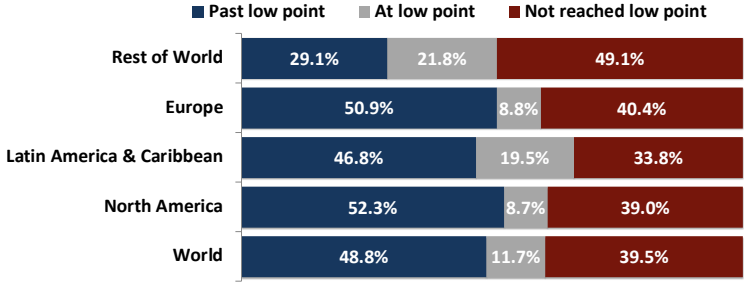
Market Sentiment (Survey)

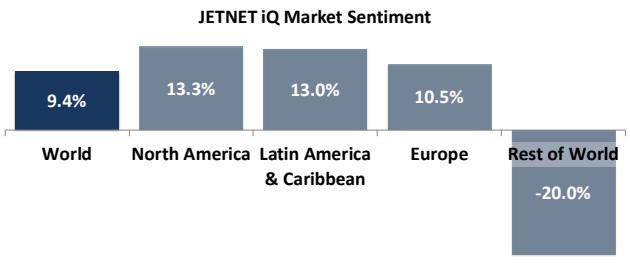
JETNET iQ Market Sentiment
Q1 2020 JETNET iQ Survev



In Q1 2020, business aircraft owners / operators began to feel more optimistic about market conditions, with more than half of respondents in North America (U.S. and Canada) and Europe indicating that they felt that the business aviation industry was past the low point of the current business cycle. This contrasts with a sharp drop in market sentiment that we had been recording throughout all of 2019. The Q1 2020 JETNET iQ Survey was fielded from mid-January though early March 2020, with 508 respondents from 59 countries reporting. Weak results for "Rest of World" in Q1 2020 (including respondents from Asia Pacific and Middle East, regions that were earliest impacted by the coronavirus) portend a very sharp downturn in sentiment in other regions in upcoming surveys. With the launch of the Q2 2020 survey in mid-April 2020, we expect to have a more global measure of the impact of COVID-19 on market sentiment across the business aviation industry.

Where is the Business Aviation Industry in the Current Business Cycle?
Q1 2020 JETNET iQ Survey





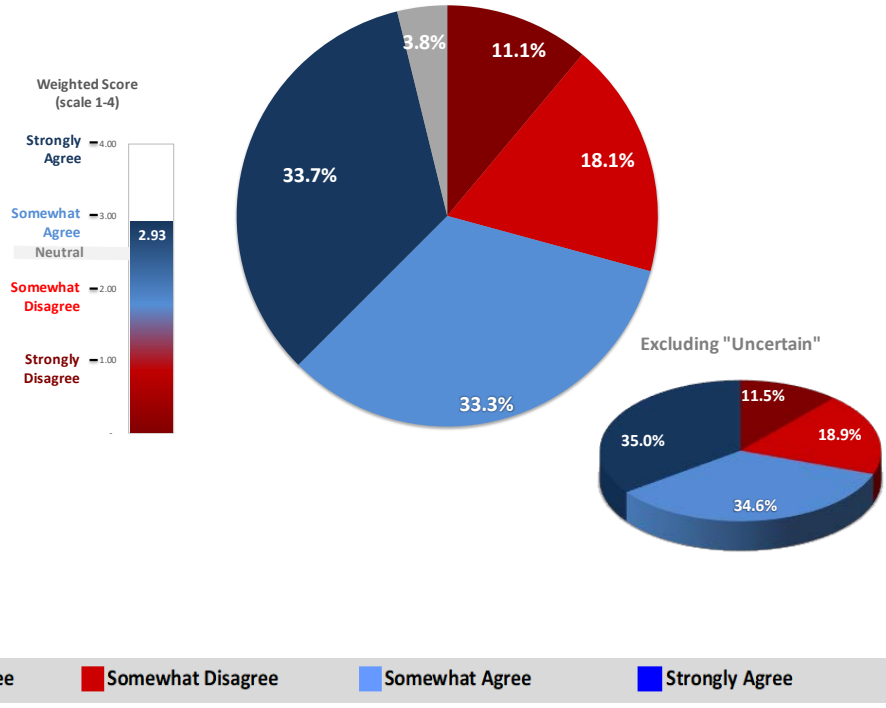
JETNET iQ Market Sentiment is the net of "Past low point" and "Not yet reached low point"

Aviation Staffing (Survey)

JETNET iQ Opinion Question: Difficulties recruiting aviation-related staff
Q1 2020 JETNET iQ Survey

Please evaluate the following statement and indicate the extent to which you agree or disagree:

"We are experiencing difficulties recruiting and retaining aviation-related staff (pilots, mechanics, technicians, etc.)"



