Aviation

COVID-19: Fleet outlook and impact on lessors and MROs

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Contents

Foreword

From traffic demand to fleet requirements to maintenance, repair, and overhaul (MRO) demand, the COVID-19 pandemic is having a profound impact on the aviation industry.

Key takeaways:

- We expect the world's fleet to recover to pre-COVID-19 levels by 2024.
- We expect new aircraft deliveries to shrink by ~3,400 aircraft over the next five years.
- Airlines are managing the reduction in traffic through aircraft deferrals and retirements.
- Europe, Asia, and the Middle East are likely to see accelerated consolidation and rationalization in the number of airlines and fleet per carrier.
- The COVID-19 pandemic will result in fewer independent lessors and more control by global financial institutions.
- We expect the share of engines covered by original equipment manufacturer agreements to increase over time.
- Low-cost regions will be at a significant advantage in the short term as cost becomes even more critical in the MRO buying decision and as slot availability is no longer an issue.
- There will be a challenge to the flight-hour contract concept as airlines look to stay away from minimum flight-hour guarantees due to uncertainty around demand.
- The increase in retirements of older passenger aircraft will boost several freighter programs.

Introduction

In 2020, global GDP growth—dampened by reduced international trade resulting from the U.S./China trade war, curtailed by the severe impact of the COVID-19 pandemic on world economies—is expected to contract by around 5%. According to the International Air Transport Association, 2020 will be the worst year in history for member airlines. Net losses are forecast at $84.3 billion, and we expect this to continue through 2021.

Until 2022, when we expect the effects of the COVID-19 pandemic will abate, commercial air travel recovery will begin with domestic traffic, followed by intra-regional services and, finally, long-haul flights. Regional jets and narrow-body aircraft typically operate the first two areas; long-haul markets, the last to fully recover, are served by large twin-aisle aircraft. Thus, the pandemic should affect the single-aisle market less than the wide-body sector, which had already been softening due to oversupply and encroaching new long-haul narrow-body aircraft, such as the Airbus A321XLR.

The change in traffic demand will influence fleet size and aircraft platforms over the next three to five years. This change will have significant implications for everyone in the commercial aviation sector.

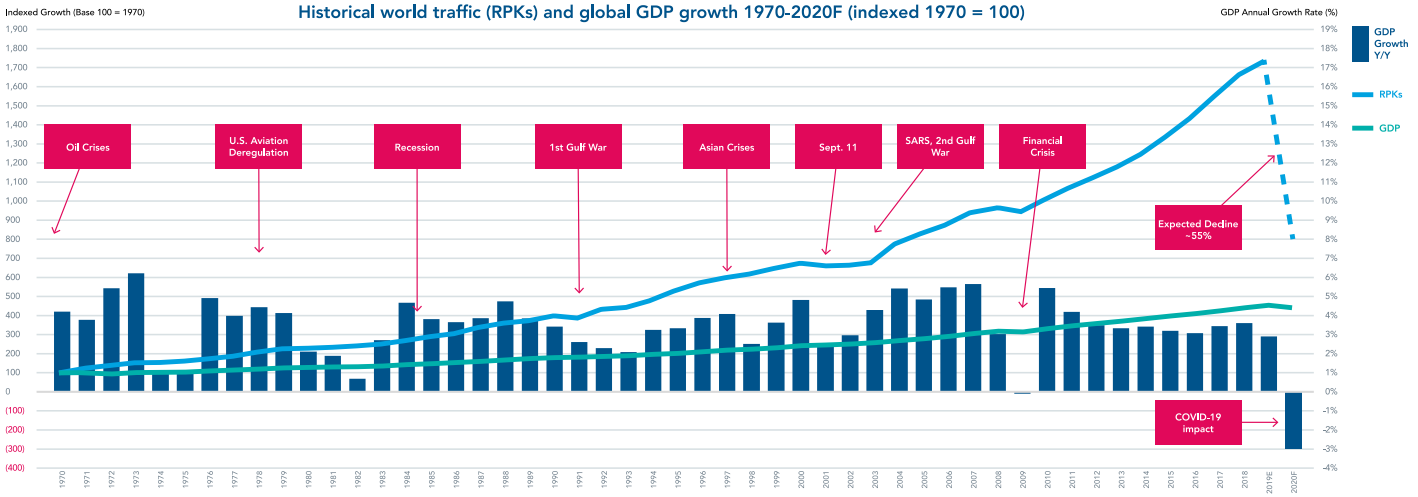
This report illustrates how a decrease in aviation traffic will translate into reduced aircraft fleet—and the implications of this reduction for the MRO industry over the short- and medium-term.

Traffic demand

The aviation industry has faced many crises in the past with resiliency (see Figure 1).

Figure 1: The resilience of the aviation industry to shocks

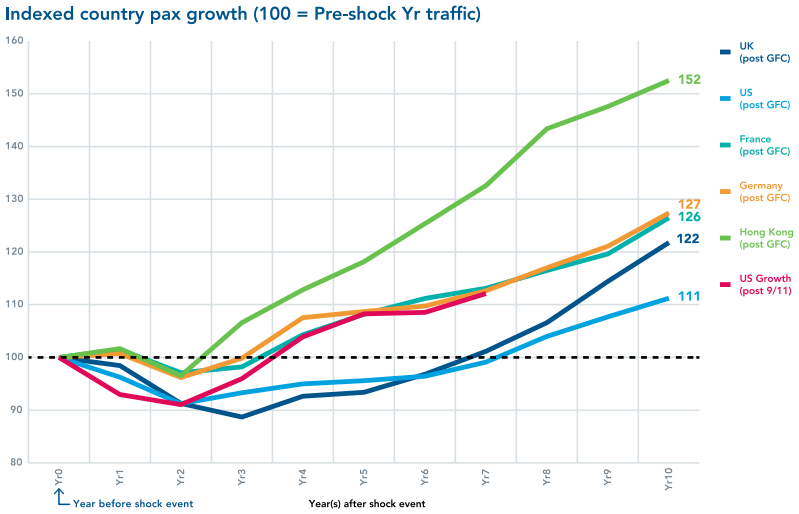
Source: IMF, IATA



After the Global Financial Crisis (GFC) of 2008, the U.S. and U.K. markets spent over six years recovering to pre-GFC traffic levels. The Asia-Pacific (APAC) market recovered much more quickly (see Figure 2.)

Figure 2: GFC recovery time by market

Source: ACI, T100, CAPA



Case study	Depth of pax traffic shock (vs. Yr 0)	Recovery time to Yr 0 pax travel levels
UK (post GFC)	-11.3%	~6 years
US (post GFC)	-8.7%	~6 years
France (post GFC)	-2.9%	~2 years
Germany (post GFC)	-3.8%	~2 Years
Hong Kong (post GFC)	-3.5%	~2 Years
US Growth (post 9/11)	-8.9%	~2 Years

However, the COVID-19 pandemic differs vastly from previous shocks—including the GFC— because the impact is global and has led to supply-side constraints and behavioral changes. (see Table 1).

Table 1: Factors differentiating the COVID-19 crisis from the GFC

Factors	Commentary
Severe global impact	■ Aviation activity has shut down on a global level.
Economic recession	■ The economic impact is expected to be much greater than in 2008, with the IMF expecting global GDP to contract 3% in 2020.
No China this time	■ Global air traffic's resilience in 2008 was thanks to China's strong growth engine, which accounted for significant traffic growth on its own, supported commodity exports in emerging markets, and afforded an abundance of cheap credit in advanced economies.
Supply-side constraints	■ The unprecedented demand drop in 2019 and 2020 is causing aircraft order cancellations and retirements unlike anything in past recessions, and is already forcing airlines into bankruptcy or liquidation, resulting in less excess capacity during the recovery.
Behavioral change	■ Past recessions have led to a loss in business-related traffic. The 2001 recession led to a loss of short-haul business traffic in the United States, and the 2008 recession led to a downgauge of business travel from premium to economy classes. Will 2020 be remembered as the year videoconferencing finally took off, permanently displacing some business travel?

