



WINGX

MAKING AEROSPACE INFORMATION INTELLIGENT

Global business aviation since pandemic

Assessing impact, interpreting recovery

Business Aviation Market Intelligence

March 2021

Global Fixed Wing Flight Activity

Divergent Trends: **Resilience** in Global Business Aviation

WINGX

- Business aviation aircraft activity far more resilient than Scheduled
- Early days: logistics, medevac; Then: leisure rebound; lockdown 2#: corporate vs holiday
- Scheduled Airlines continue to flounder, Cargo activity expanding (notably ad hoc)

2020 FY

-X%

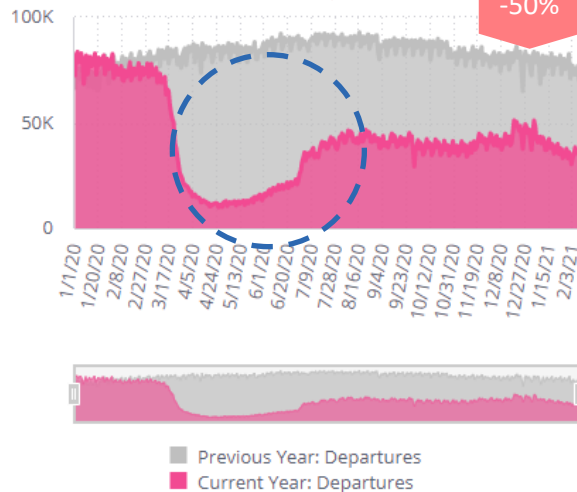
2021 YTD

-X%

Scheduled Airlines

-62%

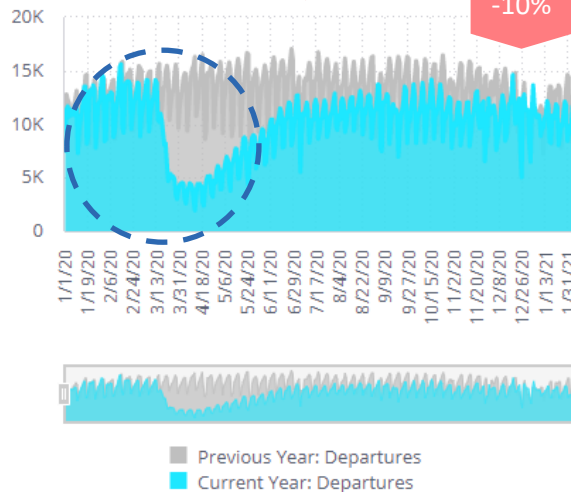
-50%



Business Aviation

-26%

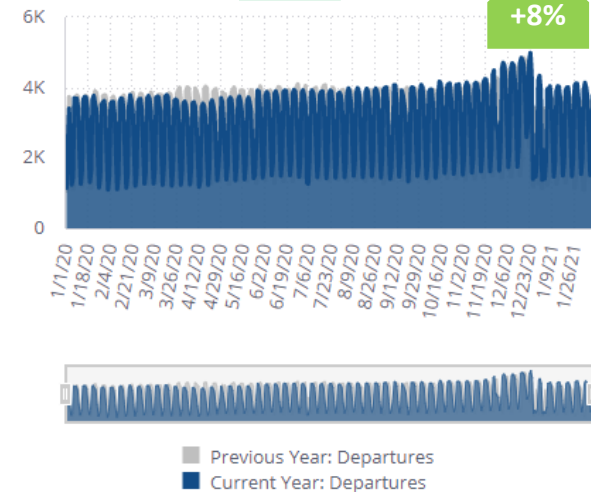
-10%



Cargo

+7%

+8%



Source: WINGX, ATC, ADSB

Investment and consolidation: **Excitement** for business aviation

WINGX

- Multi-billion \$ investment in new ventures, consolidations, acquisitions
- New-Normal / Pivotal / Transformation = essentially, this could be an inflexion point for business aviation



Blackstone, Global Infrastructure to acquire Signature Aviation in \$4.73B deal



Gama Aviation Acquires Jet East MRO



JET LINX PURCHASES MERIDIAN AIRCRAFT MANAGEMENT & AIR CHARTER

Wheels Up Continues Acquisition Spree Buying Mountain Aviation

WHEELS UP

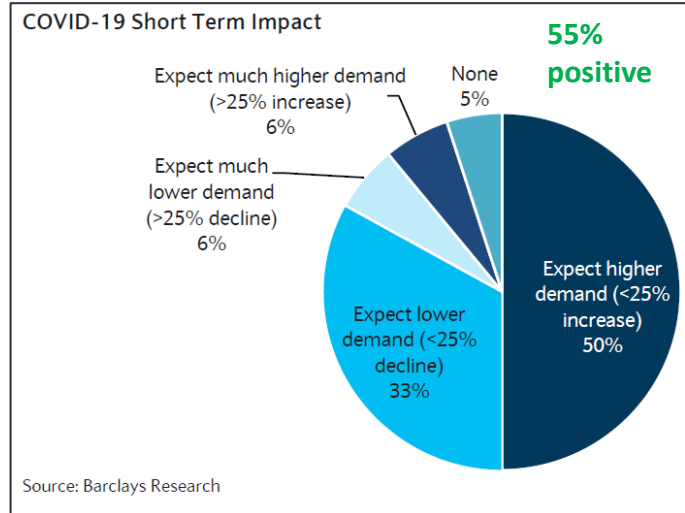
Wheels Up strikes go-public deal with Aspirational Consumer at \$2.1B valuation



Blade to go public via SPAC at \$825m



Directional's Kenn Ricci Launches A SPAC Targeting Next Generation Aviation Acquisitions



Surf Air Says It Secured \$200 Million As It Plans To Go Public

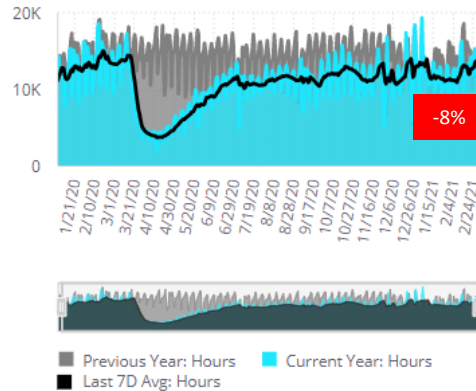
Divergent global trends

- US recovery holds up, but relapse in Europe
- Asia steady recovery; sectors only -2% this year
- Growth in South America and Oceania this year

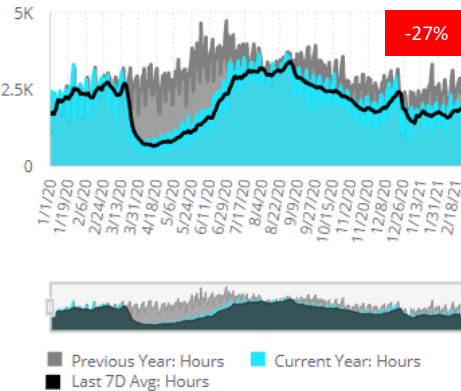
-X%
+X%

Flight hours 2021 YTD (1.Jan
28.Feb 21 vs same dates in 2020)

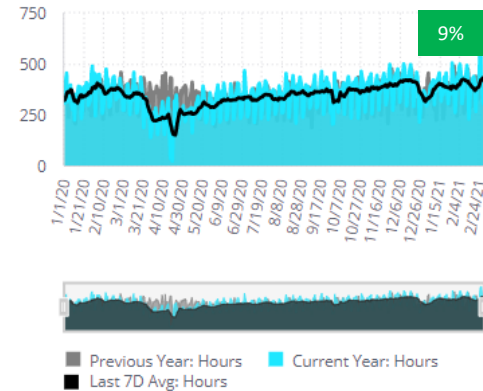
North America



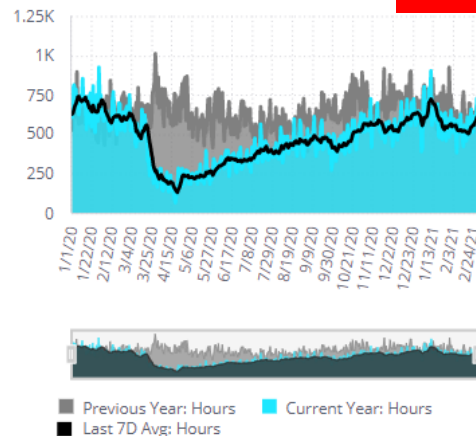
Europe



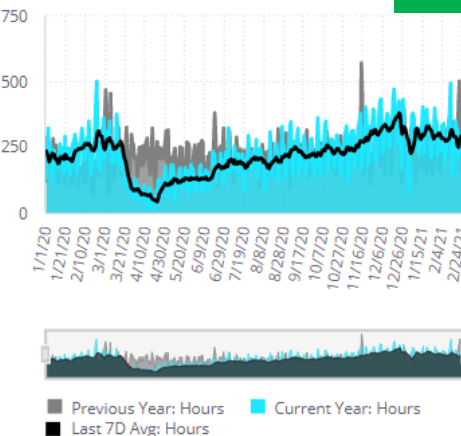
Oceania



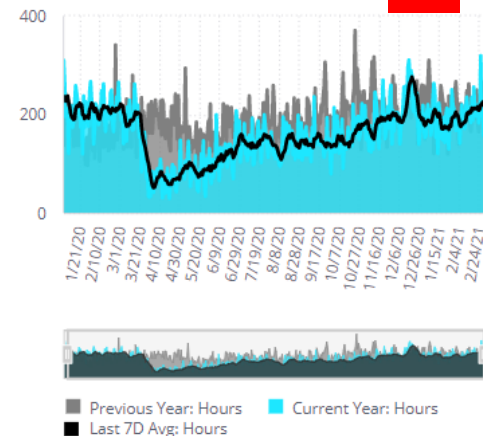
Asia



South America



Africa



Source: WINGX, ATC, ADSB
Business Aviation (Jets+Props)

