IATA

17th MAINTENANCE COST CONFERENCE

WEBINAR SERIES

Episode 2: OEMs and Supply Chain Challenges & Opportunities in the Post COVID Era

Wed. September 22, 2021
7:30-9:30am EDT

IATA

Opening Remarks

Our host today:

Chris MARKOU

Head, Operational Cost Management – IATA

markouc@iata.org

- This session is **recorded**.
- Your mic is automatically **muted**.
- Use the **Q&A feature** on the right side of your screen to submit your questions to our speakers
- **Poll:** Click on Submit once you have selected your answer
- Competition Law Guidelines

Competition Law Guidelines

Do not discuss:

- Any element of prices, including fares or service charges
- Commissions
- Allocations of customers or markets
- Marketing plans, commercial terms or any other strategic decision
- Group boycotts
- Your relations with industry stakeholders
- Any other issue aimed at influencing the independent business decisions of competitors

Next Episodes

Episode 3 – September 29

(7:30am EDT or 1:30pm in GVA or 7:30pm SIN)

- Digital Aircraft Operations

Episode 4 – October 6

(7:30am EDT or 1:30pm in GVA or 7:30pm SIN)

- Operating in the post pandemic

Visit www.iata.org/mcc to register

Agenda

- Our speakers
- IATA/RR Joint Statement and Related Best Practices
  - Rolls Royce's view
  - A walkthrough of the agreement
  - Q&A
- Annus Horribilis
  - Implications for OEMs and the Commercial Aerospace Supply Chain
  - Poll
  - Q&A

Our Speakers

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Rolls Royce's view

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A Walkthrough of the agreement

Daniel KANTER

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A Walkthrough of the IATA-Rolls Royce Joint Statement and Related Best Practices

Daniel Kanter

Assistant Director Legal Services – IATA

Background

IATA Objectives

- Enhance competition in MRO aftermarket consisting of a balanced mix of OEM and independent MROs pursuant to customer choice
- Non-discrimination principles
- Secure open environment for competition between OEMs and non-OEM parts/repairs (PMA & DER)

European Commission

- IATA asked the EC to look into aftermarket practices, generally.
- IATA received airline complaints about several OEMs
- EC selected CFM (and Honeywell) to investigate further
- The RR agreement was developed through a collaborative approach (mutually agreeable to sit down and discuss), while the CFM agreement evolved under more contentious circumstances, following IATA's formal complaint to the EC

Background

Key Dates

- 2014: IATA engages with European Commission (EC) concerning anticompetitive practices in the MRO aftermarket
- March 2016: IATA filed formal complaints against CFM and Honeywell
- March 2019: IATA-CFM settlement agreement entered into force
- July 2021: IATA-RR Best Practice document settlement agreement entered into force

IATA-CFM Settlement Agreement as a Roadmap for the MRO Industry

EC never adopted a formal decision

- Unlike a Commission decision, the private settlement agreement with CFM does not extend to other OEMs as a precedent

IATA establishing a pro-competitive framework with OEMs

- IATA-CFM agreement established a number of important pro-competitive principles for the broader MRO aftermarket
- IATA extrapolated these principles into a Code of Conduct, which we believe should apply to all engine and component OEMs
- IATA will use these principles in discussions with other OEMs to adopt similar pro-competitive policies as found in the CFM agreement

Overview of RR Agreement

Main difference with CFM agreement?

- No enforcement mechanism in case RR does not adhere to the terms of the agreement
  ⇨ No underlying formal complaint or proceedings against RR (in the CFM agreement damages provisions would be triggered in the event CFM violated the agreement)

Scope and Duration

- Covers current large civil RR engines and excludes future engine technology developments (though RR is open to amending the agreement in time for those future engine types)
- The agreement covers RR engines for an initial term of five years
  - RR and IATA will consider whether the agreement should be retained, amended, or rescinded after the initial term
- RR has also committed to a continuous review of the agreement (we will meet every quarter) and work on improvements to the joint document

Key Principles from IATA-Rolls Royce Best Practice Document (1/2)

- RR will not prevent the development of legitimate non-OEM parts or non-OEM repairs by MRO providers and independent parts manufacturers.
- RR will not prohibit the use of non-OEM parts or repairs (except for engines that are covered by risk transfer agreements).
- RR will not require any third-party MRO shop to remove non-OEM parts from any RR engine brought in for service under a RR license.
- RR will not deny warranty coverage of the OEM components and repairs on RR engines based solely on the presence of non-OEM parts or repairs.

Key Principles from IATA-Rolls Royce Best Practice Document (2/2)

- RR will sell all OEM parts, perform all parts repairs and provide technical support irrespective of the presence of non-OEM parts or repairs in the engine
- RR will provide access to engine maintenance (pursuant to Instructions for Continued Airworthiness (ICAs) and technical support to its airline customers and their approved MRO providers
- We expect to see a competitive market for Used Serviceable Material (commonly known as USM or SUM and which is currently an almost non-existent market) to be created for RR parts, resulting in a positive impact on sustainability

Thank you

Questions?