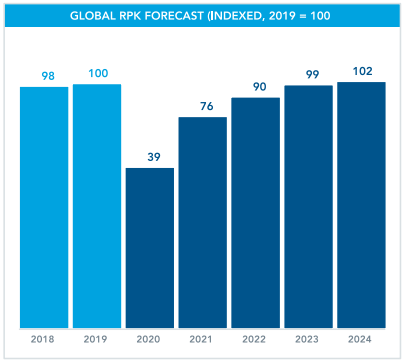
According to ICF's traffic forecast, it will take the aviation industry three to five years to recover to pre-COVID-19 traffic levels.

As noted earlier, we expect domestic/intra-regional traffic to recover faster than international long-haul traffic. Not all regions will recover at the same rate. We expect China and Asia-Pacific regions to recover the fastest. ICF expects the impact of COVID-19 to last the longest for Latin America and Africa (see Figure 3, Figure 4, Figure 5).

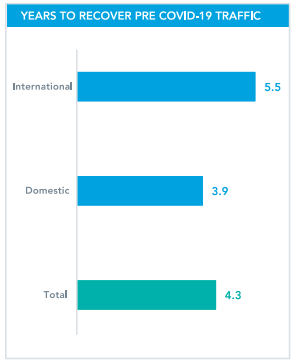
Figure 3: Global traffic recovery outlook

Source: ICF analysis

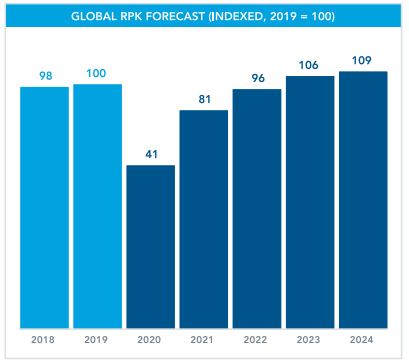
Base Case



Base Case



Optimistic Case



Optimistic Case

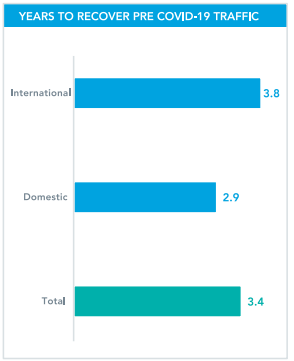


Figure 4: Domestic traffic recovery outlook

Source: ICF analysis

Base Case

Optimistic Case

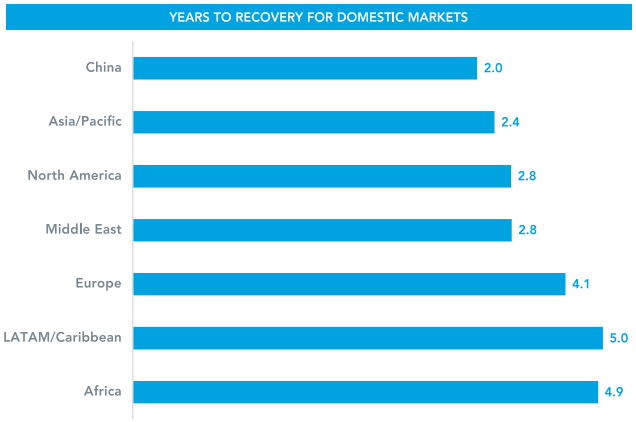


Figure 5: International traffic recovery outlook

Source: ICF analysis

Base Case

Optimistic Case

Fleet outlook

Retirements

Historically, traffic downturns have triggered accelerated retirements by operators and OEM production rate adjustments. Some operators place excess-capacity aircraft in storage; a portion of this aircraft is eventually withdrawn from service permanently.

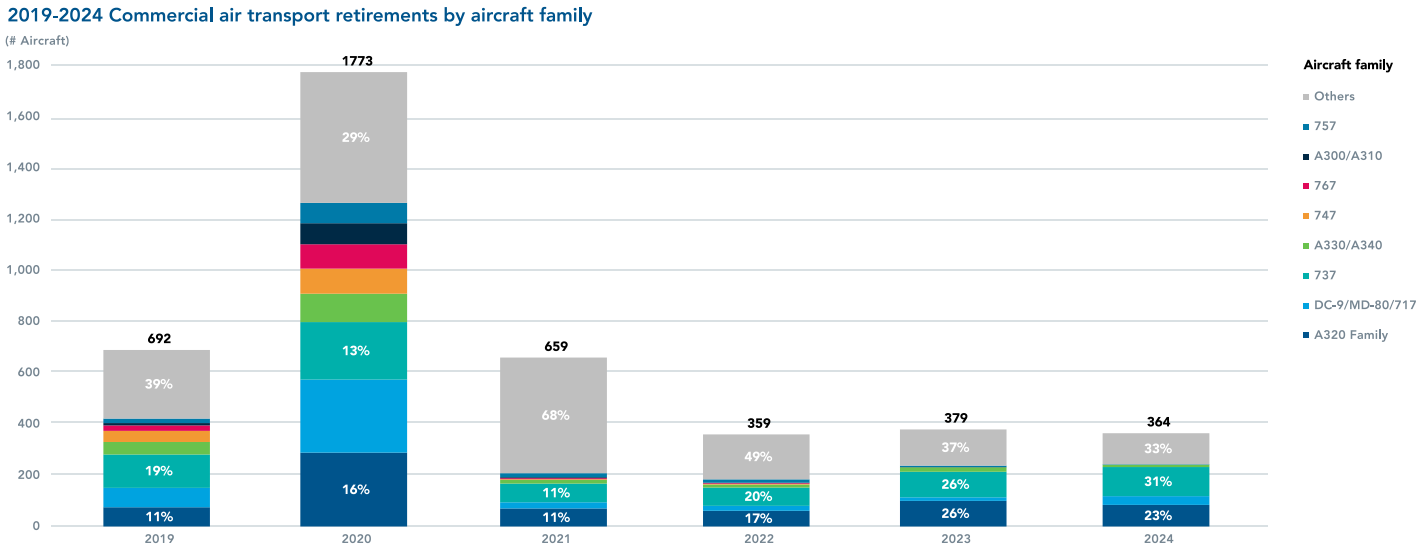
The COVID-19 pandemic has already shortened the timeline of retirements, and OEMs have cut production rates by around 30% from late-2019 levels.

During April and May 2020, many airlines announced accelerated retirement plans for parts of their fleets. Although airlines have marginalized four-engine aircraft over the last few years, the COVID-19 pandemic has accelerated this transition.

Passenger models of the Boeing 747 continue to disappear from the skies, with Corsair, KLM, Qantas, and Virgin Atlantic announcing this model's early retirement. Twin-engine wide-bodies are not immune either; Boeing 767s, older Airbus A330s, and Boeing 777s have also been removed from fleets (see Figure 6). Airlines have accelerated the retirement of previous-generation narrow-body aircraft (which some airlines planned to phase out slowly). Airlines such as Air Canada, American Airlines, Austrian, Delta Air Lines, and Singapore Airlines announced they would retire old A320ceo, 737 Classic and NG, 757s, MD-80, and MD-90 aircraft.

Figure 6: Aircraft retirement forecast

Source: ICF analysis

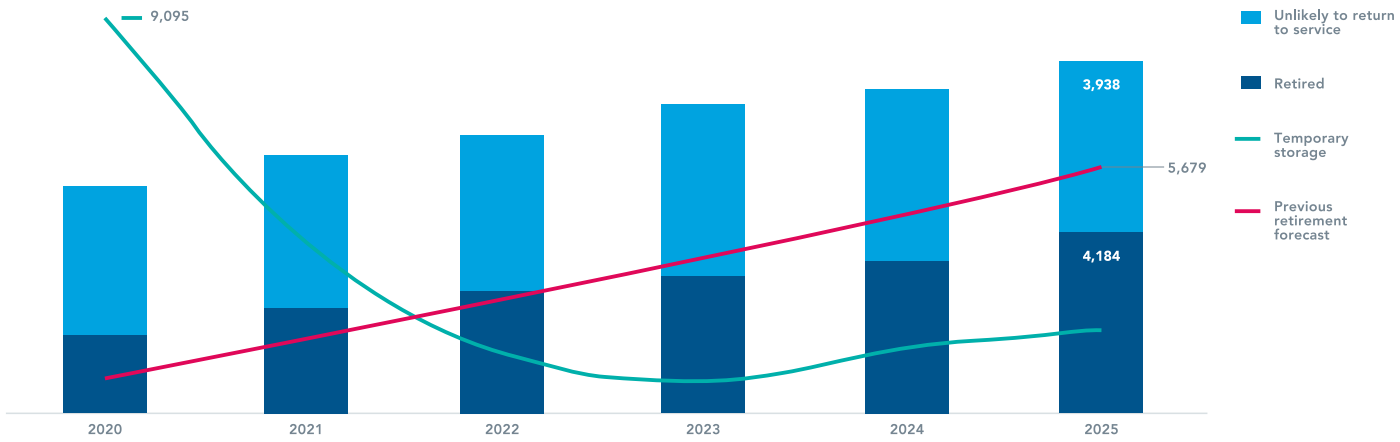


In addition to forecasted retirements, parked aircraft unlikely to return to service are a significant unknown (see Figure 7).