Even in Europe, bizav more resilient than airlines

- Bizav more resilient than Scheduled everywhere
- Even in UK: in 2021YTD, Bizav -58% but Scheduled -85%
- Russia and Turkey have more bizav activity than ever

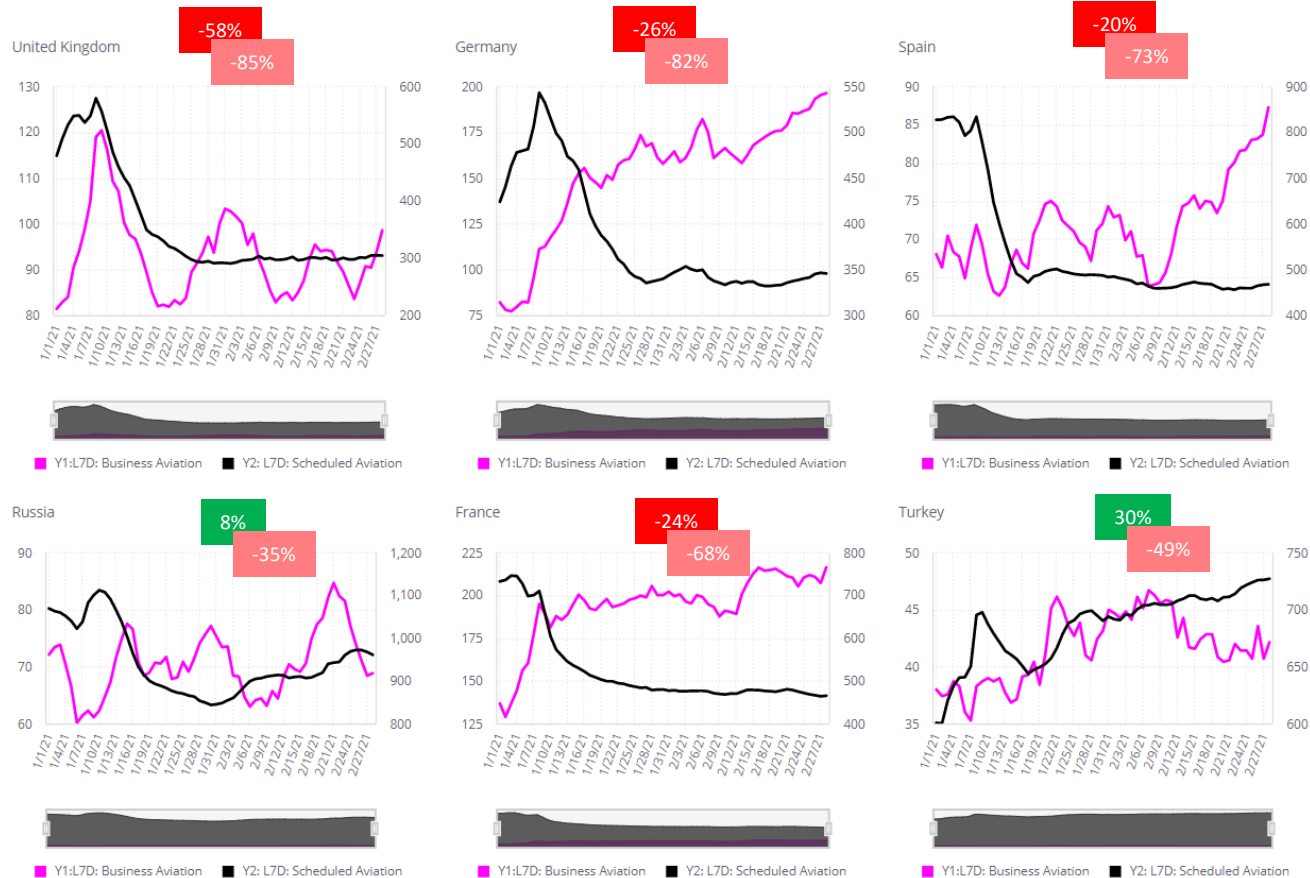
WINGX

2021 YTD
Sectors

-20%
-73%

Business aviation

Scheduled aviation



Business Aviation (Jets+Props)

Source: WINGX, ATC, ADSB

Trends by aircraft type and platform: small cabin vs large

- Much less demand for large-cabin long-range: Gulfstream, Dassault
- Mid-Small cabin & range more resilient
- Cirrus up 40%, Honda up 11%

WINGX

2020-21 YTD
Hours

-X%
-k

Flight hours %
Gain/Loss in Thousand Sectors

-18%
-602k

-28%
-146k

-34%
-115k

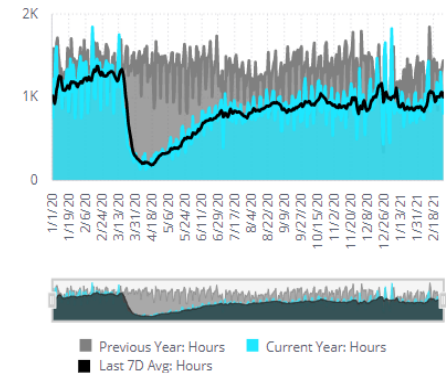
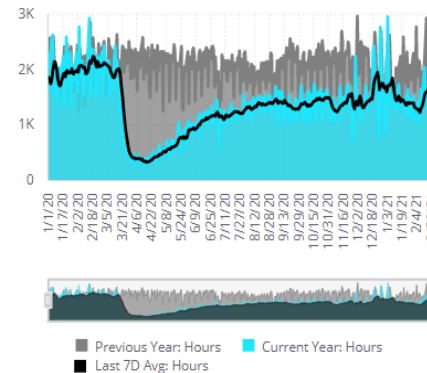
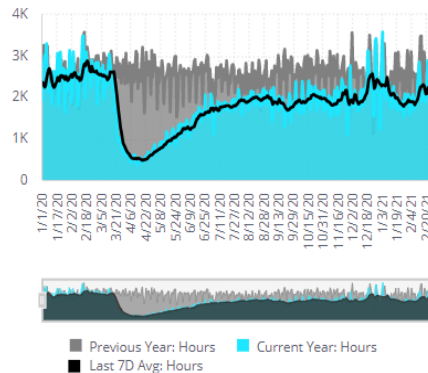
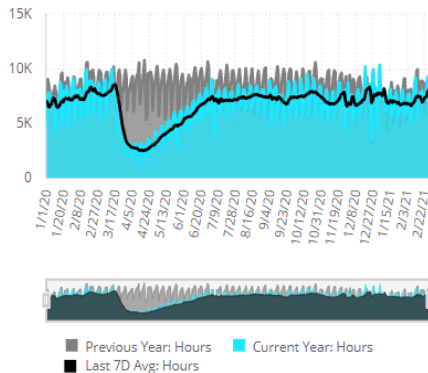
-35%
-109k

TEXTRON

BOMBARDIER

Gulfstream

DASSAULT
AVIATION



Jan 1st, 2020

Feb 28th, 2021

-35% Heavy and Ultra Long Range

-21% Super Mid / Mid

-14% Light Jet segments

-19% Turboprop

-20% Sub 1.5H

-12% 1.5-4H

-40% 4H+

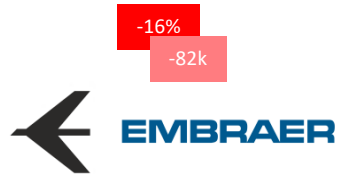
Source: WINGX, ATC, ADSB

Trends by aircraft type and platform: mid-range vs long-range

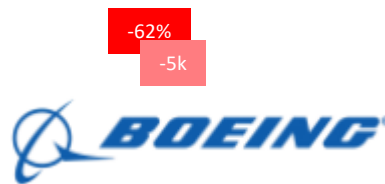
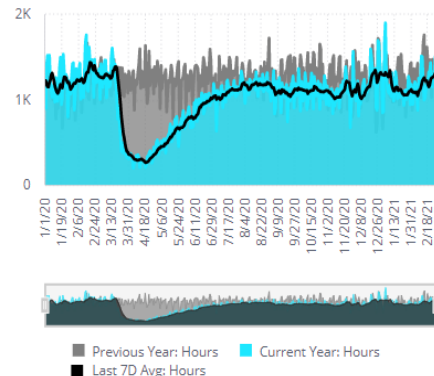
WINGX

2020-21 YTD
Hours

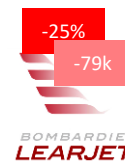
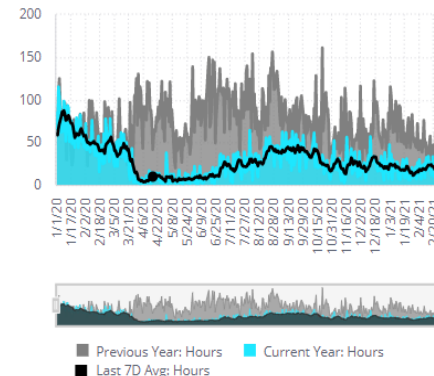
- Pilatus aircraft activity resilience stands out: PC24 activity up 50% (fleet 135/85)
- Embraer's Phenom 300 has been stand-out performer
- Boeing BBJ way back. Although Airbus A220 could find gaps in market