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Annus Horribilis

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AeroDynamic ADVISORY

Annus Horribilis

Implications for OEMs and the Commercial Aerospace Supply Chain

Dr. Kevin Michaels, Managing Director

22 September 2021

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annus horribilis

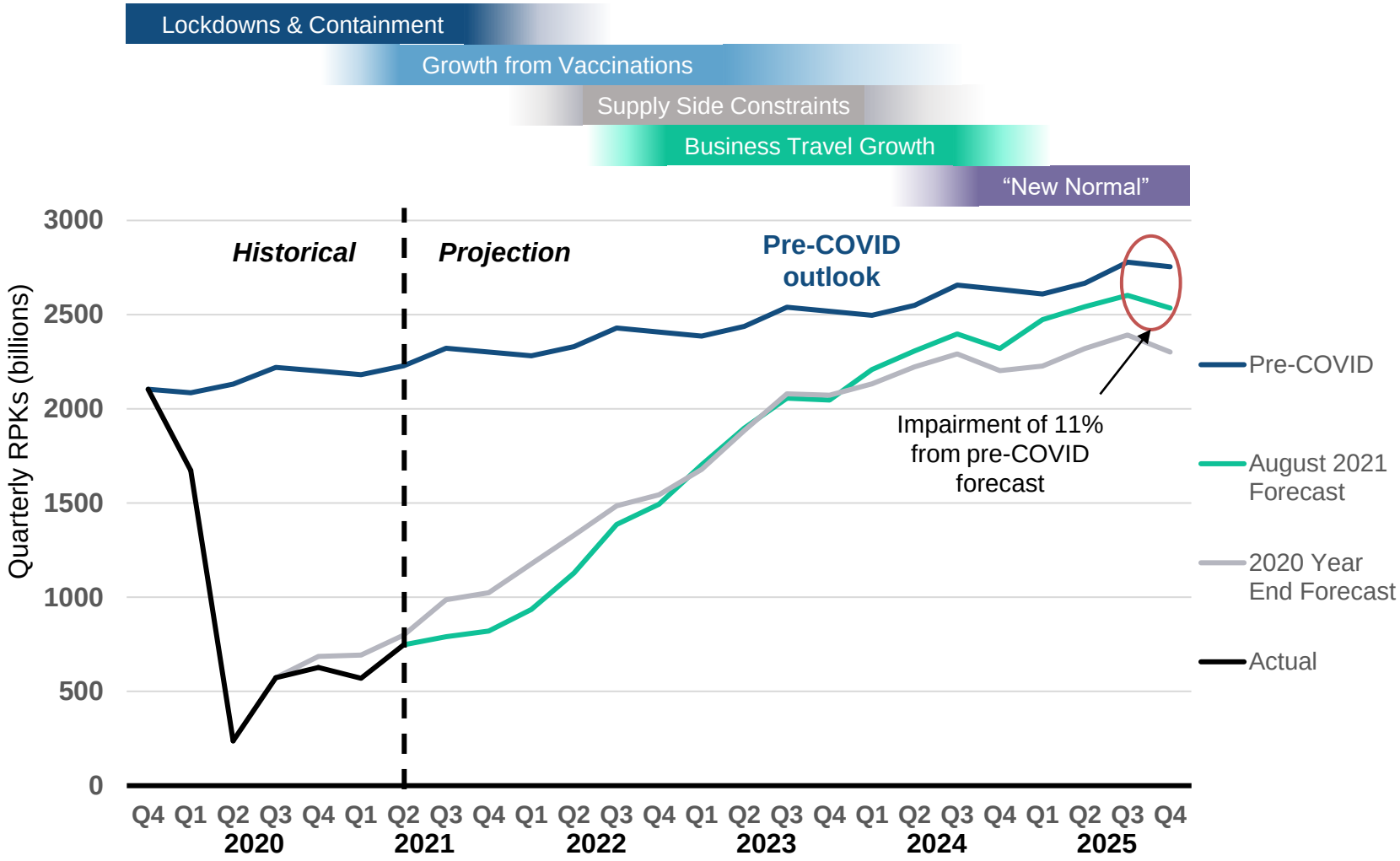
/ˌanəs hɒˈriːbɪlɪs/

noun

a year of disaster or misfortune.

AeroDynamic forecasts air travel recovery by late 2023 or early 2024

Nominal Scenario for Air Travel Recovery

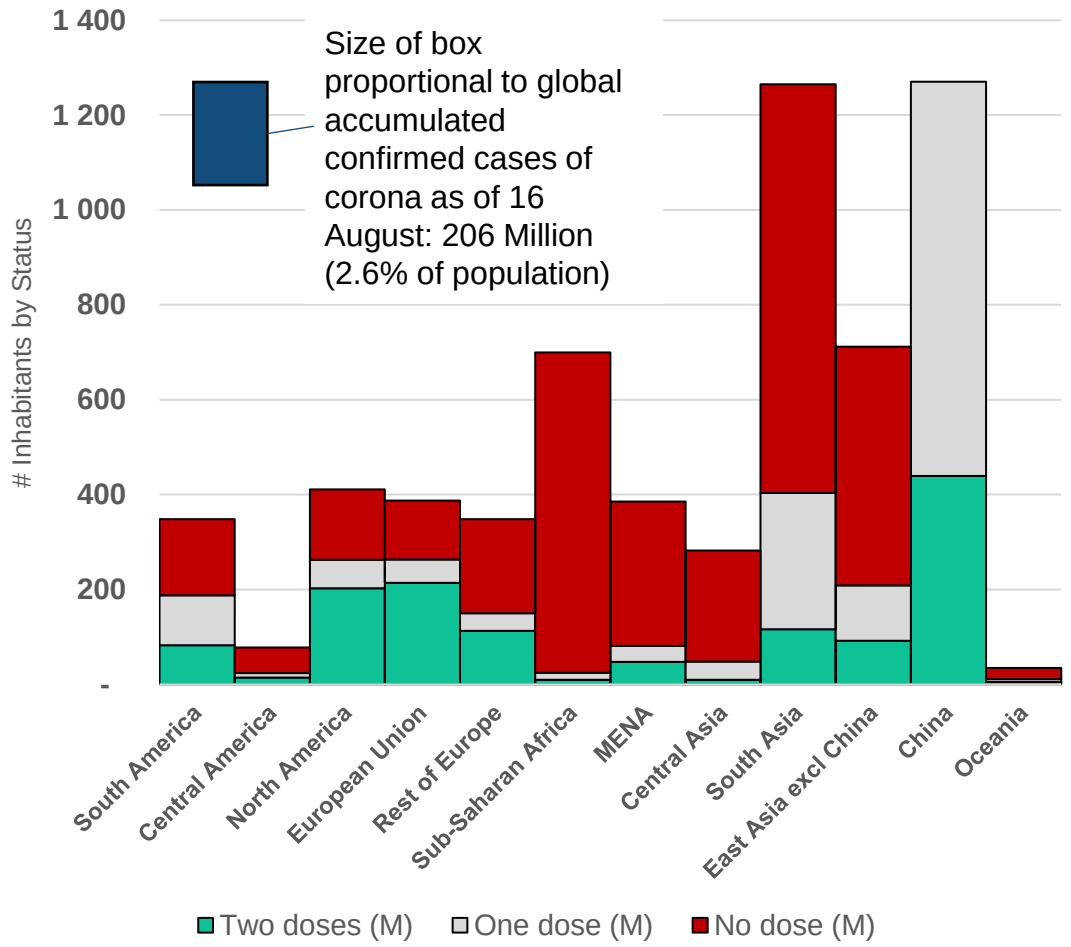


Source: AeroDynamic analysis, IATA

AeroDynamic ADVISORY

A large portion of the global population remains unvaccinated; the coming years will be a race between vaccines and new variants

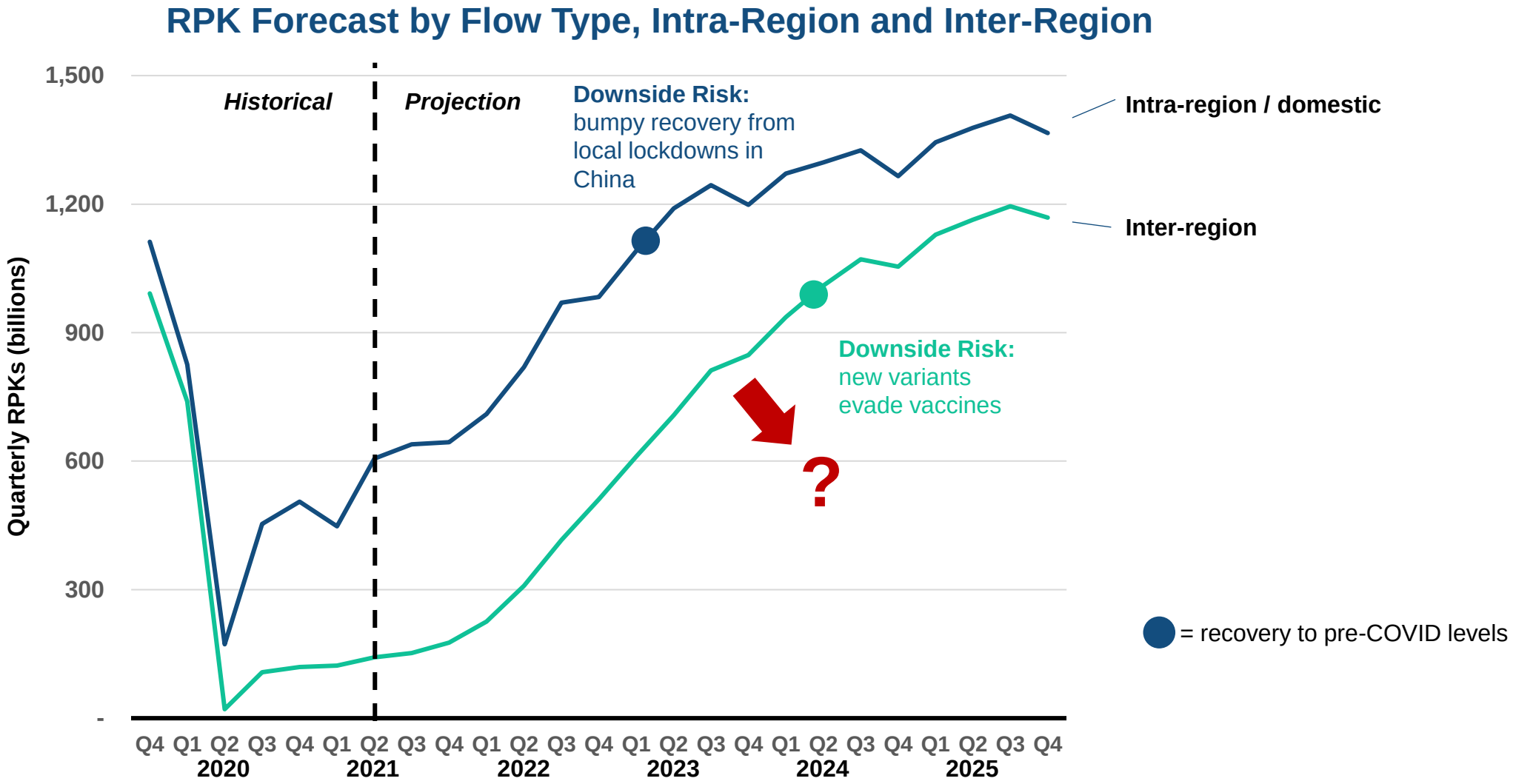
Global Adult Population and Vaccination Status*