Figure 7: Aircraft storage and retirements outlook

Source: ICF Fleet Forecast

ICF forecast aircraft storage and retirements – Cumulative

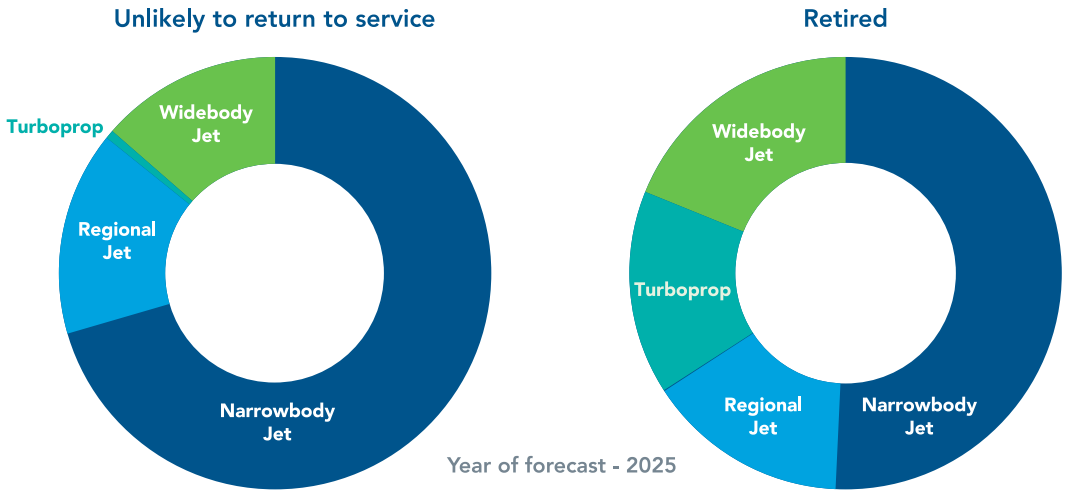


While we expect aging aircraft to be immediately retired, younger aircraft are usually stored and are likely to return to service when demand dictates. With OEMs reducing production, the number of aircraft to be returned from storage is likely to increase. However, as traffic demand recovers, OEMs will seek to fill their skylines, resulting in increased new aircraft production. This increased production will cause some younger aircraft to remain in storage for extended periods (effectively in retirement).

ICF's revised forecast estimates that, as a result of the COVID-19 pandemic, at least 2,500 additional aircraft will be retired and effectively parted out in the next five years. Cumulatively, this will result in over 8,000 retirements. As traffic demand recovers, older 737NG and A320ceo family aircraft in storage are likely to see their return deprioritized against deliveries of the 737MAX and A320neo. The forecast: at least 1,800 current-generation narrow-bodies stored during the COVID-19 pandemic will not return to service by 2025 (see Figure 8).

Figure 8: Aircraft storage and retirements distribution

Source: ICF analysis



Prioritization of aircraft to return to service

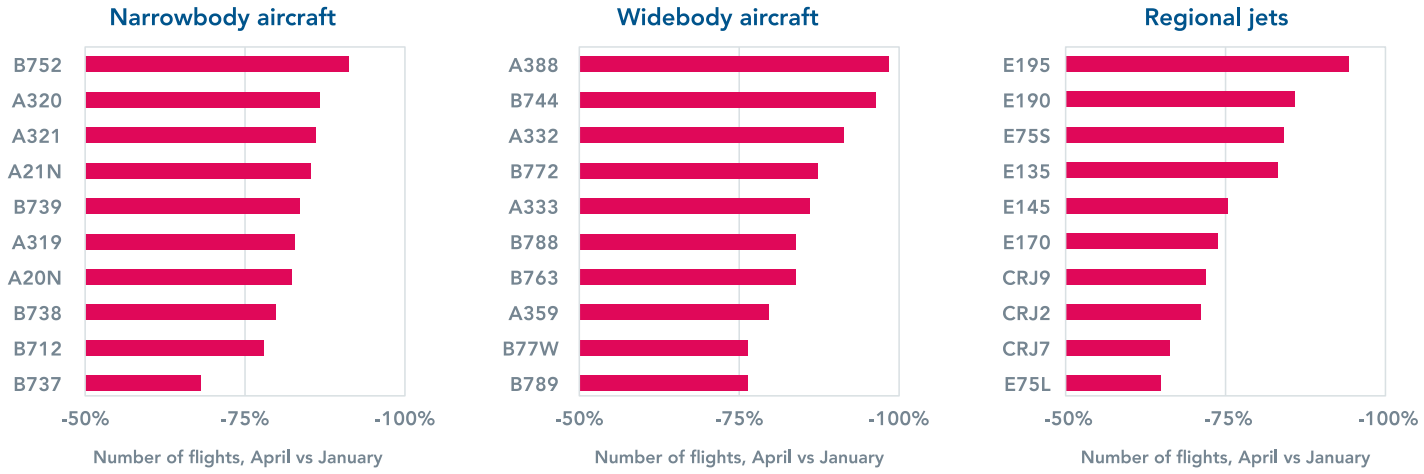
Aside from accelerated retirements, airlines are taking a tailored approach to returning their active fleets to service.

To understand the global trends of aircraft use, ICF looked at narrow-body, wide-body, and regional jets, focusing on the 10 most common passenger aircraft in each category. For this analysis, we used the Flightradar24 data from January 2020 and compared it with data from April 2020.

On a global level, the number of aircraft in the sky declined 80% between January and April 2020, varying between 55% and 99%, depending on the aircraft type (see Figure 9).

Figure 9: COVID-19 impact on fleet utilization by aircraft category and aircraft type

Source: Flightradar24 data, ICF analysis



Regarding narrow-body aircraft, even though the Airbus A320 and Boeing 737 families dominated the skies in April, they still declined by 82% on average. The activity of the two most common aircraft in January—the Boeing 737-800 and the Airbus A320—dropped from nearly 600,000 monthly flights to about 100,000 monthly flights. The Boeing 757-200 experienced the largest relative drop, from 20,000 flights to just 1,800 flights.

The COVID-19 pandemic has impacted the utilization of wide-body aircraft more than narrow-body aircraft, with flight activity declining 85% between January and April 2020. The Airbus A380 has felt this impact the most, decreasing from 10,600 flights in January to just over 100 flights in April. Boeing's 787s and Airbus' A350s experienced smaller drops of 78% on average, while flight activity for their newer and larger variants (Boeing 787-10, A350-1000) decreased around 60%. Boeing's B777-300ER, the second most common wide-body aircraft in January, is also among those with the smallest drop in utilization. This drop is partly due to many airlines opting to use them as temporary freighters.

Out of the three aircraft size categories, regional jets experienced the smallest drop in utilization at 75%. This drop is likely reflective of smaller domestic markets being less impacted during the current crisis. The larger regional jet Embraer E195 decreased the most (95%) while smaller jets Embraer E175 and Bombardier CRJ-700, both seating 70 to 80 passengers, dropped the least (65%).

Utilization and load factors

Typically, airlines seeking to maximize the use of their assets and to reduce costs closely track aircraft utilization. However, with much of their fleets grounded and parked in long-term storage, airlines need to decide what proportion of their fleet to keep active to deliver a reduced flying program.