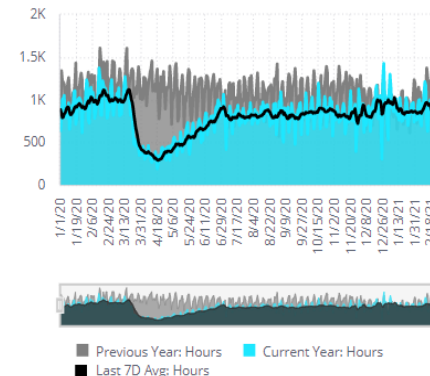
Embraer



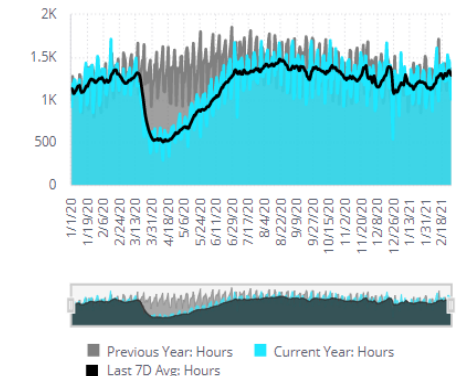
Boeing



Learjet



Pilatus



Jan 1st, 2020

-35% Heavy and Ultra Long Range

-21% Super Mid / Mid

-14% Light Jet segments

-19% Turboprop

Feb 28th, 2021

-20% Sub 1.5H

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-40% 4H+

Source: WINGX, ATC, ADSB

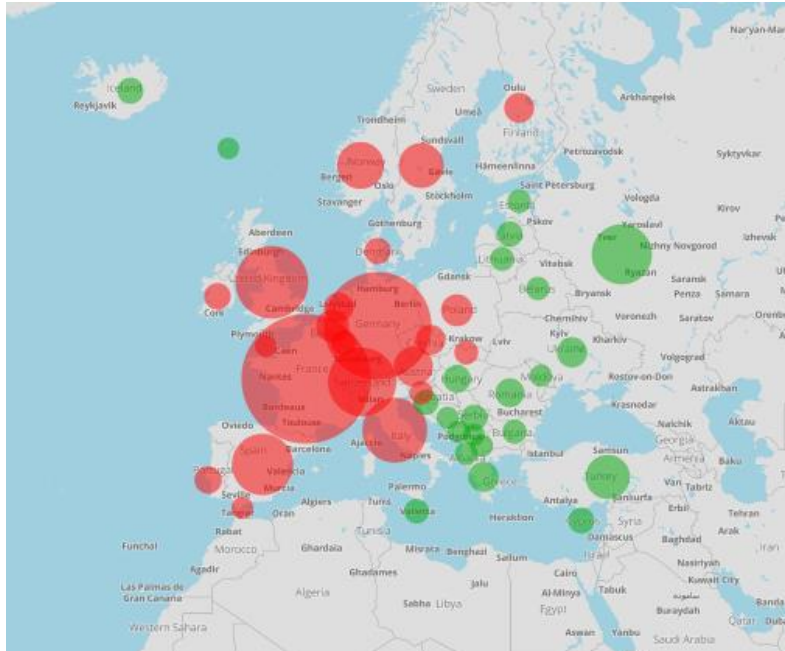
European View

Focus on Europe; business aviation flight activity through Feb 21

WINGX

2021 YTD
Sectors

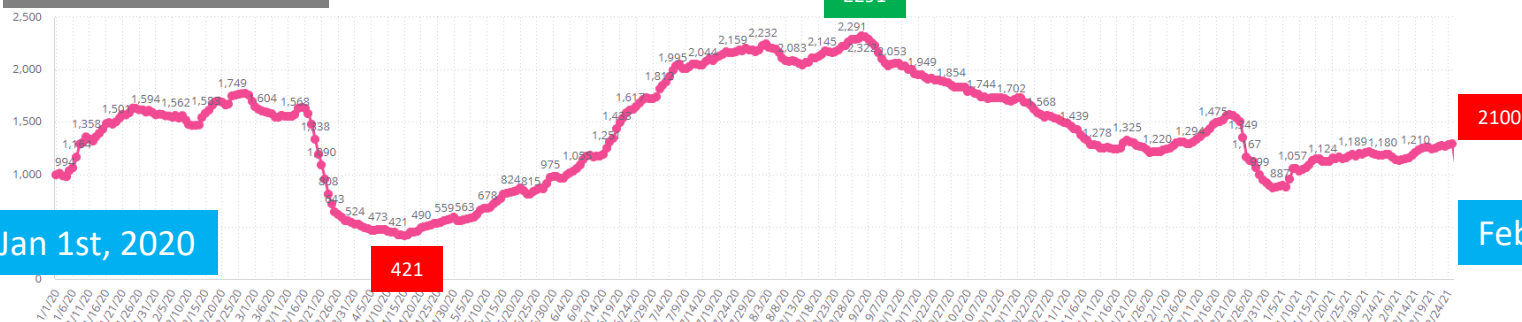
- Recovery in Eastern Europe and CIS
- Not so in Western Europe...



East vs West...

- 29% of activity in France & Germany
- UK has only 8% share, -58% YOY
- Spain, Italy, 'only' -20%
- Scandinavia -10%
- Eastern and Southern Europe- Growth

7D Rolling Average



Focus on Europe; business aviation departures from Top Cities

WINGX

2021 YTD
Deps

- Paris, London, Geneva, Zurich: severe declines
- Moscow, Istanbul, Kiev, Athens = exceptions

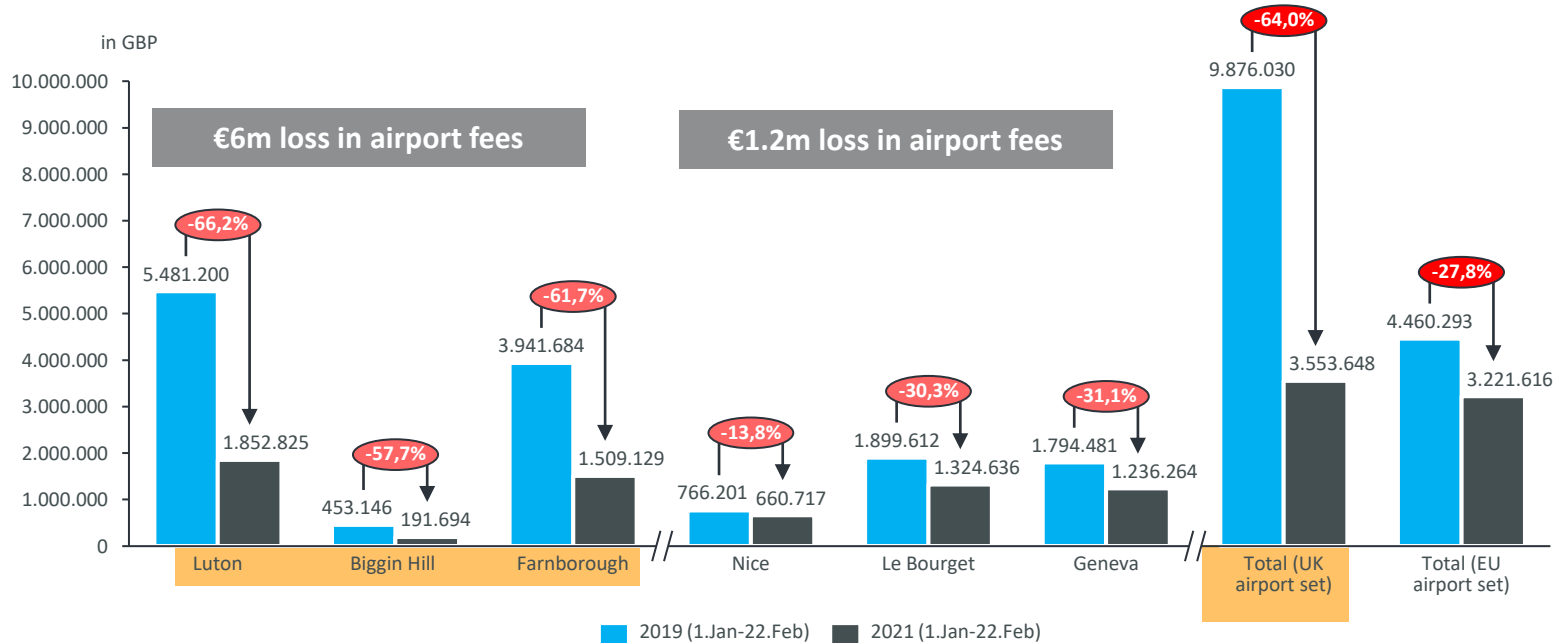
Departure City	Flights	% of total flights	PTD: growth
Paris (FR)	3,014	4.4%	-29.5%
London (GB)	2,548	3.7%	-64.5%
Moscow (RU)	2,502	3.6%	-0.1%
Geneva (CH)	1,558	2.2%	-35.6%
Zurich	1,271	1.8%	-33.2%
Nice	1,236	1.8%	-22.7%
Milan (IT)	1,129	1.6%	-33.8%
Rome (IT)	1,113	1.6%	-2.8%
Istanbul	1,108	1.6%	37.0%
Munich	1,092	1.6%	-24.7%
Vienna (AT)	798	1.2%	-19.1%
Berlin (DE)	784	1.1%	-37.2%
Frankfurt am Main	735	1.1%	-13.4%
Stockholm (SE)	704	1.0%	-19.8%
Stuttgart (DE)	666	1.0%	-30.0%
Dusseldorf	652	0.9%	-21.3%
Prague (CZ)	651	0.9%	-15.5%
Brussels (BE)	605	0.9%	-40.6%
Málaga (ES)	590	0.9%	-1.2%
Madrid (ES)	586	0.8%	-39.1%
Kiev	551	0.8%	6.0%
Cologne (DE)	540	0.8%	-16.3%
Mallorca	531	0.8%	-15.7%
Athens (GR)	523	0.8%	16.7%
Bern	523	0.8%	-25.4%
Hamburg (DE)	501	0.7%	-20.5%
Belgrade (RS)	495	0.7%	6.7%
St. Petersburg	491	0.7%	6.3%

Source: WINGX, ATC, ADSB

Airport level impact: evaluating loss of revenues

- Airport fees (Landing, Parking, Handling, Nav) have obviously been adversely affected by drop in traffic. UK-based airports have seen by far the largest decline. Estimated loss €6m*

2021 YTD
Rev



*WINGX-ADS collaboration on assessment of traffic impact on key airport fees
Fee components references:

Luton: Landing Fee, Navigation Charge, Night Operating Charge, Parking Fee

Biggin Hill: Landing Fee, Border Levy, Handling Fee, Parking Fee

Farnborough: Landing & Handling Fee Combined, Weekend & Bank Holiday Surcharge, NOx Emission Surcharge, UKBF Fee, Parking Cost, Security Screening

