

GLOBAL FLEET AND MRO MARKET FORECAST 2022-2032



Brian Prentice
Anthony DiNota
Derek Costanza
Ian Reagan
Carlo Franzoni
Madeline Stelle

Air transport fleet & MRO

Fleet size	25,578
2020–2032 fleet growth rate	2.7%
MRO market size	\$78.6 BN
2019–2032 MRO growth rate	2.6%

Global civil MRO employment

Firms	5,010
Small/medium enterprises (SME)	81.2%
Maintenance employees	380,829

US civil MRO employment

Firms	4,051
Small/medium enterprises (SME)	85.6%
Maintenance employees	182,717

US economic activity

Maintenance, repair and overhaul	\$24.3 BN
Parts manufacturing/distribution	\$23.3 BN
Total economic activity	\$47.6 BN

FOREWORD

Oliver Wyman's *Global Fleet & MRO Market Forecast Commentary 2022–2032* marks our firm's 22nd assessment of the 10-year outlook for the commercial airline transport fleet and the associated maintenance, repair, and overhaul (MRO) market. We're proud to say that this annually produced research, along with our *Airline Economic Analysis*, has become a staple resource of executives working in aerospace manufacturing, airlines, MRO, and financing of the sector through private equity firms and investment banks.

The year's research focuses on airline fleet recovery and growth in the wake of unprecedented challenges from the coronavirus pandemic as well as related trends affecting aftermarket demand, maintenance costs, technology, and labor supply. The outlook details how COVID-19 has significantly disrupted traffic, fleet dynamics, and MRO. Understanding these marketplace realities is vital to making well-informed business decisions and developing strategic long-term plans for the aviation industry.

As you will read in the report, the next few years are pivotal for industry recovery as COVID-19, economic forces, traveler sentiment, and government policies compel the industry to re-imagine its future.

In conjunction with each year's *Global Fleet & MRO Market Forecast*, we conduct an annual survey on hot topics, critical issues, and new opportunities in MRO. To participate in the 2022 survey, please contact the research team at MROsurvey@oliverwyman.com.

Oliver Wyman's Aviation Competitive and Market Intelligence team, partners, and vice presidents are available to assist with any questions about this forecast, as well as with the *Airline Economic Analysis*, which is scheduled to be released in March. We hope you find the data and insights valuable as you refine your business models and develop strategies for moving forward.

Best regards and wishes for a wonderful 2022,

Brian Prentice

Partner and Study Leader
Oliver Wyman

Anthony DiNota

Senior Vice President and General Manager
CAVOK, Oliver Wyman

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EXECUTIVE SUMMARY

A DECADE OF GROWTH, WITH A FEW CAVEATS

After two years of turmoil, the aviation industry appears to be poised for a decade of growth. But unlike the last decade, which enjoyed steady annual increases in demand, the next 10 years are apt to be filled with a multitude of challenges that will test the industry's resilience.

COVID-19 continues to torment airlines and aerospace as well as the global economy in general despite effective vaccines. While a significant portion of domestic air travel demand around the world has recovered and the fleet is growing again, the unpredictable nature of COVID-19 and its variants remains the industry's biggest immediate obstacle to business as usual. The rapid spread of Omicron at the end of 2021 set in motion a variety of complications for the industry from absenteeism in the workforce, to government travel restrictions, to disruption of the supply chain, to name a few.

Even so, as we enter 2022, there is cautious optimism that the industry has turned the corner and is once again on an upward trajectory, thanks to widespread dissemination of vaccines, government stimulus, and pent-up demand for travel — at least in developed economies. By the early part of 2023, global demand for domestic travel is expected to reach and exceed its 2019 pre-pandemic peak. From there, the outlook is for steady growth through the rest of the decade at rates that even exceed expansions in gross domestic product.

Worldwide, the business and international travel segments, on the other hand, will take longer to recover, restricted by corporate and government policies unlikely to be fully lifted until COVID-19 transitions into an endemic disease. But it was not just restrictions that took a bite out of corporate travel.

Videoconferencing and a mounting recognition that people can conduct business without being face to face has had an impact. In the foreseeable future, sluggish business travel recovery is apt to put a cap on both airline profitability and growth, but the potential for lower long-term corporate demand exists.

For international travel, the biggest impediment has been and will be the disparity between cross-border rules and vaccination coverage. Globally, a slow recovery in this segment will limit the number of widebody aircraft in the fleet for years.