ICF has examined the operating patterns for a few major carriers to determine the balance between utilization, commercial, operational, and maintenance requirements. Here's how two significant carriers—British Airways (BA) and Delta Air Lines (Delta)—compare.

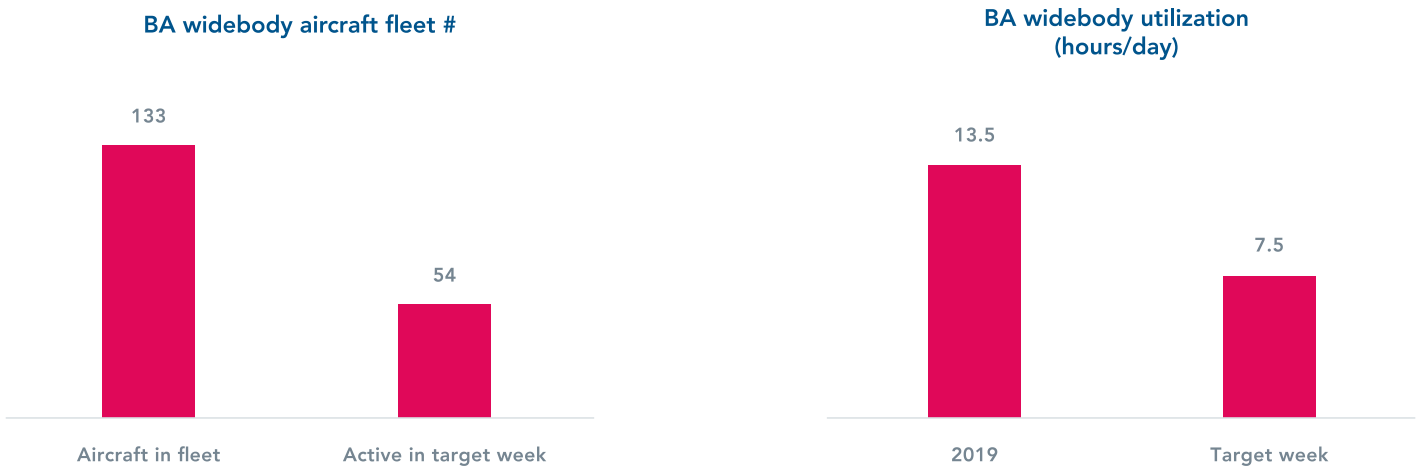
Currently, BA offers very limited short-haul flying. However, the airline has maintained a degree of long-haul connectivity for passenger and cargo-only flights. Typically, BA would operate more than 200 wide-body flights per day, but in the last week of April 2020, our analysis found BA operated less than 25% of this: an average of just 45 flights per day.

Typically, BA's long-haul fleet delivers more than 13 hours of utilization each day per aircraft, equivalent to 10,500 km per aircraft per day. Had BA maintained these utilization levels, the carrier would have required less than 30 wide-body aircraft. However, BA has kept over 50 wide-bodies flying, with utilization levels averaging 7.5 hours per day. In other words, BA is choosing to operate with 1.6x the number of wide-body aircraft than it typically needs (see Figure 10).

A combination of factors explains this, including new schedules, longer turns required for either cleaning or cargo handling, and a "buffer" to enable the addition of more flights relatively easily (since bringing aircraft out of long-term storage can take some time).

Figure 10: British Airways fleet utilization (pre- and post-COVID-19 pandemic)

Source: Flightradar24, CAPA Fleets, IATA/CAA



A similar analysis for Delta—with over 800 aircraft available—implies a similar pattern. Delta is operating a relatively limited wide-body schedule, averaging just over 20 flights per day. Like BA, the carrier is choosing to keep at least 2.5x aircraft in operation for 1x worth of wide-body flying. Across Delta's narrow-body fleet, the carrier operated 300 aircraft in the target week, with 200 operated on any given day (again at reduced levels of utilization).

ICF has translated its traffic forecast, anticipated load factors, and anticipated airline behaviors into a utilization forecast against the 2019 baseline (see Table 2).

This forecast considers the differences between airlines in the same country, based on the percentage of the airline's scheduled seats at the largest hubs, the proportion of the airline's domestic market under its control, and the total number of seats offered by the airline. The forecast contemplates the following aircraft metrics: technology generation, aircraft age (in comparison to other aircraft of the same type in the airline's fleet), aircraft market mass, and aircraft size.

Table 2: Forecast monthly utilization as a % of 2019 UTE

Source: ICF analysis

Period	Single-Aisle	Twin-Aisle
May-20	11%	10%
Jun-20	17%	16%
Jul-20	28%	24%
Aug-20	38%	32%
Sep-20	47%	39%
Oct-20	54%	44%
Nov-20	60%	49%
Dec-20	64%	53%
Jan-21	69%	56%
Feb-21	72%	59%
Mar-21	75%	62%
Apr-21	78%	64%
May-21	80%	66%
Jun-21	82%	68%
Jul-21	84%	70%
Aug-21	86%	71%
Sep-21	87%	73%
Oct-21	89%	74%
Nov-21	90%%	75%
Dec-21	91%	76%

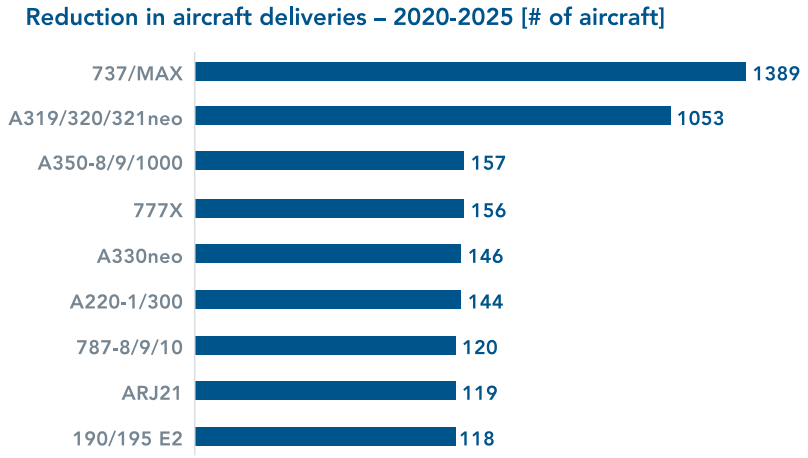
ICF expects narrow-body utilization to have almost a full recovery by early 2022, while wide-body utilization will lag behind 2019 levels.

New aircraft production

Notwithstanding accelerated retirements and return to service considerations varying by aircraft categories, ICF anticipates a significant slowdown in new aircraft deliveries. We estimate the delivery of 3,600 fewer aircraft over the next five years compared to pre-COVID expectations (see Figure 11).

Figure 11: Reduction in aircraft deliveries by aircraft family (2020–2025)

Source: ICF

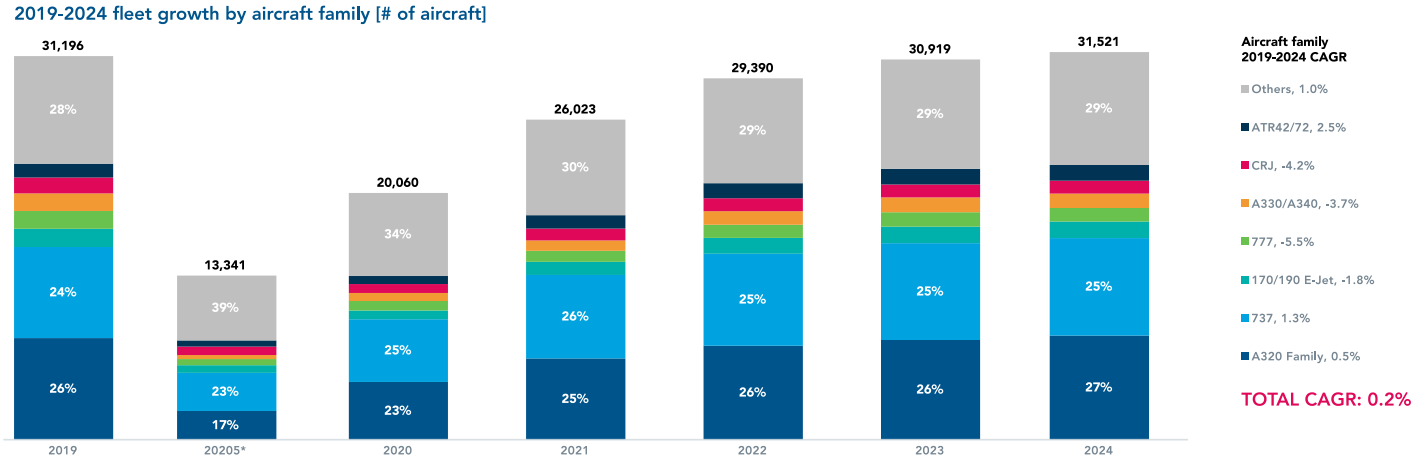


Resulting fleet outlook

As of December 2019, there were an estimated 31,200 commercial aircraft operating globally. ICF now anticipates this level of active fleet won't be reached until at least 2023 or 2024 (see Figure 12).