Source: The Economist, Bernstein, AeroDynamic Advisory analysis

(*) As of 1 August 2021; calculations assume two doses required per person

The recovery of air travel will be bifurcated between intra-region and inter-region travel



Source: AeroDynamic analysis, IATA

The need for business travel – particularly customer-facing trips -- isn't going away despite warnings from thought-leaders…

"My prediction would be that over 50% of business travel and over 30% of days in the office will go away."

Bill Gates, former Microsoft CEO

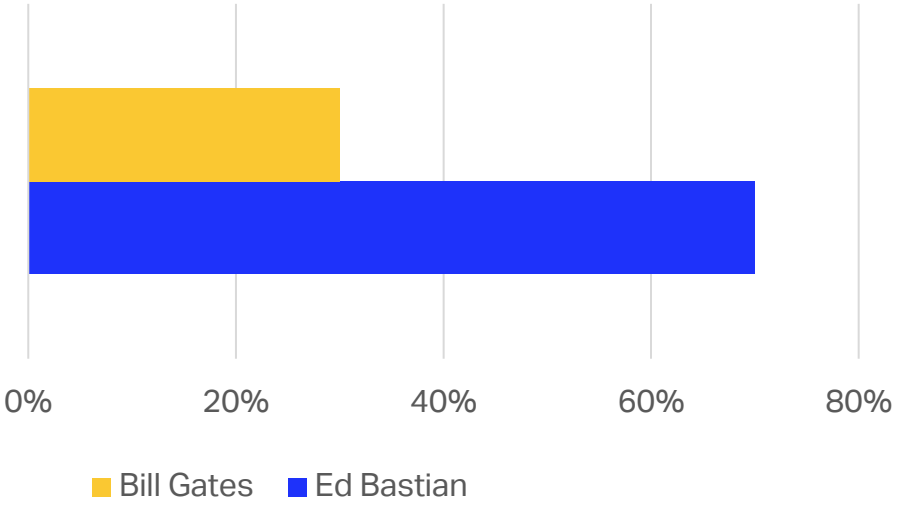
"Mr. Gates is a brilliant man, but he's not a business traveler. He hasn't been on the road in a long, long time. Business travel is done in the trenches, not sitting in the CEO suites."

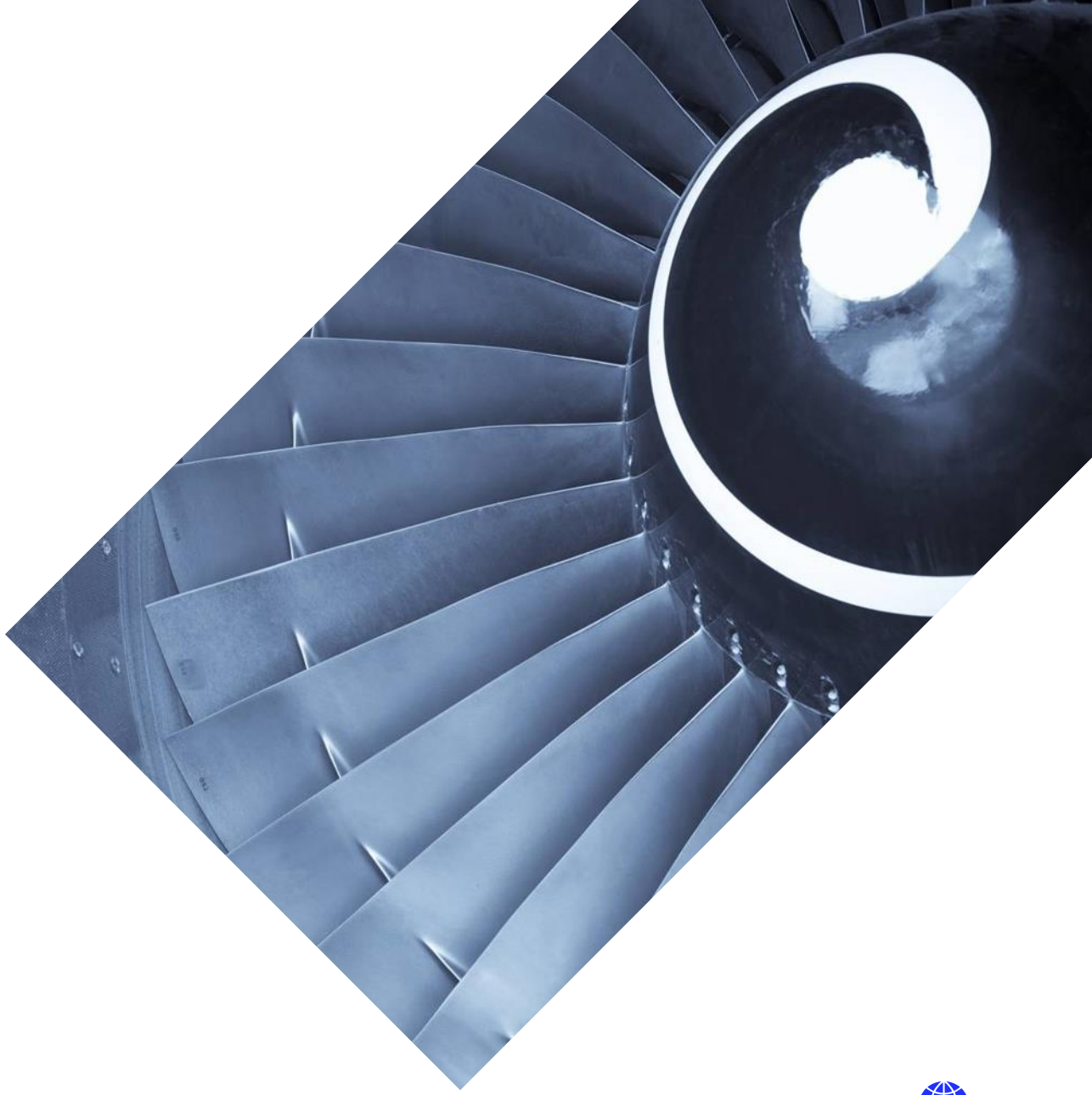
Ed Bastian, Delta Air Lines CEO

Sources: CNBC – 17 November 2020 interview with Gates; AWST – 7-20 December 2020 interview with Bastian