Nice: Landing Fee, Kilo Apron Start Assistance, Parking Cost

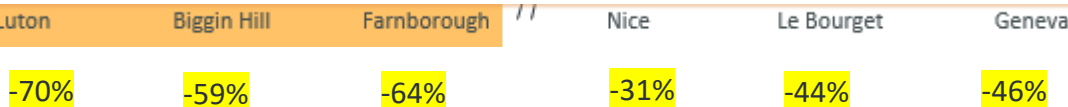
Le Bourget: Landing Fee, Parking Cost

Geneva: Landing Fee, Parking Cost, Parking Slot Fee, Slot Coordination Fee, Noise Fee, Emissions Fee, Terminal Navigation Charge

THIS ANALYSIS IS POWERED IN
COLLABORATION WITH



NOX
EMISSIONS
21 VS 20



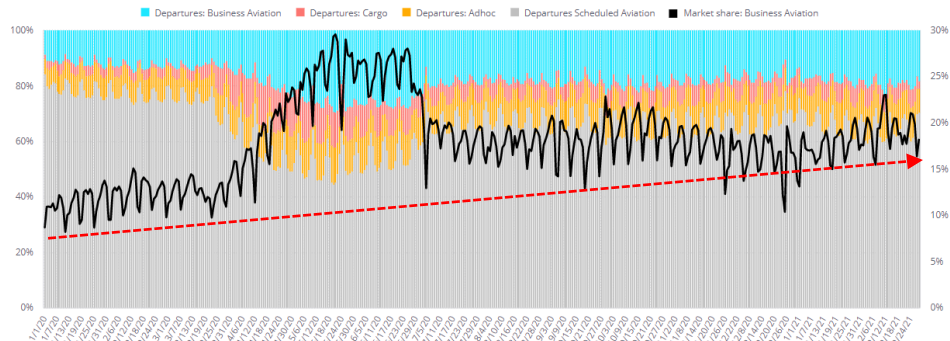
Shift from Scheduled to On-Demand

Business aviation is more important part of connectivity mix

- Bizav has increased share of total FW by >2X
- In the UK, Bizav share is almost 20% in Feb-21

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2020-21 YTD
Sectors



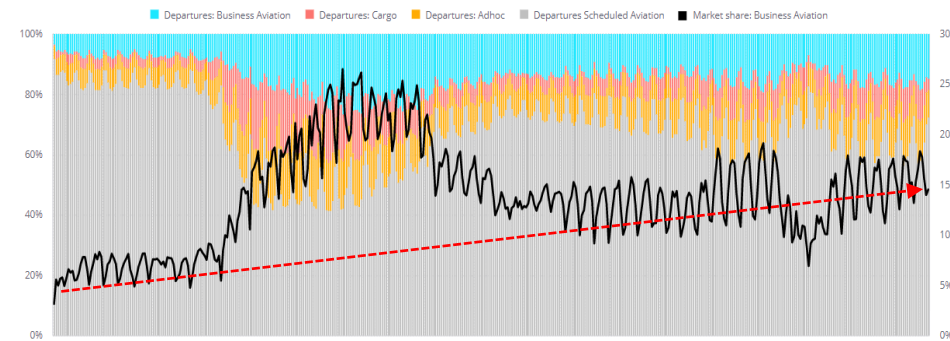
Jan 2020

Feb, 2021

7.5%

17%

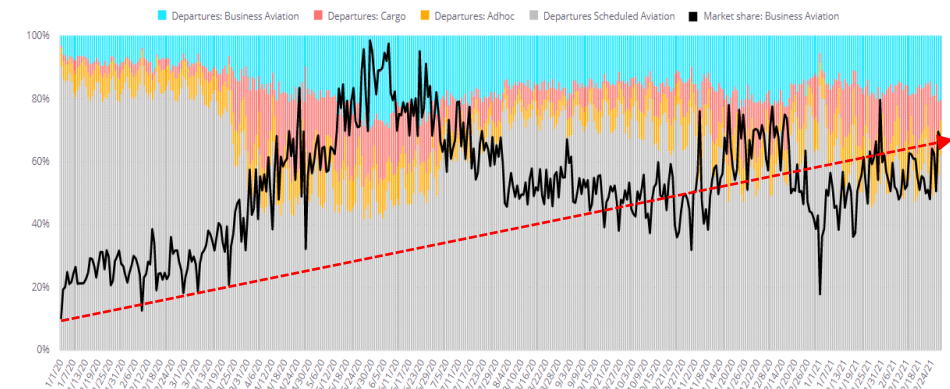
GLOBAL



6%

14%

EUROPE



3%

19%

UK

Y1 Axis = share of sectors; Y2 Axis = Bizav share of total sectors
Business Jets and Props

Grey = 2019; Orange = 2020; Black line = 7D 2020

Scheduled vs Bizav from Metro Hubs in 2021

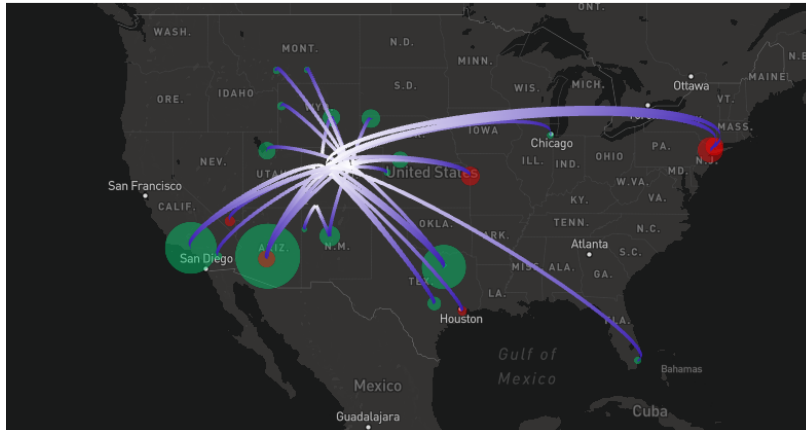
From Colorado: Top 20 metro destinations

WINGX

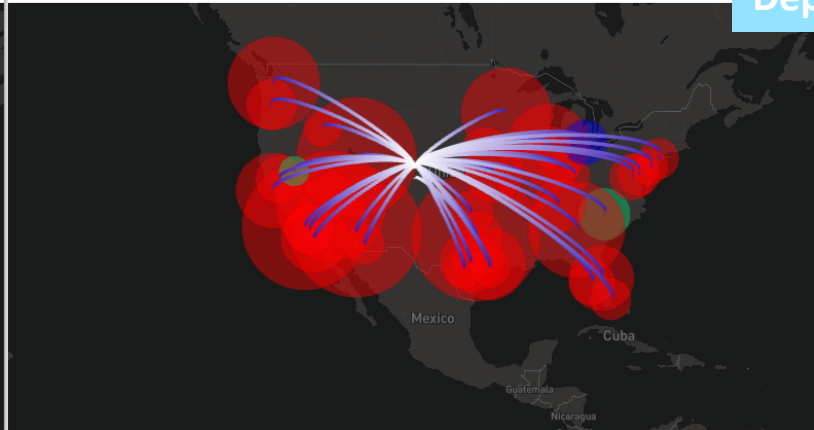
Bizav outbound +1% vs Sched outbound -29%. Bizav +11% to Phoenix, Sched -27%

2021 YTD
Deps

Top 30 Outbound Pairs - Business Aviation



Top 30 Outbound Pairs - Scheduled Aviation



Outbound Pairs (BizAv / Scheduled)

Arrival City	Arrival Country	Business Aviation		Scheduled Operation	
		Flights	YoY growth	Flights	YoY growth
Phoenix (US-AZ)	United States	672	11%	1,086	-27%
Los Angeles (US-CA)	United States	657	-12%	1,593	-34%
Dallas (US-TX)	United States	490	15%	356	-6%
Houston (US-TX)	United States	352	-1%	955	-27%
New York	United States	325	-29%	590	-49%
San Francisco (US-CA)	United States	281	-9%	855	-38%
Salt Lake City	United States	261	37%	996	-22%
Chicago	United States	230	-21%	1,131	-29%
Austin (US-TX)	United States	220	9%	333	-36%
Las Vegas (US-NV)	United States	217	-30%	608	-41%
Palm Springs	United States	162	8%	193	-4%
San Diego	United States	161	0%	360	-42%
Kansas City (US-MO)	United States	159	14%	299	-41%
Fort Worth	United States	154	-3%	1,576	-4%
Oklahoma City	United States	148	25%	251	-30%
Miami (US-FL)	United States	147	19%	214	-17%
Jackson (US-WY)	United States	146	66%	110	-26%
Minneapolis (US-MN)	United States	125	-21%	500	-35%
Grand Total		10,683		27,492	-29%

Change in Bizav traffic to these locations

Change in Sched traffic to these locations

From Istanbul: Scheduled vs Bizav

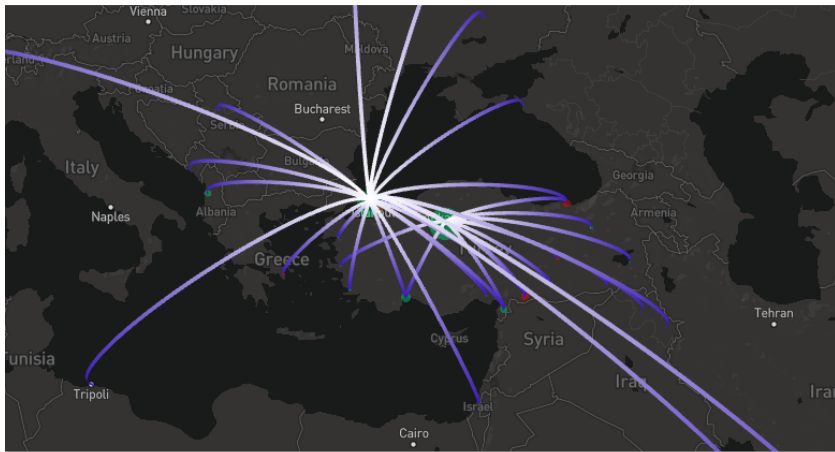
Bizav outbound +13% vs Sched outbound -48%