Figure 12: Fleet outlook by aircraft family

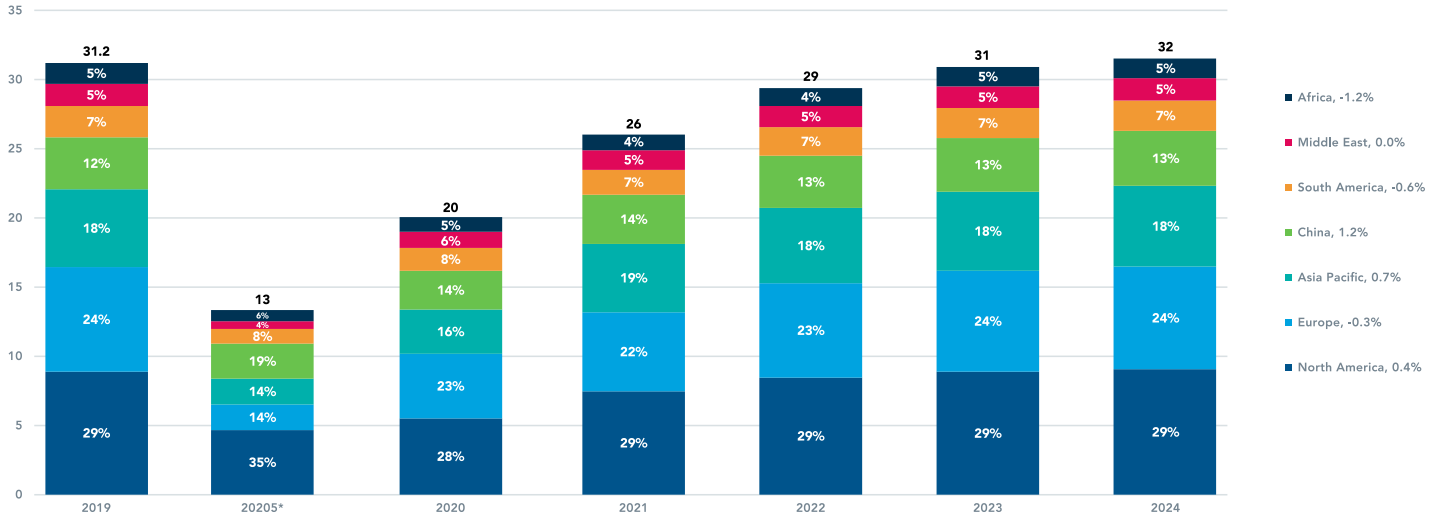
Source: ICF
20205*: Data from May 2020



Looking at the regional picture, it is apparent that all regions face a similar fate (see Figure 13). This reinforces the global impact of the COVID-19 pandemic.

Figure 13: Fleet outlook by region

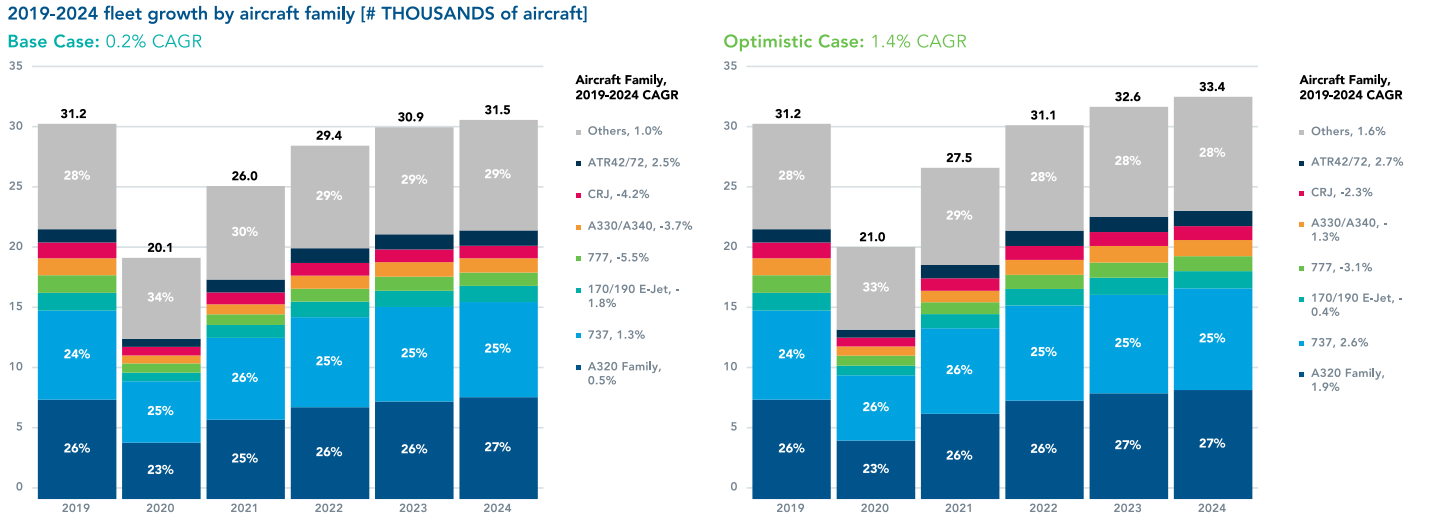
Source: ICF
20205*: Data from May 2020



Under a more optimistic scenario, fleet recovery could still occur in 2022, but surviving airlines ramping up capacity slightly faster than anticipated would drive this recovery (see Figure 14). A somewhat more positive GDP performance and continued foreign direct investments in Africa may boost this.

Figure 14: Fleet outlook (base and optimistic scenarios)

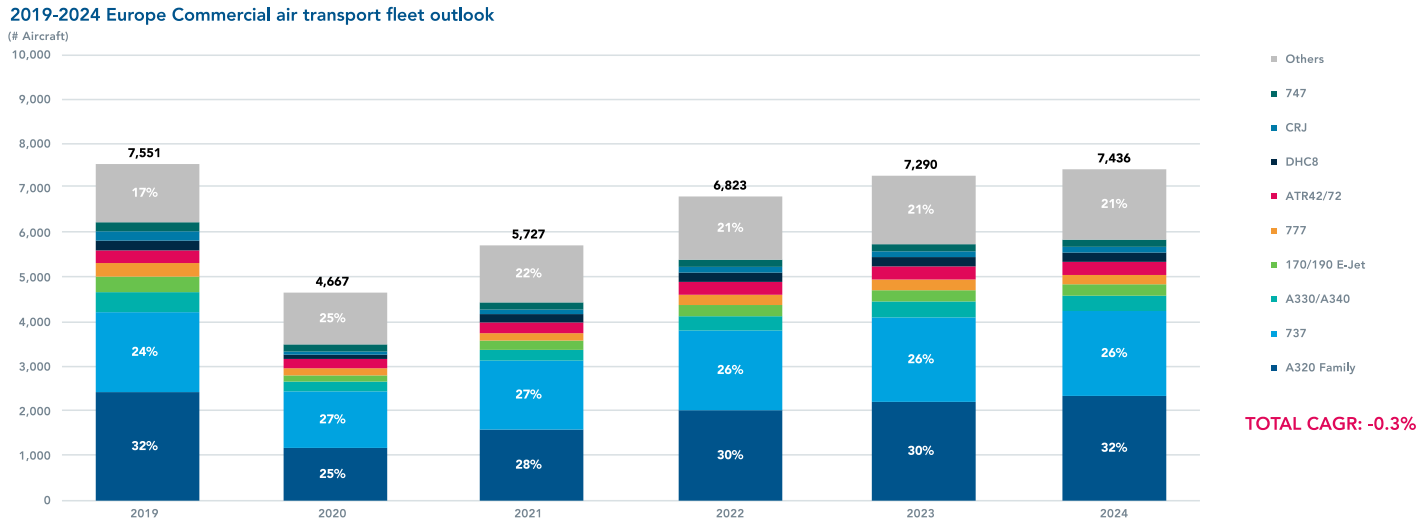
Source: ICF analysis



In Europe, the A320 and 737 platforms will predominate, returning to service first in line with domestic/intra-Europe traffic (see Figure 15).