Poll Results

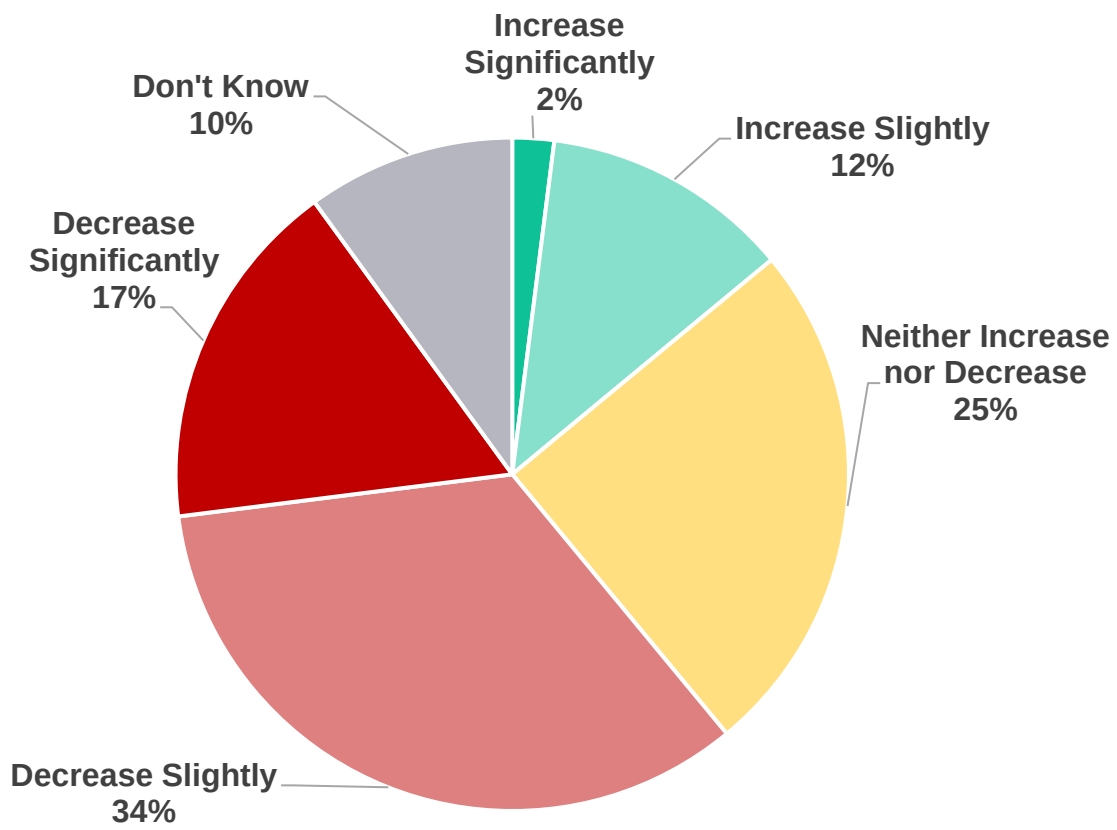
Who is right about the future of business travel?





…however, most companies expect travel budgets to shrink post-COVID

GBTA Poll: Change In Future Travel & Expense Budgets

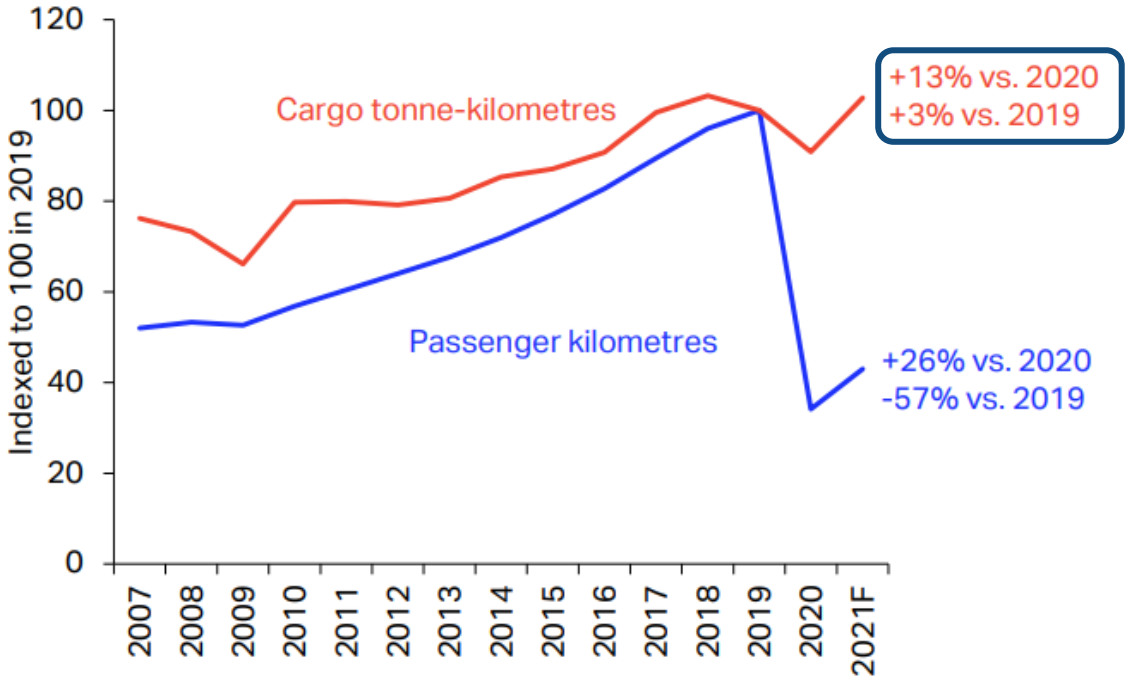


- Over 50% of participants in a GBTA poll expect a decrease in T&E budgets
- Intra-company travel is likely to suffer the most, while customer-facing travel should recover rapidly
- Fewer premium fare passengers means more pressure to downgauge on international flights

Source: Global Business Travel Association - Coronavirus Poll

Air cargo is a bright spot in aviation and is poised to accelerate

Global passenger-Kms (RPKs) and cargo ton-Kms (CTK) flown



› The COVID-19 pandemic led to an explosion of ecommerce and changes to supply chains which favor air cargo