EG Flights from Istanbul to Moscow, bizav +5%, Sched -52%

WINGX

2021 YTD

Top 30 Outbound Pairs - Business Aviation



Top 30 Outbound Pairs - Scheduled Aviation



Outbound Pairs (BizAv / Scheduled)

Arrival City	Arrival Country	Business Aviation		Scheduled Operation	
		Flights	YoY growth	Flights	YoY growth
Istanbul	Turkey	129	16%	712	-63%
Ankara	Turkey	92	6%	1	-50%
Tirana	Albania	40	900%		
Antalya	Turkey	33	65%	108	-64%
Hatay	Turkey	30	150%	18	-51%
Dubai	United Arab Emirates	29	383%	30	3%
Trabzon	Turkey	22	-4%	87	-39%
Gaziantep	Turkey	20	-23%	47	-69%
Moscow (RU)	Russia	20	5%	14	-52%
Bodrum	Turkey	18	125%	22	-52%
Edremit	Turkey	15	275%		
Van (TR)	Turkey	14	133%	99	-3%
Doha	Qatar	13	0%	1	
Erzurum	Turkey	13	18%	47	-48%
Adana	Turkey	12	33%	26	-80%
London (GB)	United Kingdom	11	-58%	14	0%
?anl?urfa	Turkey	10	400%	33	-39%
Tripoli (LY)	Libya	10	25%		-100%
Grand Total		935		13%	3,077

Change in Bizav traffic to these locations

Change in Sched traffic to these locations

From Moscow: Scheduled vs Bizav

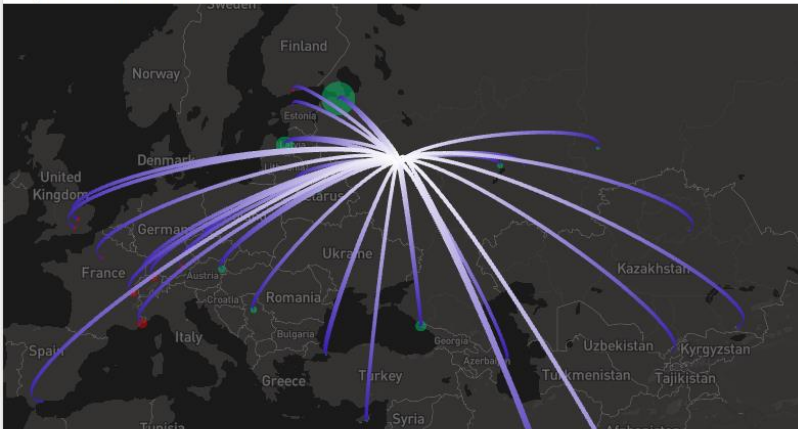
Bizav down 5% - but up almost 3X to Dubai, to which Sched is down 74%

Flights to Sochi: Bizav up 53%; Sched down 2%

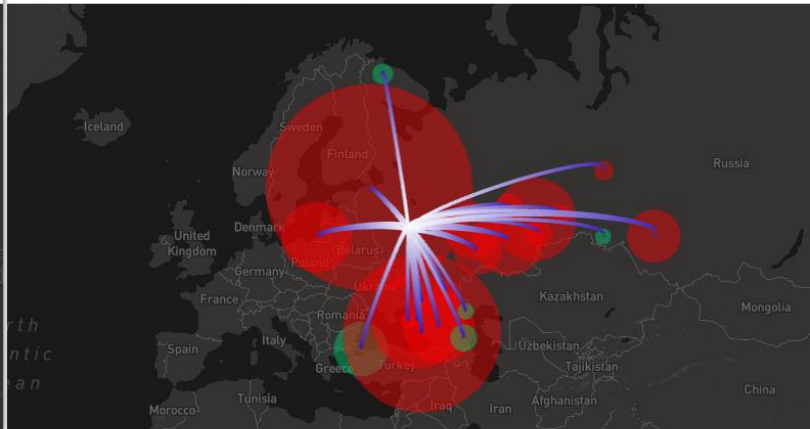
WINGX

2021 YTD

Top 30 Outbound Pairs - Business Aviation



Top 30 Outbound Pairs - Scheduled Aviation



Outbound Pairs (BizAv / Scheduled)

Arrival City	Arrival Country	Business Aviation		Scheduled Operation	
		Flights	YoY growth	Flights	YoY growth
St. Petersburg	Russia	183	1%	1,362	-39%
Dubai	United Arab Emirates	168	273%	149	-74%
Riga	Latvia	142	163%	9	-98%
Sochi	Russia	75	53%	1,372	-2%
Malé	Maldives	58	263%	46	24%
Kazan	Russia	52	126%	448	-38%
Nice	France	46	-43%	15	-82%
Vienna (AT)	Austria	45	10%	85	-74%
Geneva (CH)	Switzerland	44	-37%	20	-87%
Belgrade (RS)	Serbia	44	5%	41	-79%
Vilnius	Lithuania	41	24%		-100%
Moscow (RU)	Russia	38	27%	42	-76%
Minsk	Belarus	35	46%	53	-94%
London (GB)	United Kingdom	34	-69%	92	-78%
Zurich	Switzerland	34	-47%	21	-89%
Istanbul	Turkey	31	158%	645	10%
Yekaterinburg	Russia	30	50%	618	-41%
Helsinki	Finland	30	-9%	24	-93%
Grand Total		1,921	-5%	18,088	-50%

Change in Bizav traffic to these locations

Change in Sched traffic to these locations

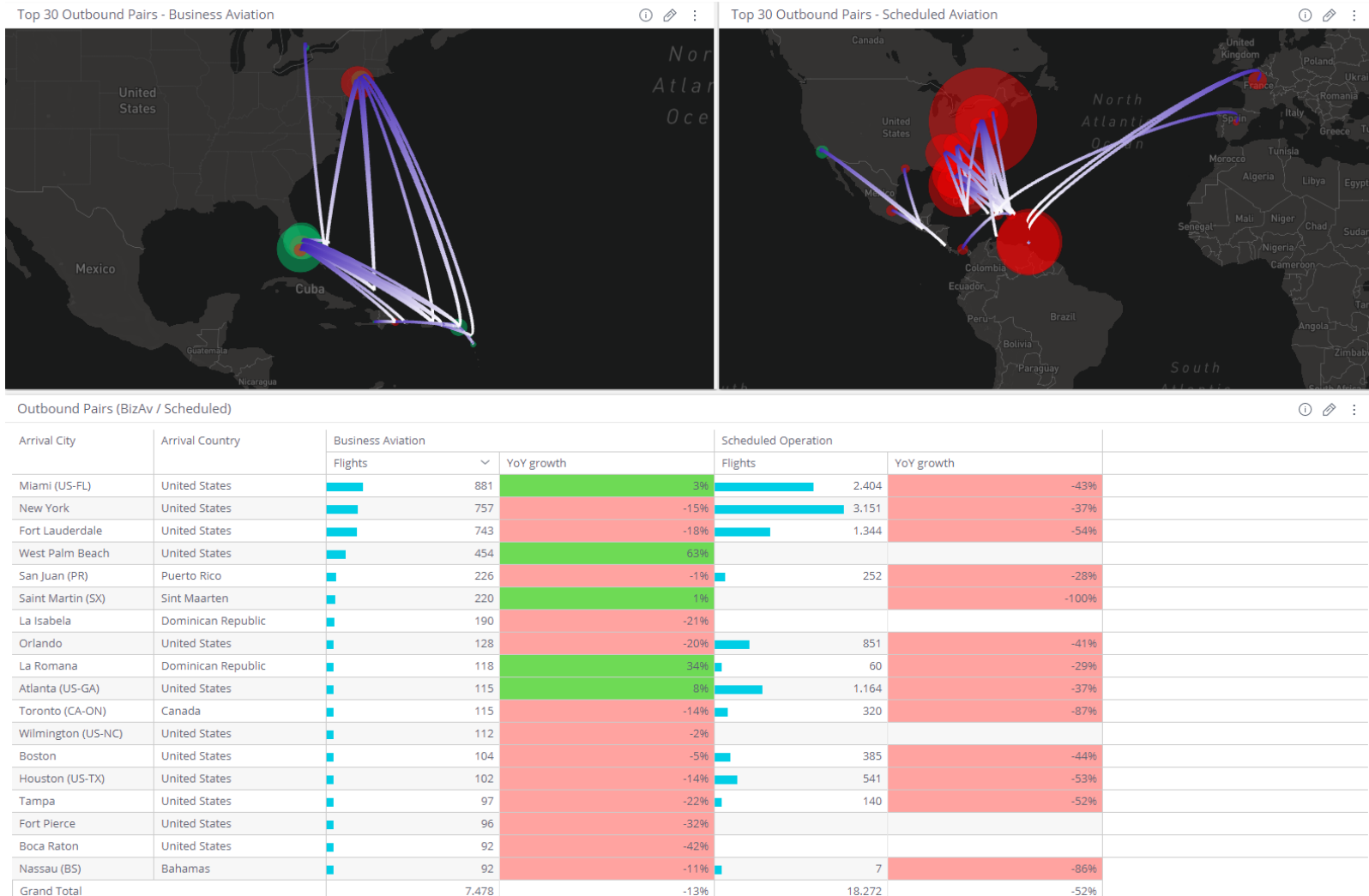
From Caribbean: Scheduled vs Bizav

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Business aviation activity down 13%, Scheduled outbound flights down 52%