Figure 15: European fleet outlook

Source: ICF



Focus on narrow-body aircraft

Impact on airlines

Since the beginning of the year, new aircraft deliveries are down nearly 40% on original plans. As airlines seek to reduce costs and preserve cash liquidity, further cancellations and deferrals can be expected over the remainder of the year and into 2021.

We expect new orders for narrow-body aircraft to be well below historical levels. In May 2020, Boeing and Airbus had logged a mere 18 and 286 gross orders respectively for the 737MAX and A320neo products; orders for wide-body aircraft were even more restrained as long-haul operations remain moribund. The retention of older aircraft in a low fuel-price environment is a viable option as airlines seek to preserve and build cash reserves. In comparison, the disposal or sale-leaseback of newer aircraft generates higher cash returns.

Nevertheless, many observers predict that airlines will typically be reduced in size in the range of 15% to 30% as economic conditions slowly improve in a post-pandemic environment. We predict passenger load factors to follow a similar pattern, favoring newer, smaller, and more fuel-efficient aircraft which respond to ESG investor needs and weak demand. Improved demand is expected for the Airbus A220 and Embraer E2 regional jets, as airlines strive to serve strategic city pairs while facing slow demand and low fares.

Older aircraft requiring major airframe and engine overhauls are leading candidates for retirement, as are the less populous members of the Airbus A320 and Boeing 737 family (including the A318 and 737-600). Large fleets

of Boeing 717, 737 Classic, MD-80/-90, and Boeing 757s—all of which are now two generations behind current technology aircraft— are also prime candidates for disposal.

The relative marketability of aircraft assets will follow suit. It may vary significantly from an initial slow demand through the restoration of more normal services should a COVID-19 vaccine be deployed successfully. During different phases of recovery, airlines and lessors alike will need to manage their fleets for optimal marketability and returns.

How to mitigate it - Lessors

The prime impact to lessors will be requests from airlines for lease rental deferrals and holidays for in-service aircraft, which most lessors report to be in the order of 80% of lessees.

During the second quarter, ICF observed lessors granting only short-term deferrals of two to three months, typically to preferred operators, with payback expected immediately following the deferral period (including interest). However, as the market has continued to deteriorate with low levels of passenger traffic, lessors have had to adjust their expectations and have embraced longer term rent reductions as well as alternative compensation structures such as power-by-the-hour (PBH) agreements.

Typically, lease extension requests and future seasonal overpayments counter longer-term rental reduction requests. In other cases, lessors negotiate early return and termination, with aircraft moved to other operators and jurisdictions on short-term leases (e.g., three years) as markets return to pre-pandemic levels.

Alternatively, lessors can draw down security deposits and negotiate around maintenance reserves and redelivery conditions.

Lessors can also enter PBH arrangements with the lessee and, where relevant, pay for storage/maintenance/insurance costs.

At a macro level deferred deliveries and cancellations can and have been negotiated with the OEMs, with several lessors already canceling large blocks of aircraft - mainly 737MAXes - further challenging the type as it navigates a return to service.

Impact on current market values

Given the unprecedented downturn in airline operations and passenger demand, an immediate and seemingly prolonged decline in aircraft values and lease rentals occurs. The long-term impact of the COVID-19 pandemic, however, is difficult to determine at present.

Many observers suggest a recovery period of three to five years before traffic volumes return to pre-COVID-19 levels. In these unpredictable times, the market will inevitably see some airline and lessor casualties.

The regional sector has borne the brunt of early value declines, where many regional airlines have collapsed given weak financial structures. In the enormous aircraft (VLA) sector, where airlines operate in limited markets,

international passenger traffic has evaporated and is unlikely to recover for some time. Neither sector has enjoyed lessor favor, which exposes aircraft in both sectors.

In-production narrow-body aircraft and the latest-generation wide-body aircraft have retained favor, with the current market value (CMV) for 2019 vintage aircraft dropping around 5% to 10% (see Table 3).

Older narrow-body aircraft, unencumbered by leases and requiring expensive heavy maintenance, exhibited the most significant declines in the order of 15% to 20%; these aircraft are likely to remain parked and eventually retired as economic conditions improve (see Table 4). The delivery of new aircraft in earnest will exacerbate this divergence.

Table 3: CMV by aircraft type

Some variation within these percentages will exist as some models will likely fare better in terms of demand, values and lease rates as the industry recovers

Source: ICF

Segment	Age Band (years)			
	>20	10-19	5-9	<5
Older Narrowbody (737 Classic, MD-80, 757, pre-1995 A320)	27%	23%	N/A	N/A
Current Narrowbody (A320ceo, 737NG excl -700 & -900ER)	18%	16%	12%	8%
New Technology Narrowbody (A32neo, 737MAX)	N/A	N/A	7%	4%
737-700	17%	15%	10%	6%
737-900ER	N/A	18%	13%	9%
Older Widebody (777-200/200ER, A340, 747, A330 Classic)	38%	33%	25%	18%
Current Widebody (777-300ER)	N/A	25%	18%	10%
New Technology Widebody (787, A330neo, A350)	N/A	N/A	11%	7%
767-300ER	20%	16%	13%	8%

Table 4: CMV by engine type

Source: ICF

Engine Model	Jan 2020 CMV	Jul 2020 CMV	% Change
CFM56-7B26	$4.6	$3.8	-18%
CFM56-7B26E	$7.5	$6.7	-10%
V2524-A5	$4.2	$3.7	-14%
V2524-A5 Select	$5.1	$4.5	-10%
GEnx-1B74/75 (SP)	$17.1	$16.0	-6%
CF6-80C2B7F	$2.7	$2.7	0%

Focus on the A380

The A380 has fared particularly poorly relative to most aircraft following the onset of the COVID-19 pandemic, with planned retirements brought forward and accelerated by several operators. Travel restrictions imposed by governments, which instigated initial retirement en masse, now seem likely to remain in the longer-term. As airlines now contemplate emerging from the crisis around 30% smaller, the pace of permanent retirement is quickening, and the numbers are growing.

The COVID-19 pandemic has exacerbated a difficult situation for the A380. Because of this, a concerted move away from the craft has been underway for some while. The four-engine A380 has fallen prey to the fundamental changes to long-haul operating economics brought about by the Airbus A350 and A330neo, the Boeing 787, and the Boeing 777X (which will enter service in 2021). Further, a fundamental shift to point-to-point routes has marginalized the A380 (optimized for hub and spoke operations).

A thin operator base dominated by the United Arab Emirates (operating nearly 50% of the fleet) and the competitive onslaught of numerous large twins returning from the lease and available for sale will hamper secondary market opportunities for the A380. An absence of a lessor base highlights the A380 as a poor financial asset with high capital and operating costs, and prohibitive reconfiguration costs.