One of the primary challenges facing business aircraft owners and operators is the difficulty recruiting and retaining aviation technical talent. Based on our surveys, this challenge is being felt worldwide, but is particularly concerning to European and North American owners / operators. According to JETNET iQ's Q1 2020 survey, almost 70% of respondents agreed that they were having difficulty recruiting and retaining aviation talent. European respondents had the highest level of "Strongly Agree" plus "Somewhat Agree" (75%), followed closely by North America (74%), Rest of World (59%) and Latin America & Caribbean (55%).

Talent recruitment and retention, a strategic challenge to many in the industry just a few weeks ago, is suddenly no longer an issue demanding immediate management attention. Sharp reductions in flight operations, vast fleets of parked aircraft, and shuttered airline hubs are now the norm, only weeks after our Q1 2020 Survey was conducted.

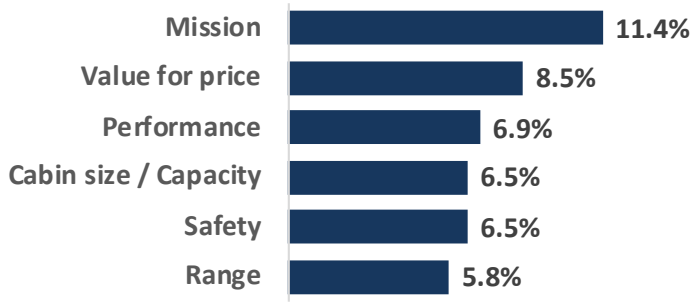
Purchase Criteria (Survey)

Business Aircraft Purchase Criteria
Q1 2020 JETNET iQ Survey

Top 5 Purchase Criteria Worldwide

In the decision to purchase {*your most recent aircraft model*}, what were the most important criteria?

Purchase Criteria
% of "Most Important Criteria" Score



What are the primary criteria used in business aircraft purchase decisions? The Q1 2020 JETNET iQ Survey provided respondents with an array of 30 different purchase criteria, plus an opportunity to include their own "write in" response if their choice was not provided amongst our response options. Based on the opinions of more than 500 respondents from 59 countries, "**Mission**" and "**Value for price**" are the two most important considerations that influenced their most recent business aircraft purchase.

When asked how satisfied respondents were with their most recent aircraft purchase, the highest satisfaction levels were for dispatch reliability, scoring a worldwide average of 4.32 on a scale of 1-5, where "5" equals "extremely satisfied." Owners / operators were somewhat less enamored with their overall customer service experience, which scored 3.88, and with resale value retention, at 3.96.

With lower new business aircraft deliveries expected in the next several years, OEMs will be challenged to maintain the highest standards in customer service and support despite the financial challenges and margin pressures their organizations may be facing.

On a scale of 1-5 (where 5 = Extremely Satisfied), how would you rate the first year of experience for your most recent purchase:	All Respondents	North America	Latin America & Caribbean	Europe	Rest of World
Meets or exceeds our expectations for retaining its resale value	3.96	3.90	4.16	3.83	4.12
Customer Service experience meets / exceeds expectations	3.88	3.92	3.85	3.44	4.11
Aircraft meets / exceeds dispatch reliability expectations (minimal AOG time)	4.32	4.42	4.29	3.93	4.12

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 Consulting** 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 8 different levels**. JETNET iQ is a partnership between JETNET LLC of Utica, NY and Rolland Vincent Associates, LLC, of Plano, TX.

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, 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:

COVID-19: European Centre for Disease Prevention and Control (ECDC) https://www.ecdc.europa.eu/en/novel-coronavirus-china
GDP growth forecasts (2020):
The Economist – April 4, 2020
https://www.economist.com/economic-and-financial-indicators/2020/04/04/economic-data-commodities-and-markets
Stock Markets:
Dow Jones Industrial Average (DJIA): http://ca.spindices.com/indices/equity/dow-jones-industrial-average
London Stock Exchange (FTSE 100) : http://www.londonstockexchange.com/statistics/ftse/ftse.htm
Exchange Rates: U.S. Federal Reserve
Business Confidence: US ISM Manufacturing PMI (U.S.); European Commission (Euro Area)
Consumer Confidence: University of Michigan Survey of Consumers (U.S.); European Commission (Euro Area)
Unemployment: Bureau of Labor Statistics (U.S.); Eurostat (Euro area)
Business aircraft fleet, deliveries, transactions, utilization: JETNET
Survey results: JETNET iQ Global Business Aviation Surveys (Quarterly)

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).

DJIA: Dow Jones Industrial Average (Ney York)
FTSE: Financial Times Stock Exchange (London)
GDP: Gross Domestic Product
OEM: Original Equipment Manufacturer
YOY: Year over Year
YTD: Year to Date

Disclaimer:

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