Bizav flights from Miami up 3%; scheduled connections down by 43%

2021 YTD



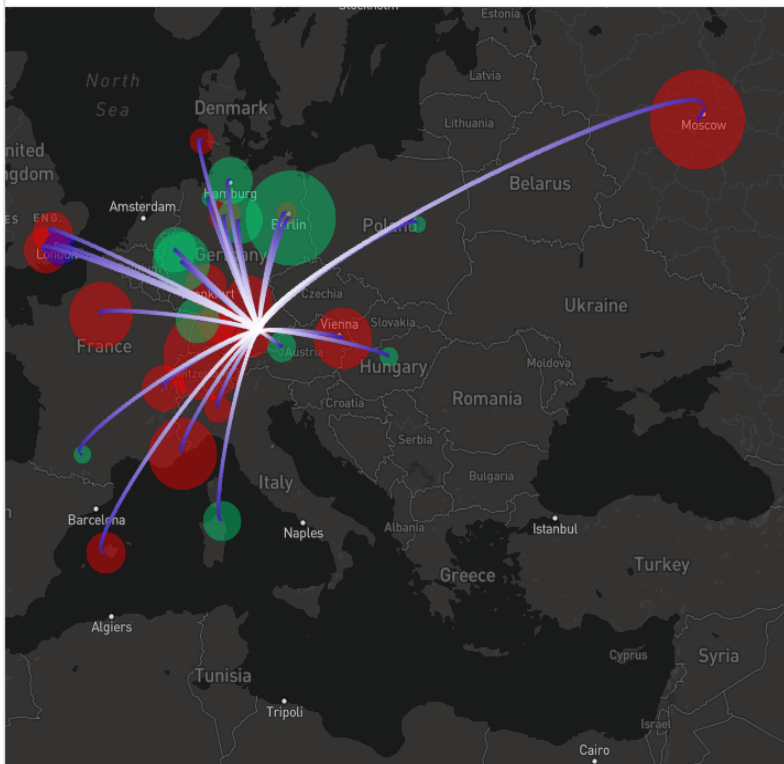
From Munich: Scheduled vs Bizav

Business aviation activity down 31%, Scheduled outbound flights down 89%.
Cologne, Hamburg, Baden-Baden; replacing scheduled. Olbia +45% vs -68%

WINGX

2020 FY

Top 30 Outbound Pairs - Business Aviation



Outbound Pairs (BizAv / Scheduled)

Airport Code	Arrival Airport	Arrival City	Arrival Country	Business Aviation		Scheduled Operation	
				Flights	YoY growth	Flights	YoY growth
EDDM-EDDB	Berlin-Schoenefeld	Berlin (DE)	Germany	219	3%	222	276%
EDDM-UUWW	Vnukovo Intl.	Moscow (RU)	Russia	210	-14%	11	-48%
EDDM-LSZH	Zurich	Zurich (CH)	Switzerland	183	-17%	1,089	-59%
EDDM-EDDK	Cologne Bonn	Cologne	Germany	146	14%	1,767	-66%
EDDM-LOWW	Vienna Intl.	Vienna (AT)	Austria	135	-7%	1,124	-58%
EDDM-EDDH	Hamburg	Hamburg (DE)	Germany	134	63%	3,023	-58%
EDDM-EDSB	Karlsruhe Baden-Ba...	Baden-Baden	Germany	121	36%		-100%
EDDM-LFMN	Nice-Côte d'Azur	Nice	France	119	-43%	342	-74%
EDDM-EDVE	Braunschweig-Wolf...	Braunschweig	Germany	117	15%		-100%
EDDM-LIEO	Olbia Costa Smeralda	Olbia (SS)	Italy	109	45%	127	-68%
EDDM-EDDL	Dusseldorf	Dusseldorf	Germany	107	5%	2,790	-61%
EDDM-LFPB	Paris-Le Bourget	Paris (FR)	France	103	-49%		
EDDM-LEPA	Palma De Mallorca	Mallorca	Spain	93	-4%	626	-77%
EDDM-EGGW	London Luton	London (GB)	United Kingdom	92	-10%	52	-83%
EDDM-EGLF	Farnborough	London (GB)	United Kingdom	88	-28%		
EDDM-EDDN	Nuremberg	Nuremberg	Germany	86	-39%	235	-80%
EDDM-LSGG	Geneva Cointrin Intl.	Geneva (CH)	Switzerland	82	-36%	532	-67%
EDDM-EDDF	Frankfurt am Main	Frankfurt am...	Germany	78	-36%	2,054	-59%
EDDM-EGKB	London Biggin Hill	London (GB)	United Kingdom	77	0%		
EDDM-EDDV	Hannover	Hannover	Germany	71	-15%	1,165	-58%
Grand Total				5,850	-21%	63,359	-68%

« < 1 2 3 4 5 6 7 > »

Rows 1-20 (789 Total)

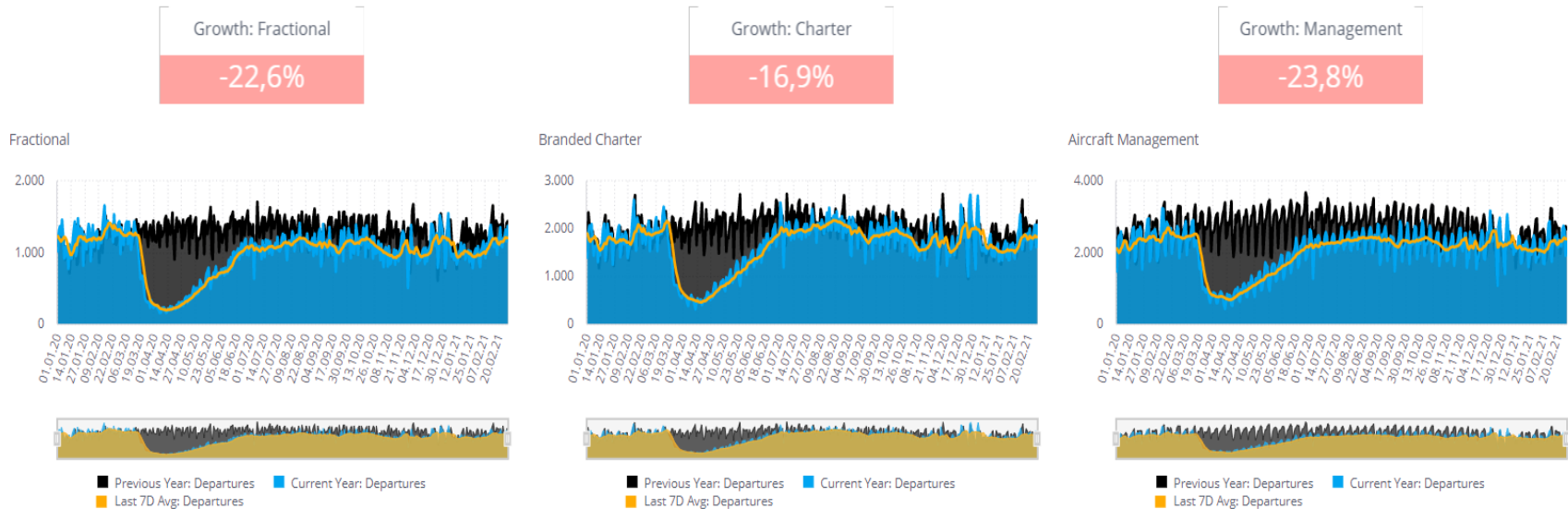
The Rise of Charter

Charter market has provided the ballast to global resilience

WINGX

2020-21 YTD
Deps

- Branded charter 17% below normal since Mar-20.
- Only -10% in 2021 (for hours: +1% in the US vs -20% in Europe!)
- Private slowest to recover, but improving -27% in 2020, -13% in 2021



Operator Type	Departures	PTD: growth (Departures)
Private	1.661.316	-27,5%
Aircraft Management	869.123	-23,8%
Branded Charter	697.605	-16,9%
Fractional	415.179	-22,6%
Hybrid / Shuttle	221.491	-11,7%
Ambulance	176.033	-3,2%

Business Jets +TP only

Source: WINGX, ATC, ADSB

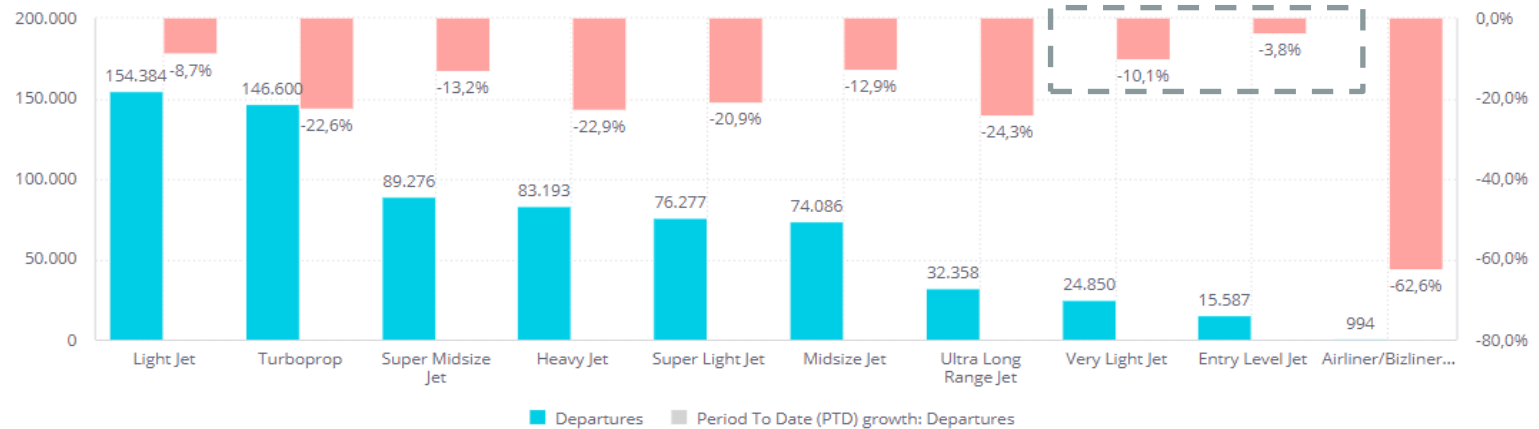
Charter trends by aircraft segment

- Globally: Midsize (CL30); Light (Phenom); Very Light Jet (Mustang, Honda)
- Growth vs pre-pandemic for Nextant, CJ3, Caravan