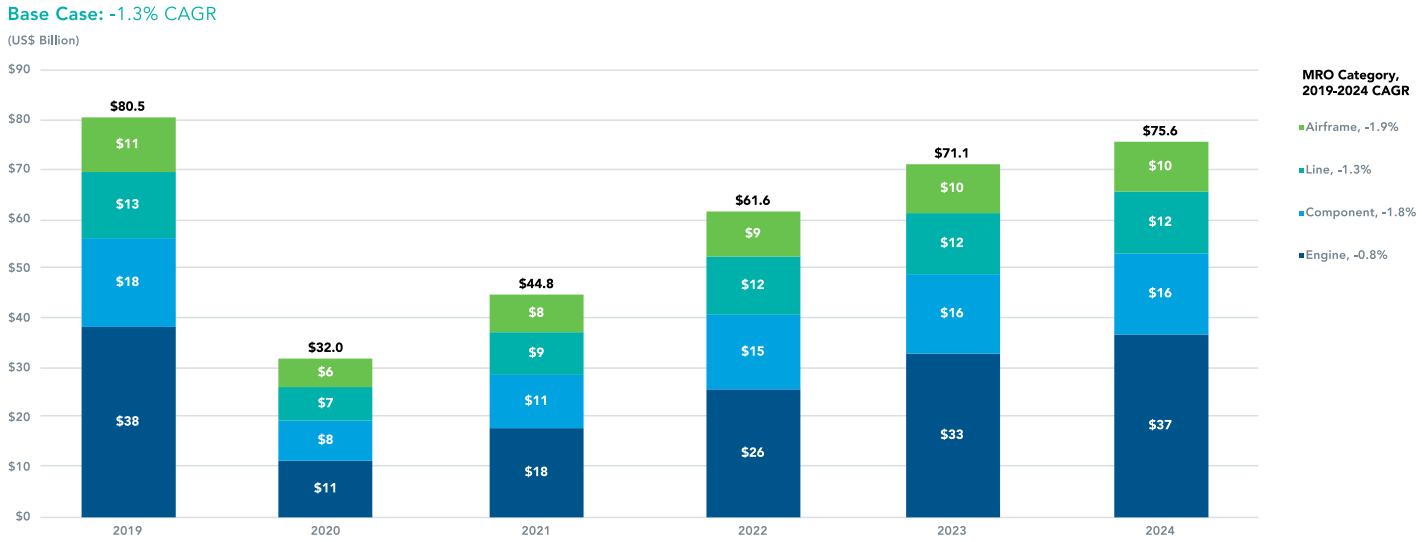
MRO outlook

In line with the fleet outlook and further impacted by the change in fleet mix and maintenance behavior, the MRO industry does not expect to recover to pre-COVID-19 levels over the next five years. The smaller active fleet will drive this decreased MRO spend (see Figure 16).

The use of green-time engines to avoid costly shop visits further compounds this issue, along with the avoidance of expensive heavy checks by returning aircraft to service with lesser maintenance exposure (the same will be true for landing gear overhauls and thrust reversers).

Figure 16: MRO spend outlook (by maintenance category)

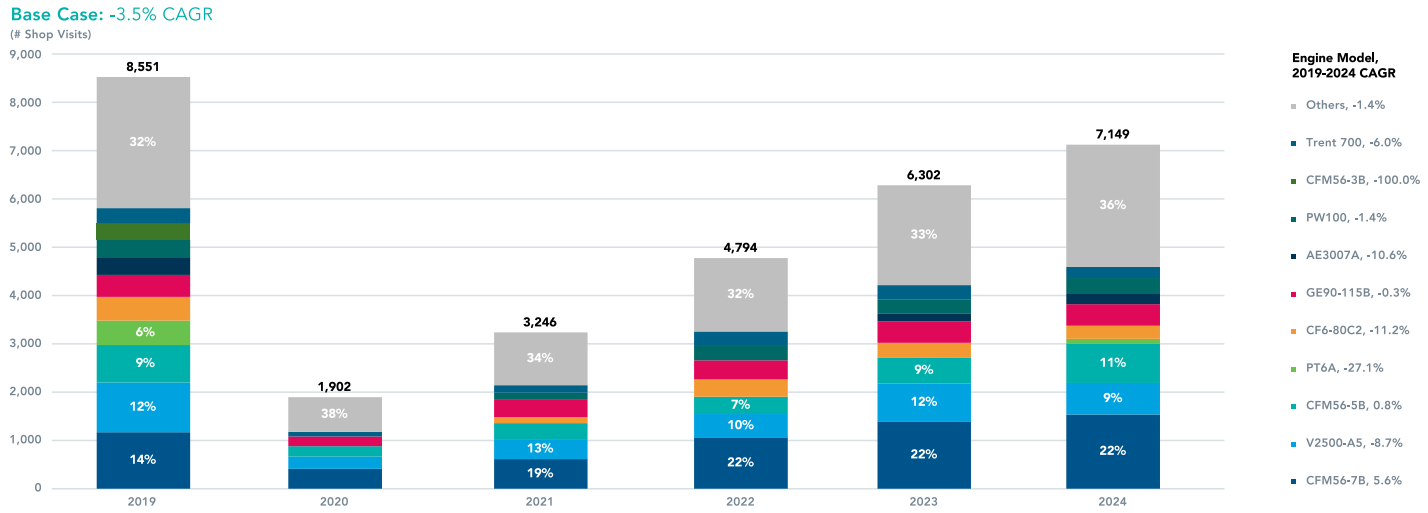
Note: 2019 constant USD
Source: ICF



The availability of parked engines with significant green time available especially will impact engine maintenance in the next one to two years (see Figure 17).

Figure 17: Engine shop visit outlook (by engine type)

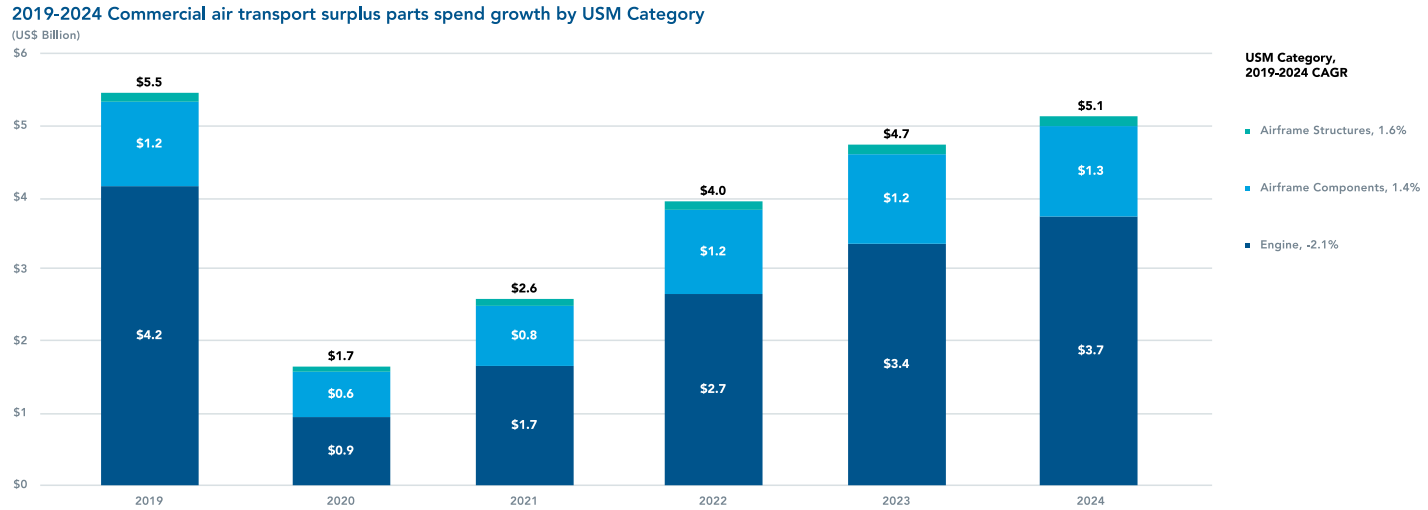
Source: ICF



The availability of parked aircraft will enable MROs to exploit used serviceable material to reduce cost per event. We anticipate the market to return to pre-COVID-19 levels by 2024 at a value exceeding $5 billion (see Figure 18).

Figure 18: Surplus parts spend outlook

Note: 2019 constant USD
Source: ICF



Implications

The COVID-19 pandemic will have severe implications for four key markets within the aviation sector.