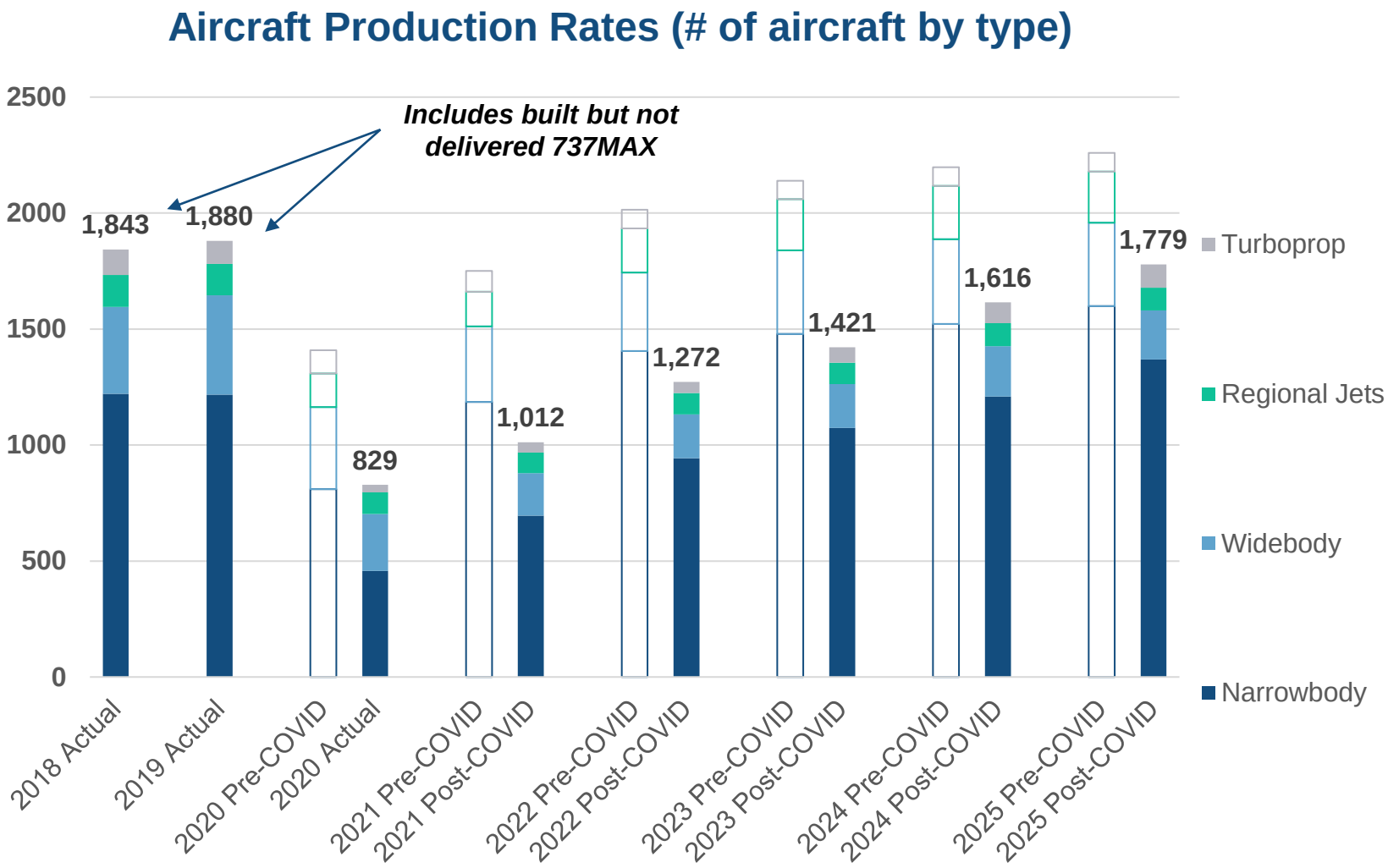
Air cargo activity recovered to pre-COVID levels by late 2020

The 2,000+ freight aircraft fleet is operating at 10-20% higher levels of utilization than before the crisis

Air cargo accounted for ~30% of airline revenue in 2020…up from 12% in 2019

Sources: IATA, Logistics Capital & Strategy

Aircraft production over the five-year period is down more than 30% in the revised post-COVID forecast

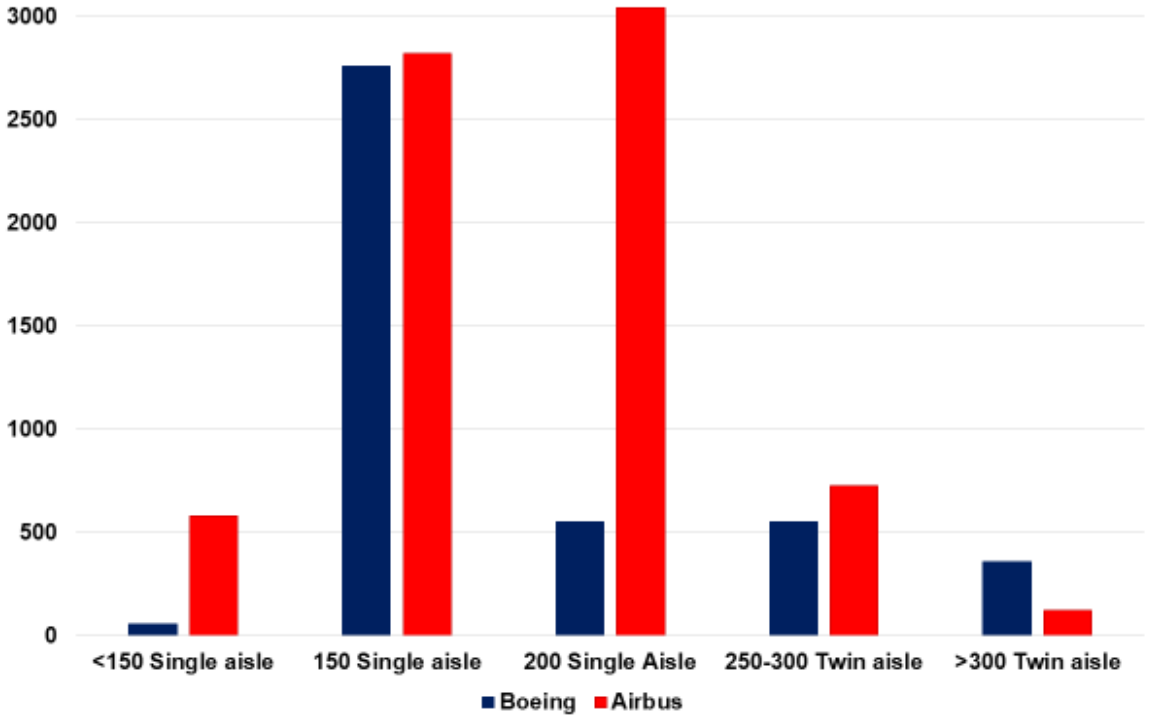


- The share of single aisle production will increase from 65% to 76%
- Conversely, the share of twin-aisle aircraft will decline
  - Over-production in 2010s
  - Less business travel
  - Slow international travel recovery
  - A321neo and XLR

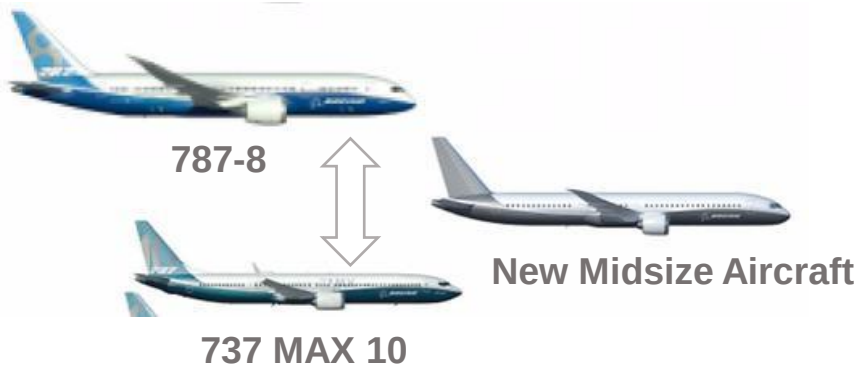
Source: AeroDynamic Advisory, CAPA

Boeing needs to launch a smaller version of the NMA as soon as possible

Airbus & Boeing Backlogs*



* with ASC 606, per The Teal Group, November 2020



- The A321neo's advantage in 200+ seats will reshape the duopoly if Boeing does not respond
- The post COVID world will require a smaller version of the NMA; a 200 – 250 seat aircraft (perhaps a single aisle) would be ideal
- CFM is suggesting that Boeing wait until 2035 to respond so that it can leverage its proposed RISE open rotor

Source: The Teal Group; AeroDynamic analysis

The service record of the C919 in the first few years will be crucial in shaping China's aviation strategy…

› The C919 will likely receive CAAC authorization and enter service later this year

› As a new aircraft from a new OEM, it is unlikely that the C919 can achieve 98%+ dispatch reliability and acceptable customer support

› The service record of the C919 in the first few years will be crucial in shaping China's aviation strategy…and dependence on Airbus and Boeing