WINGX

2020-21 YTD
Deps

Growth Trend by Aircraft Segment



PTD Trends by Aircraft Type

Aircraft Type	Departures	Flight Hours	Period To Date (PTD) growth: Hours	Period To Date (PTD) growth: Departures
Cessna-Citation Excel / XLS	58,643	92,885	-12,4%	-19,0%
King Air 350	40,922	52,870	-14,3%	-22,1%
King Air 200	33,199	38,119	-21,6%	-25,8%
Bombardier-Challenger 300 / 350	32,908	65,322	-3,4%	-6,9%
Hawker-Hawker 700/750/800/850/900	31,987	56,279	-8,5%	-16,6%
Hawker Beechjet 400/400A /Nextant	29,269	41,695	9,2%	-4,2%
Gulfstream G300/350/400/450	25,211	59,554	-13,1%	-17,5%
Cessna-Citation X / 10	24,672	52,255	-6,3%	-12,6%
Pilatus PC-12	22,335	31,481	-19,3%	-26,7%
Cessna-Citation CJ3	22,292	34,105	3,7%	-7,3%
Cessna-560 Encore / 5 / Ultra	21,770	28,209	-6,6%	-11,6%
Learjet 60	21,481	34,472	-1,1%	-6,5%
Bombardier-Challenger 600/601/604/605/6...	19,213	38,557	-24,8%	-27,6%
Cessna 208 Caravan	18,695	17,144	-4,5%	2,2%
Cessna-Citation CJ2	18,478	24,979	-7,6%	-13,1%
Grand Total	697,605	1,141,854	-11,7%	-16,9%

Business Jets +TP only

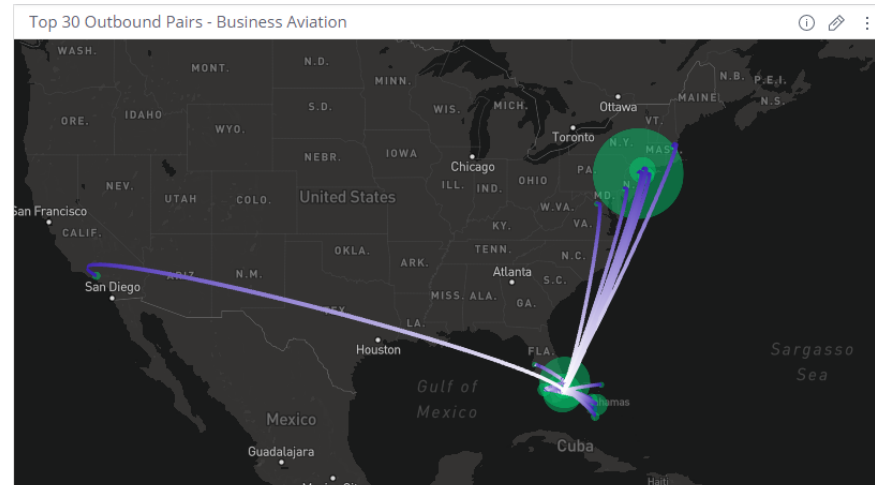
Source: WINGX, ATC, ADSB

Record breaking charter out of Florida

- Top 20 Metro hubs have seen 20% increase in Charter traffic since same 2021
- Commuter service for East Coast Wealthy and Finance Sector?

WINGX

2021 YTD
Deps



Outbound Pairs (BizAv / Scheduled)

Arrival City	Arrival Country	Business Aviation	
		Flights	YoY growth
New York	United States	1,320	32%
Miami (US-FL)	United States	689	9%
Fort Lauderdale	United States	567	21%
West Palm Beach	United States	518	34%
Tampa	United States	422	-2%
Naples (US-FL)	United States	395	53%
Orlando	United States	355	-13%
Atlanta (US-GA)	United States	255	31%
Boca Raton	United States	246	12%
Chicago	United States	234	29%
Nassau (BS)	Bahamas	222	4%
Jacksonville (US-FL)	United States	205	11%
Cleveland (US-OH)	United States	190	61%
Fort Myers	United States	183	62%
Philadelphia (US-PA)	United States	177	40%
Washington (US-DC)	United States	174	60%
Boston	United States	163	42%
Sarasota/Bradenton	United States	163	60%
Grand Total		12,658	21%

1,520 business jet charters
from Florida to New York so
far this year: 32% YOY
increase

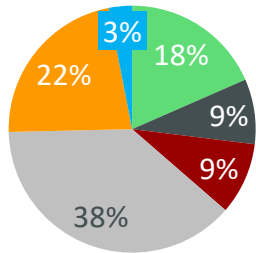
Case-Study: VLJ operator GlobeAir since

- Notable: Floating fleet; more One-Way; more direct retail, increased share

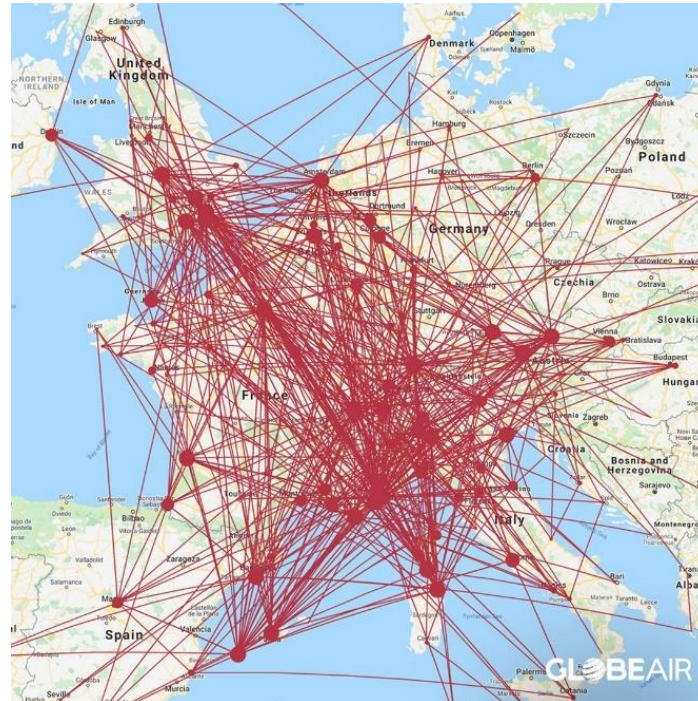
WINGX

Since Jun-20

Types of Trip



Now 50% OW



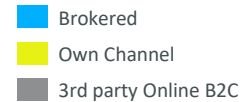
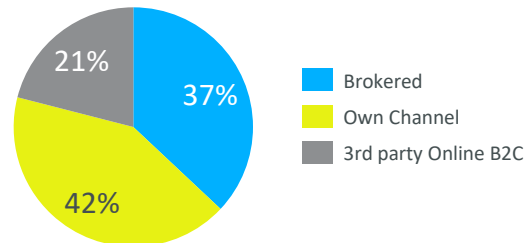
Market share
Peers:
Mustang, CJ1, P100

36,4 %

49%



Booking Channel



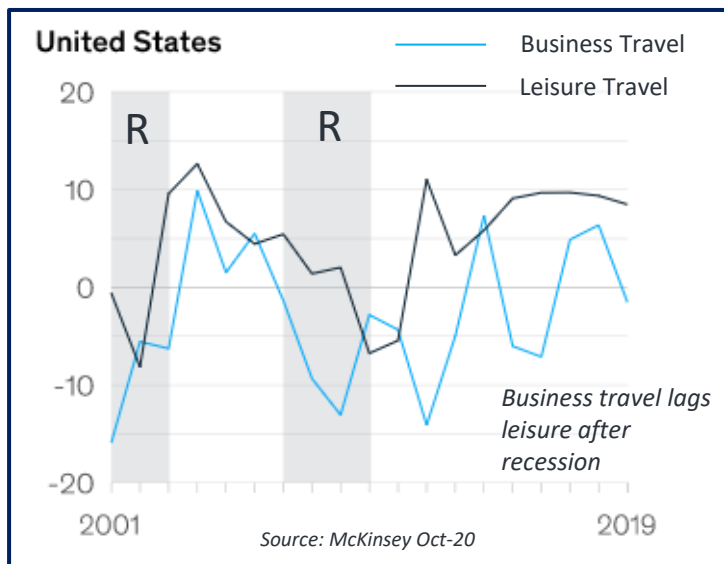
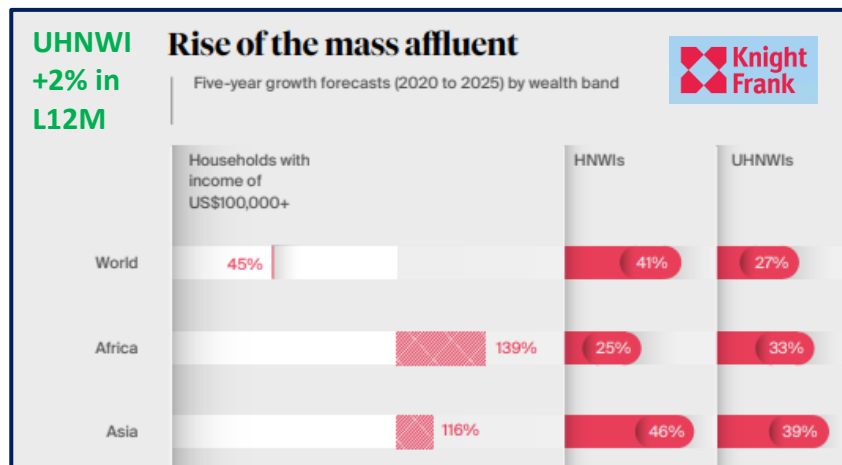
Now >50% retail

Step-back: Global Context

Bigger picture outlook for business aviation for 2021

WINGX

- Strong sentiment that economy rebounds – but doubts that business will fly any time soon