Airline market implications

Airlines will likely be reduced in size around 15% to 30% of pre-COVID-19 levels as economic conditions slowly improve in a post-pandemic environment. Passenger load factors will also decline, favoring newer, smaller, and more fuel-efficient aircraft.

A series of successive consolidations— especially in North and Latin America—have produced more robust, rationalized carriers. Local governments and regulators appear more inclined to preserve these. ICF believes Europe, Asia, and the Middle East are generally a step behind in that process. As a result of the pandemic, each region will likely see accelerated consolidation and rationalization in the airlines and fleet per carrier.

Airlines manage the reduction in traffic with a combination of deferrals (new aircraft) and retirements (used aircraft). Deliveries of new aircraft since January 1, 2020, are down nearly 40% on original plans. Further cancellations and deferrals can be expected well into 2021. MAX cancellations since January 1, 2020 stand at over 400 units. Older and mid-life aircraft requiring major airframe and engine overhauls are leading candidates for retirement, as are larger twin-aisle craft like the 777-300ER and A380s.

Lessor market implications

Larger, better-capitalized lessors will play a critical role in the survival of airlines judged to be acceptable post-COVID-19 credit risks. We believe this will drive more consolidation among both lessors and airlines. To some extent, this consolidation began in 2017 with the failures/mergers of airlines, including Air Berlin, Monarch, Air Italy, and Thomas Cook, and with lessors including Tokyo Century/ACG, DAE/AWAS, and Avolon/CIT.

We expect a smaller number of global full-service lessors will emerge from the COVID-19 pandemic. Still, we also see the underpinnings of continued possible increases in the market share of operating leases as a percentage of total aircraft financing in force by the middle of the decade. The shakeout from the COVID-19 pandemic will result in fewer independent lessors. More of the industry will be controlled by large global banks, insurance companies, and other financial institutions with less sensitive credit ratings and more diverse forms of capital access.

There is arguably less risk now among lessors, given sophisticated management teams and financial risk functions, built in anticipation of worldwide crises, which can specifically affect the commercial aviation sector. These include:

- Younger fleets, with an emphasis on narrow-body craft.
- Diverse, credit-vetted portfolios.
- Investment-grade lessor status for bulk capital raises and long-term cap structure.
- Strong financial parents, such as global banks or insurance companies.
- A reputation for working with airline customers over the long term.
- A solid track record for successfully moving aircraft to new leases.
- Creative and innovative leasing solutions.

MRO market implications

While the MRO market had recently become a sellers' market due to a lack of capacity, the COVID-19 pandemic and the associated reduction in fleet activity has made it a buyers' market again, with excess MRO supply. ICF expects that investors may buy some suppliers with weak cash positions. The intense competition to capture market share will lead some players to reduce in size.

As a result of the significant availability of parts resulting from the smaller active fleet size, one segment where we expect productive investments is in parts trading. There is an urge within the market to best monetize these parts. For engine and component MRO, where material accounts for a significant portion of the repair costs, players with expertise in useful parts sourcing are likely to succeed, as they will be able to offer either competitive replacement units or use serviceable material for the repair. The financial backing of these players will play a role, given the initial investment required to source the parts.

For labor-intensive maintenance, low-cost regions will be at a significant advantage as the pressure on turnaround time diminishes due to the availability of spare aircraft. Therefore, the cost will become even more critical to the buying decision.

Airlines will challenge the flight-hour contract concept in the short- to medium-term. They will want to stay away from minimum-flight-hour guarantees in contracts, given the significant uncertainty around demand.

MRO will likely emphasize new services. For instance, we expect an increased emphasis on mobile, on-wing services for light maintenance (in addition to the classic support) for engine MRO.

Lessors' influence in the MRO procurement should remain limited unless they end up taking a stake in the airline (as was the case with Norwegian Air Shuttle).

We expect the increased use of mobile technologies to extend into the maintenance sector, with the increased

adoption of remote training.

ICF expects the share of engines covered by OEM agreements to increase over time. Given that margins on the sales of new engines have eroded over time, engine OEMs need these programs to support their bottom line. GE Aviation has been pursuing a larger market share of agreements through its OnPoint Program. CFM International has a high share of LEAP engines up to end of 1st run SVs. Pratt & Whitney has sold GTF engines on agreements to gain market share. Rolls Royce already has 100% uptake for the Trent 1000, the Trent 7000, and the Trent XWB, and 90% uptake for the Trent 700.

Due to the economic impact of the COVID-19 pandemic, smaller independent MROs are vulnerable, and some will not make it through the crisis. As larger organizations subsume smaller firms, OEM's share of services will likely increase as they look to fill the gap.

Freighter market implications

Air cargo has proved to be one of the few sectors to perform relatively well during the COVID-19 pandemic. Several Chinese cargo airlines reported rising volumes, even during the worst of the outbreak in the region. While belly-hold freight suffered from a collapse in passenger operations, a rapid increase in demand for dedicated freighter capacity has evolved.

Having undergone a proverbial boom in recent years, the global e-commerce market is proving a significant impetus. The market exhibits little sign of slowing down, even in the face of global uncertainties on trade, manufacturing sectors, and regional slowdowns.

The recent, significant increase in the retirements of older passenger aircraft linked to the COVID-19 pandemic will boost several programs. These programs include legacy conversion programs (such as the wide-body Boeing 767) and emerging programs (such as the narrow-body Airbus A321 and Boeing 737-800 types replacing the Boeing 757 and 737 Classics). These programs, in turn, will boost MRO passenger-to-freighter (PTF) conversion revenues for established shops such as AEI, EFW, IAI, and Pemco.

Conclusion

As everyone inside and outside the aviation industry has realized, there will be no return to pre-COVID-19 normality in the short term. As a result, all aviation players need to adapt their business models to succeed in their individual market spaces.

Future success requires a cutting-edge strategy that takes into account hard data about the MRO and aerospace market. After all, this is an opportunity to implement fundamental, long-lasting change and transformation (never a priority in daily business). ICF can help you define the right strategy for your sector and ensure you emerge from this unprecedented global crisis with clarity and focus.

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Over the past decade, Yann has worked both in industry and as a consultant. He has worked at an executive level for Airinmar (an AAR Corp. company). His work with Airinmar and AAR involved helping airlines optimize their repair TAT, minimize their maintenance spend, and optimize their inventory holdings. As a consultant, Yann has worked on operational projects, helping organizations optimize their business processes. He also helped airlines negotiate support contracts with OEMs and MROs. Yann holds an MSc in Air Transport Management from Cranfield University and an MEng in Aerospace Engineering from ESTA.

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Stuart leads ICFs Aircraft Practice and joined ICF in 2013 as a principal. He specializes in asset valuation, aircraft market research, asset management, and lease analysis. Stuart has extensive experience in valuing tangible assets and performing market analysis and financial modelling, and he works closely with clients to provide asset valuations (aircraft, engines, and parts), due diligence/transaction support and related market and financial analysis, aircraft program management, aircraft remarketing, and sourcing. Prior to joining ICF, Stuart spent nearly 15 years at Aviation Specialists Group where he provided aircraft valuations, analyzed aircraft leases and their impact on residual values, modelled maintenance cash flows, and conducted aircraft physical inspections. Stuart has a bachelor's degree in Economics from Pennsylvania State University and is an ISTAT Certified Senior Appraiser.

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Allan has worked in the aviation Maintenance and Engineering and Maintenance, Repairs and Overhaul (MRO) space for the past thirty-two years. For almost half of his career he has fulfilled key management positions with the airline in Maintenance Planning, Maintenance Information Systems, Technical Records, and Production Control. He then spent almost ten years managing the MRO IT portfolio for Sabre Airline Solutions before owning an SAP development of its iMRO system with HCLAxon for eighteen months. He has been in pure consulting for the past eight years with Oliver Wyman and ICF. Allan's experience spans both the operations side as well as the IT side of maintenance management. He understands the nuances of digital transformation projects both from the end user's perspective as well as software design, development, and adoption challenges. He has seen more than twenty system go-lives on more than eight different MRO IT systems during his career.

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