The Sukhoi Superjet - a useful reminder of the importance of dispatch reliability and customer support

Source: AeroDynamic Advisory

After years of more vertical integration, OEMs are deleveraging…

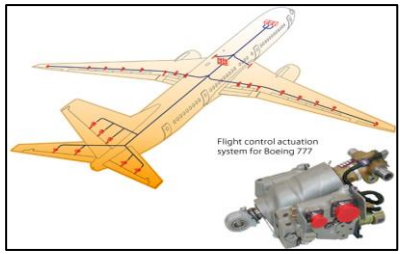
OEM Deleveraging

Airbus terminated plans to vertically integrate on the A320neo/GTF nacelle

Rolls-Royce to sell assets, including ITP Aero, to raise at least $2.6 billion

Bombardier sold Short Brothers to Spirit AeroSystems

Boeing Vertical Integration



Flight Controls & Actuation

Avionics

APUs

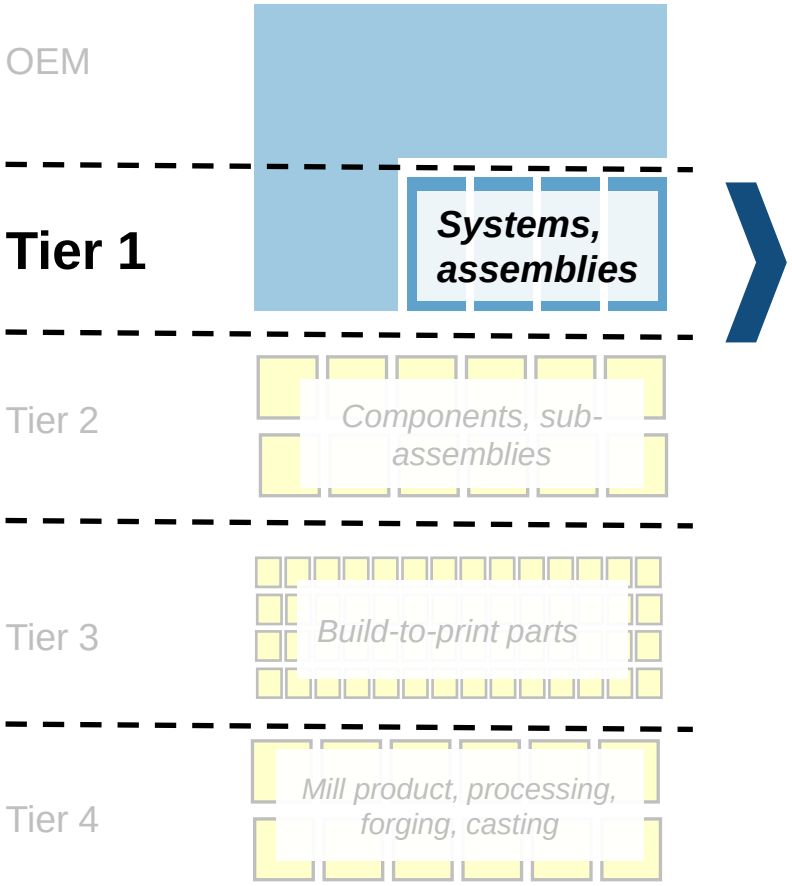
Propulsion Systems

Aerostructures

Interiors

Source: AeroDynamic Advisory

Tier 1 suppliers will restructure, “right size,” and engage in M&A



› Like OEMs, Tier 1s will purge under-performing or non-core assets

› Avionics and systems suppliers are the least vulnerable given their market diversification and aftermarket exposure

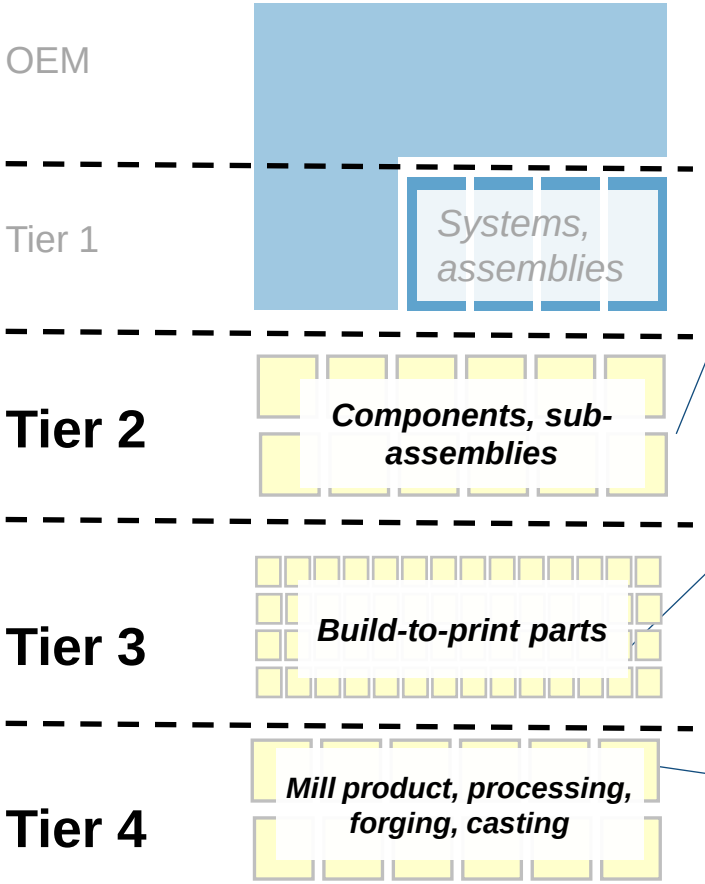
› Aerostructures and interiors suppliers are experiencing financial distress and will “right size”

› Cash-rich Tier 1s and holding companies as well as private equity will be active in M&A; some may need to rescue failing but critical suppliers

› The blind pursuit of scale without synergies will ebb

Source: AeroDynamic Advisory

The outlook for sub-tier suppliers varies considerably; Tier 3s will suffer the most