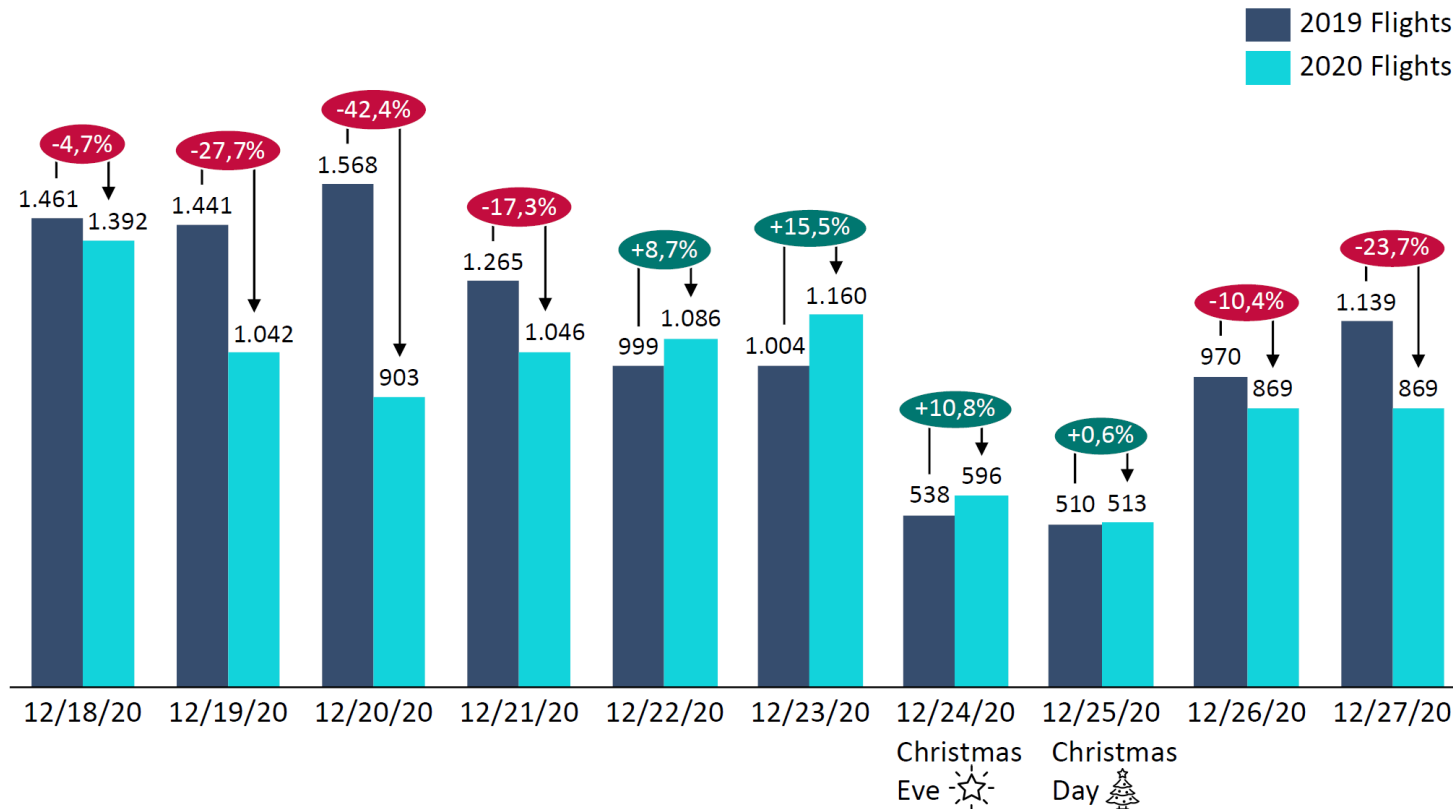
= 84% respondents; less travel ahead

Will Leisure/Lifestyle offset lack of Business traveler?

Pent-up demand to getaway? Christmas 2020 case study:

Operator Type	PTD: growth (hours)
Private	0.4%
Aircraft Management	6.0%
Branded Charter	16.1%
Fractional	2.7%
Ambulance	-26.0%
Government	11.8%
Cargo	-1.9%
Hybrid / Shuttle	5.1%
Grand Total	5.2%

**XMAS
2020**



Source: WINGX, ATC, ADSB

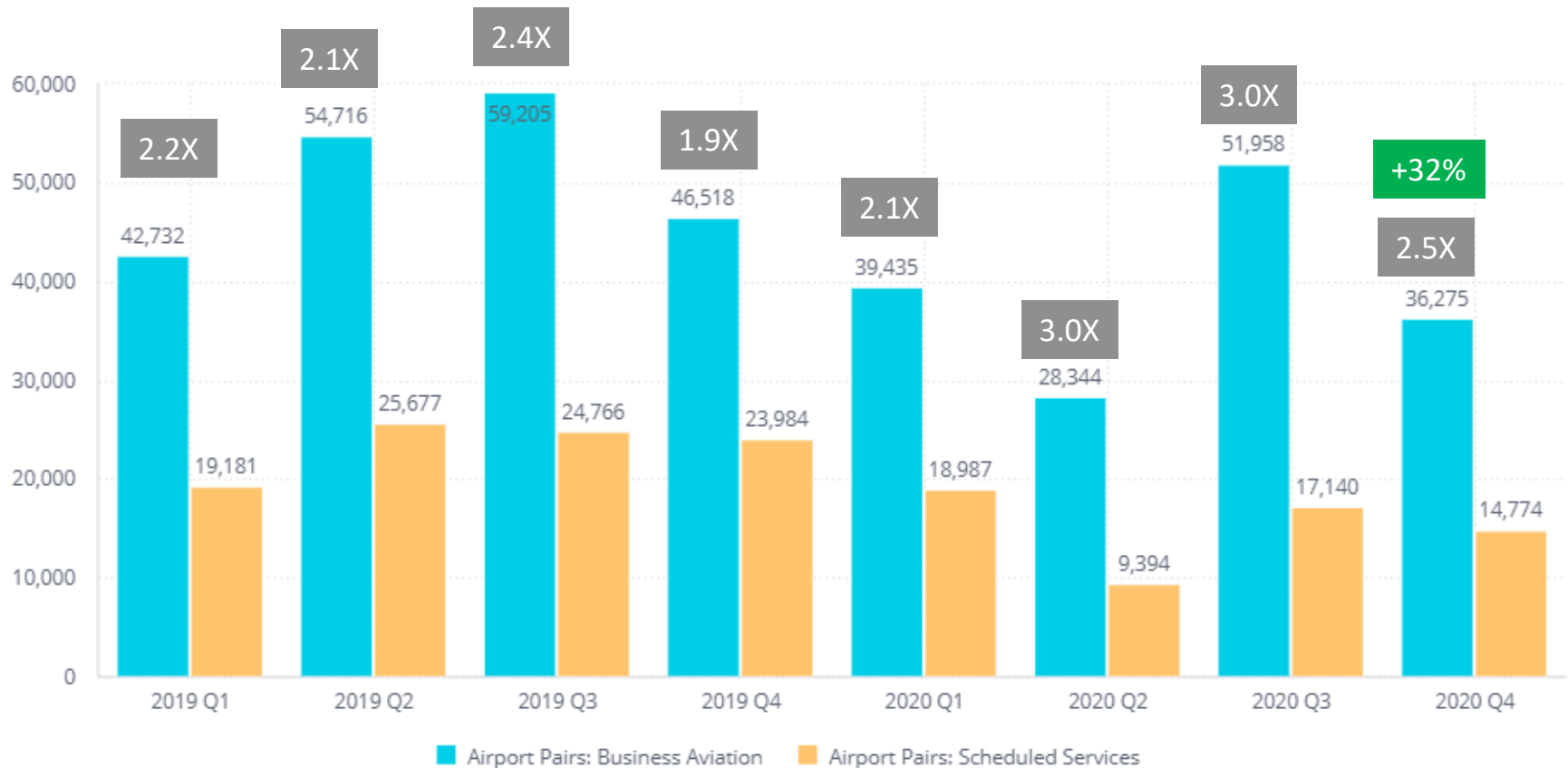
How important will Business Aviation connectivity be?

WINGX

- 40% increase in relative connectivity advantage through Spring-Summer last year
- Numerous new entrants looking to establish membership and shuttle hybrids

In Feb-20 Lufthansa Group expects capacity on offer to increase to 40 to 50 percent of 2019 levels






In August 2019, for example, a passenger on an incoming flight to Frankfurt could connect to around 35 flights within a connecting window of one to four hours; the possible connections fell to just 11 by August 2020. McKinsey & Company



Source: WINGX, ATC, ADSB






Conclusion: Cyclical recovery prospects?

- Vaccine-assisted recovery could unlock pent-up demand

KEY FACTORS	What happens?	Impact on business aviation demand
Vaccination and travel restrictions	Vaccines implemented, LD lift? But now more complicated	
Health hazard shared spaces	Flying private = Flying safe for employees and family	
Economic recession & uncertainty	Lockdown costs materialising: unemployment & confidence	
Eroded scheduled connectivity	Business aviation step up to fill essential connectivity gaps	
Wealth creation vs tax rises	K shaped recovery spurs spending for a while	

Secular changes to Business Aviation environment

- Economic recession, sustainability optics...but transformation of on-demand aviation

KEY FACTORS	What happens?	Impact on business aviation demand
De-globalisation and slower growth	Less trade less travel as inter-regional frictions add up	
Sector consolidation, new entrants	Scaled up suppliers add efficiency, access, cost	
Environmental challenges	Until jet fuel alternative, aviation could be toxic	
Changing lifestyle behaviour	Less corporate travel, but new bizav users could stick	
Rise of on-demand aviation and AAM	New paradigm blurs bizav and scheduled distinction	

- The resilience of non-scheduled aviation activity since COVID is **remarkable**
- Particularly in **big domestic** markets: US, Russia, Turkey
- In Europe: Light Jets and Props; in the US: **Light and Midsize**
- **Charter** operations strongest, especially dedicated/floating fleets
- Business aviation is clearly **supplementing eroded scheduled connections**
- **Cyclical recovery** on track, barring vaccination problems and economic blow up
- Pandemic has accelerated **secular trend benefiting on-demand** aviation sector



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