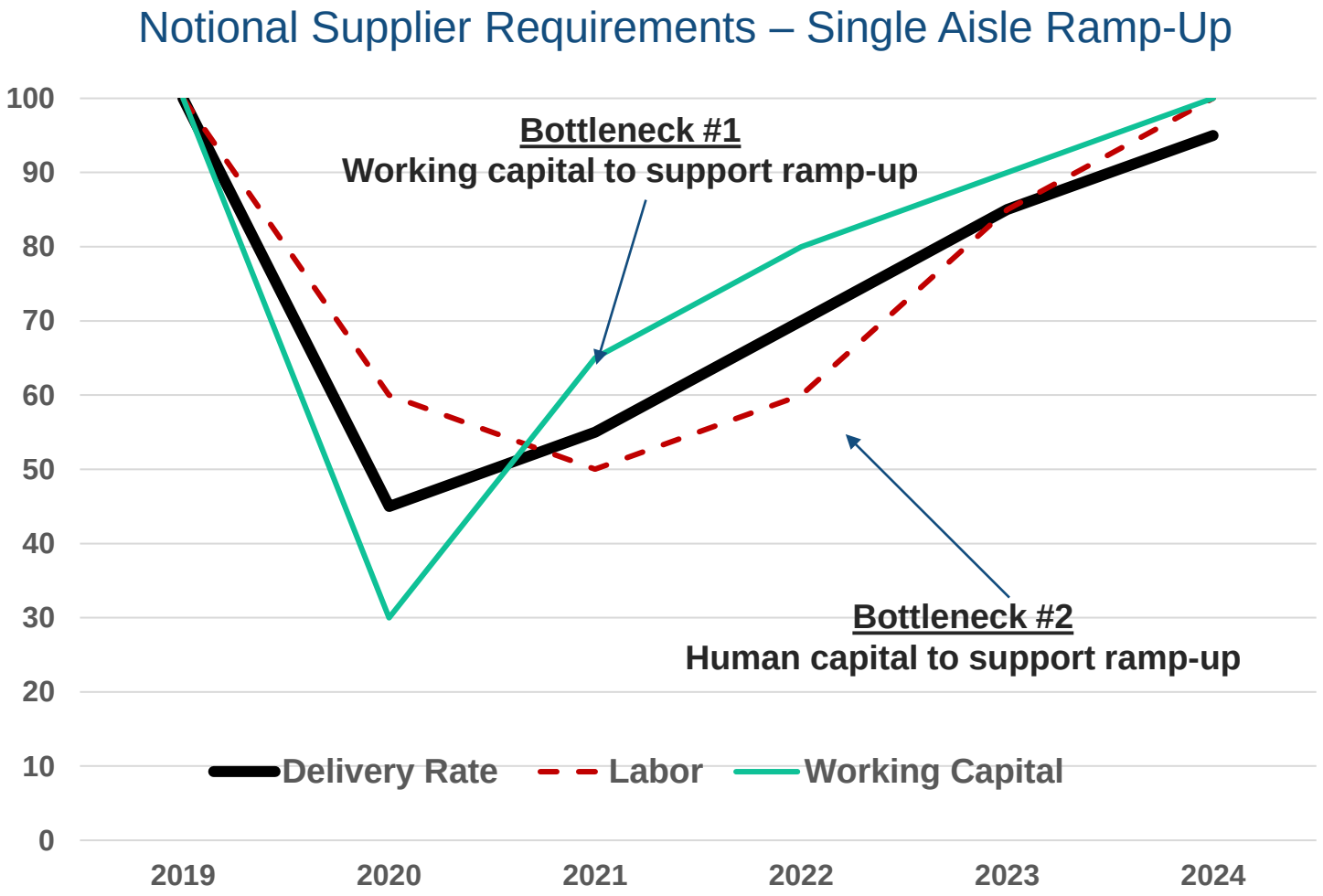
- Some attrition, particularly in aerostructures and interiors
- Targeted acquisitions by Tier 1s, holding companies and private equity

- Significant attrition or restructuring expected – especially in aerostructures and general machining
- Diversified suppliers serving the defense, BGA, or non-aerospace customers are best positioned
- Government aid programs will influence degree of attrition in each country

- Suffering from “whipsaw” effect – destocking + reduced volumes
- No significant attrition expected - most raw material mills large and diversified; raw material prices are resilient

Source: AeroDynamic Advisory

…however, the working capital and human capital requirements of a production recovery will lead to more failures



› The working capital with many small suppliers is depleted; many survived through government funding and burn-down of WIP

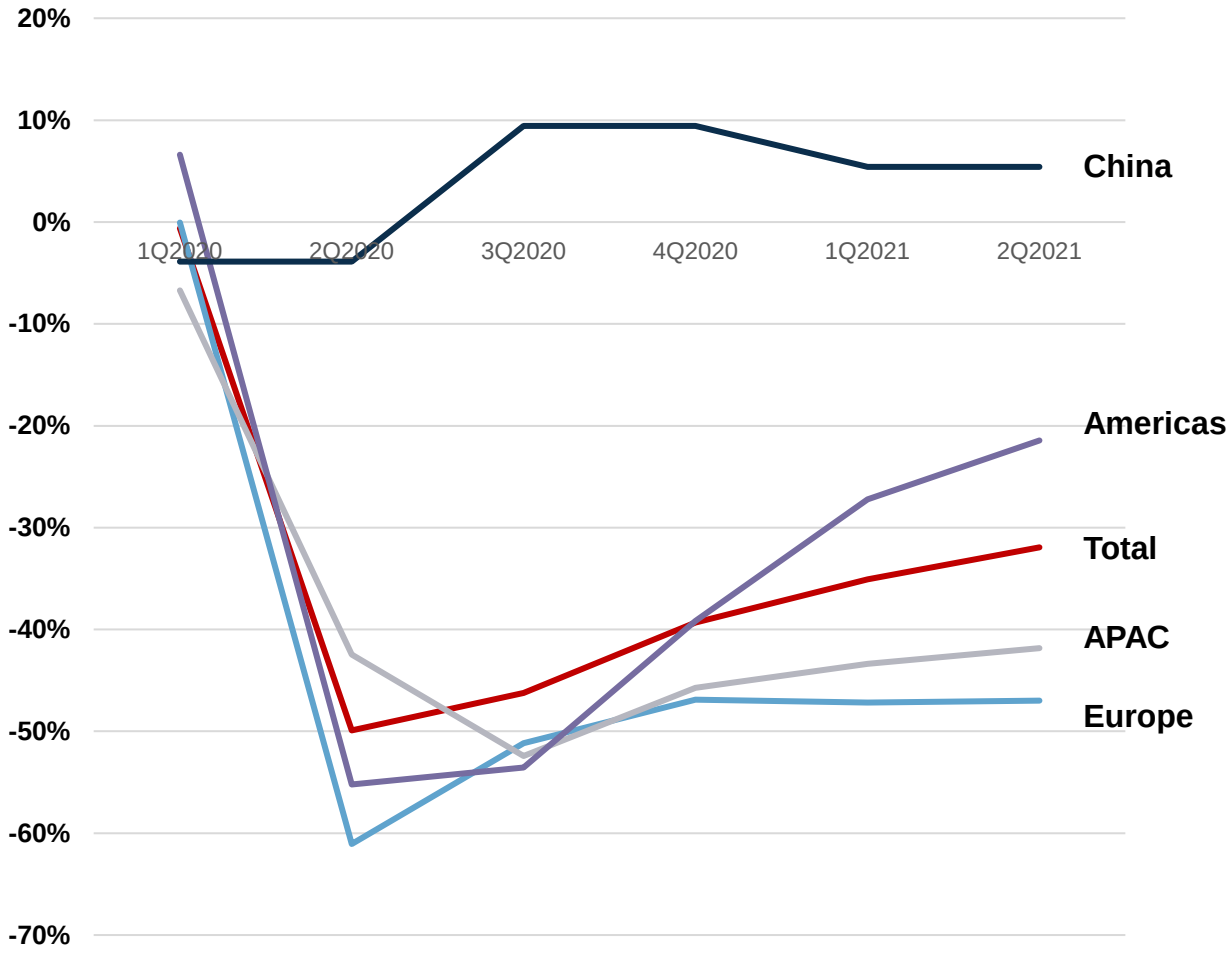
› Supporting a ramp-up will require non-existent working capital

› Human capital is another bottleneck; can they bring back skilled employees after deep cut-backs?

Source: AeroDynamic Advisory

MRO spending remained resilient in China and nearly recovered in the US…elsewhere it remained well below pre-COVID levels

Quarterly Airline MRO Expenditures* By Region



(*) Versus same quarter 2019, 44 airlines covered

- Global MRO spending remains >30% below pre-COVID levels
- China and the US are the most resilient MRO markets
- Europe and APAC remain well below pre-COVID spending levels

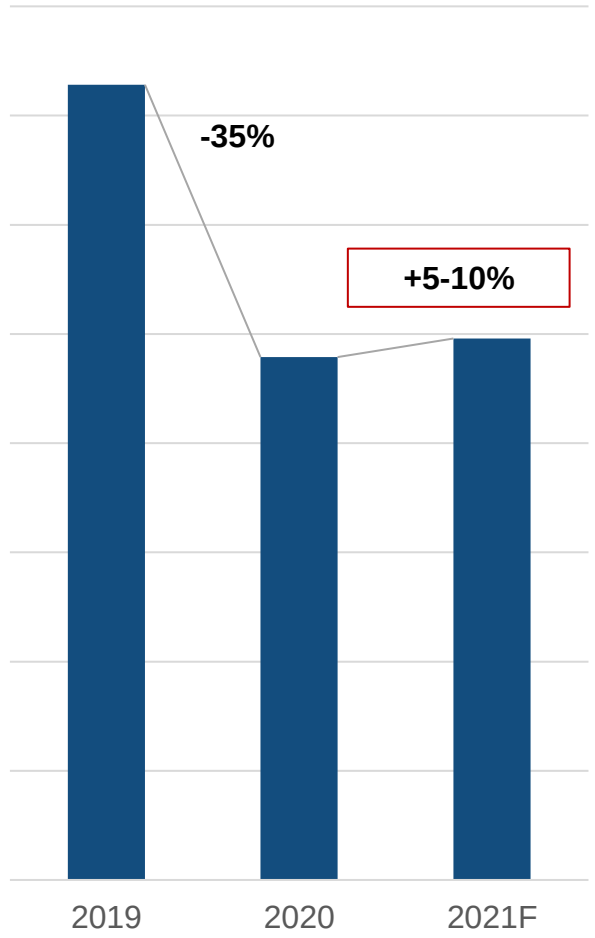
Source: Airline financials, AeroDynamic Advisory analysis

Airline MRO expenditures will remain subdued in 2021

MRO Outlook for Second Half of 2021 (Trajectory Versus Similar Quarter 2019)

Region	Q3	Q4	Commentary
China	↘	↗	• August outbreaks impacted airline utilization. Capacity could come back in Q4, but road is bumpy
APAC	→	→	• Little improvement in utilization expected due to high case loads
Americas	↗	→	• Close-to-full domestic capacity towards summer • However, outbreaks of Delta variant in August meant fewer-than-expected paying passengers. • No meaningful growth expected in winter MRO activity beyond typical peak
Europe	↗	→	• A few airlines may embark on ambitious preparations for next summer, but most will need to manage costs carefully

2019-2021F Airline MRO Expenditures



Source: AeroDynamic Advisory

A dynamic time awaits the MRO sector on multiple fronts

COVID Recovery – Implications for MRO

OEMs

- Aircraft OEMs revising aftermarket goals and narrowing offerings, including broad support
- Component OEMs to position offerings to a more price-sensitive customer, including USM
- Engine OEMs need to watch supply chain to handle coming ramp-up. Need to carefully manage their supply chain to prepare for the ramp-up

MROs

- Integrators prepare for more flexible contracting
- Independents poised to a period of growth - well-positioned to support the freighter fleet
- Must cope with human capital constraints, preparing for ramp-up
- MRO consolidation (incl partial sell-off of Lufthansa Technik?)

USM Suppliers*

- $2 Billion pre-COVID, growing to $4.5 Billion in a few years
- A320ceo, 737NG, A330, 777 key platforms
- Will impact airline sourcing, OEM aftermarket revenue streams and become central in most support contracts

Airline Challenges

- Typical airline staff reductions 25-30% across the board
- Challenge to get talent to return
- Smaller engineering & purchasing departments
- Airlines more dependent on suppliers
- Still, strict cost regime expected
- Consolidation on the way and some airlines recapitalizing

Passenger-to-Freighter Conversions

- Structural trends favoring long-term cargo growth
- Cargo important piece of airlines' revenue mix
- Majority of supply of freighters to come from PTF conversions
- Significant ramp-up in PTF conversion capacity
- Over-supply mid-decade?

Source: AeroDynamic Advisory

(*) Used Serviceable Material)

In 2021, AeroDynamic completed its third annual OEM aftermarket customer satisfaction survey, with CFM receiving the top score

185 Survey Responses

21 Suppliers Measured

Highest 2020 Overall Satisfaction Scores

	Aircraft OEMs	Engine OEMs	Mech/Elec Suppliers	Avionics Suppliers
Highest Overall Score	7.3 AIRBUS	7.5 CFM	7.0 Parker	7.0 BAE SYSTEMS

Top Score

7.5

CFM International

Metrics Measured

- Ease of Doing Business
- Product Reliability
- Technical Support
- Parts Cost
- Parts Availability
- AOG Support
- OEM Repair Cost
- OEM Service Center Performance
- Overall Satisfaction
- Net Promoter Score

Partners

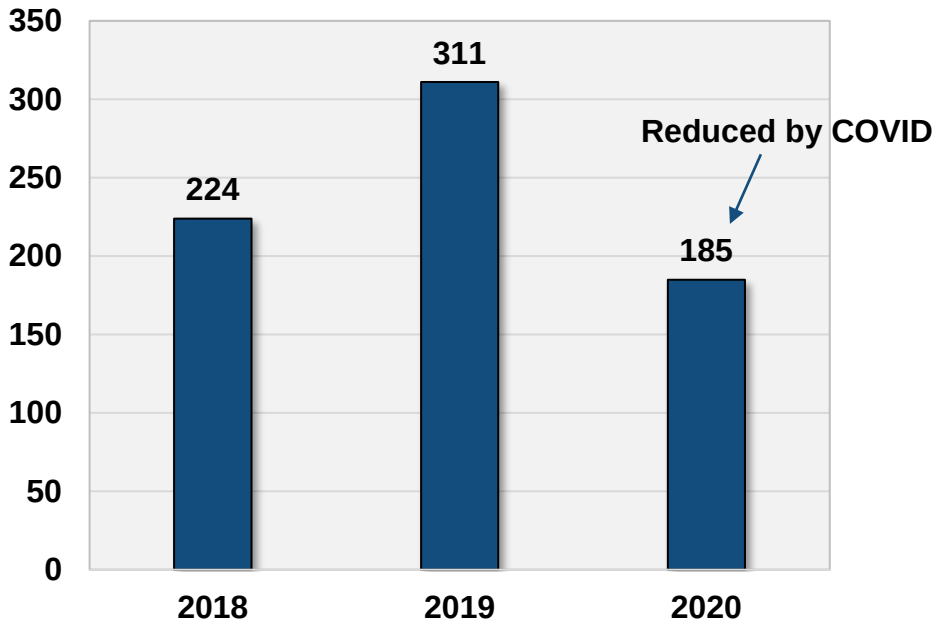
AeroDynamic ADVISORY

AVIATION WEEK NETWORK

ATW AIR TRANSPORT WORLD

In January 2022, we will conduct our fourth annual airline customer satisfaction survey and encourage you to participate

Annual Participation (# of Participants)



2021 not conducted due to COVID-19 impact

Time Period Next Survey **January – February 2022**

Target Audience **All commercial airline operators**

OEMs Being Measured

- Aircraft OEMs
- Engine OEMs
- Mechanical / Electrical suppliers
- Avionics Suppliers
- Interiors & IFE Suppliers
- Nacelle & Thrust Reverser Suppliers

Metrics

- **Ease of Doing Business**
- **Product Reliability**
- **Technical Support**
- **Parts Cost**
- **Parts Availability**
- **AOG Support**
- **OEM Repair Cost**
- **OEM Service Center Performance**
- **Overall Satisfaction**
- **Likelihood to Recommend to a Peer or Colleague**

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AeroDynamic
2019 Winner
Choice Outstanding
Academic Title Award

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Thank You!

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Useful links

- IATA/RR Agreement
  www.iata.org/mctg/#tab-4
- Maintenance Cost Technical Group
  www.iata.org/mctg
- Technical Operations Working Group
  www.iata.org/tog
- Safely Restarting the Aviation Industry

Thank you!

For more information on MCC 2021, please visit www.iata.org/mcc

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