At the beginning of 2022, the global fleet was the same size as it was in 2017, and it is not expected to top its January 2020 apex of almost 28,000 until sometime in the first half of 2023. By 2032, the fleet is expected to eclipse 38,100 aircraft, a compound annual growth rate (CAGR) of 4.1% between January 2022 and the beginning of 2032.

Because of the slower return of international travel, most of the fleet recovery will be in narrowbody aircraft, which will make up about 64% of the fleet by 2032 versus 58% in January 2020. While narrowbodies are expected to recover to pre-pandemic levels by midyear, much of the increase initially will be from aircraft being brought out of storage or the delivery of aircraft in manufacturers' inventory. Before COVID-19 struck, the industry was struggling with the 2019 worldwide grounding of the 737 MAX — more than 400 of which had been built but not delivered at the time the pandemic shut down air travel in 2020.

While most of the fleet is a story of recovery, cargo is a story of growth. A 17% increase in shipments in 2021 over 2019 — thanks in part to COVID-related online shopping — pushed the cargo fleet to expand during the pandemic. In 2021, the number of aircraft dedicated to cargo grew 3%, and the conversion of passenger aircraft to freight use broke records.

For the maintenance, repair, and overhaul (MRO) sector, the market is being redefined by a fleet in transition, in part because of higher numbers of retirements of aircraft due to enter a period of intensive MRO expenses. MRO demand should recover to pre-COVID levels by 2024, but annual growth in the second half of our 10-year forecast period will be 2.8%. By 2030, MRO demand is expected to reach \$118 billion, 13% below the pre-COVID forecast of \$135 billion.

The slower growth projections won't apply everywhere around the world. For instance, the active China-based fleet and its MRO demand had already exceeded pre-pandemic levels by the end of 2021. Other regions like Western Europe will not see MRO demand recover until 2025.

Another trend that will reshape the MRO landscape is a potential push toward onshoring of capacity — a direct response to the impact of COVID-19's unforeseen stranding of some assets with quarantines and its continuing disruption of supply chains. While some of the impetus is expected to diminish as COVID-19 fades, airlines and aerospace manufacturers are likely to want a decent amount of capacity that cannot be taken out of the mix by trade wars or sudden travel restrictions. That translates to domestic maintenance providers.

Beyond COVID-19, there are additional impending risks on the horizon that portend some degree of disruption for the industry.

The first is a labor force potentially too small to support aviation's anticipated growth. Prior to the pandemic, the industry was already looking at a potential shortfall mid-decade in the number of key aviation workers — pilots and aviation mechanics chief among them. At the time, the pressing problem was baby boomers reaching retirement age and not enough candidates to take their place. The pandemic has exacerbated those demographic trends by encouraging early retirements among airline and aerospace workers uncertain about the career prospects in a sector that COVID-19 almost entirely shut down for months.

Likewise, two years of pandemic also is likely to have discouraged many would-be pilots and mechanics from entering the industry. With demand lagging, the industry hasn't had to fully confront the problem yet, but that won't be the case for much longer. Over the next 20 years, Boeing estimates, the industry will need 612,000 new pilots, 626,000 new maintenance technicians, and 886,000 new cabin crew members

Another challenge facing the industry is climate change. Currently, aviation accounts for about 2.3% of total carbon dioxide emissions — still dwarfed, for instance, by road transport and other economic activities. But the anticipated transition to electric vehicles over the next 10 years is likely to cut road transport's share of total emissions from transportation and potentially raise aviation's — an industry without an immediate alternative to fossil fuels. That may increase pressure on the industry and even result in efforts to limit commercial flying.

Despite the fact that aerospace manufacturers have been relentlessly driving for more fuel efficiency almost since the industry's inception, there is no existing or obvious technological solution for substantially cutting emissions — at least not over the next decade. While research and development are underway on the use of hydrogen or electric engines to power aircraft, the commercial production of such revolutionary aircraft for commercial flight is probably 15 to 20 years off.

Since the potential for more efficiency gains on traditional jet engines appears somewhat limited, the most effective tool immediately available is sustainable aviation fuel (SAF), made from non-fossil feedstocks such as used cooking oil and waste animal fat. While SAF can produce 80% fewer emissions than conventional jet kerosene-based fuels like Jet-A1, currently less than 1% of the fuel consumed by aviation is SAF. Most of the biggest airlines have pledged to increase that percentage to 10% by 2030, but even if sufficient capacity was built in time to produce the necessary SAF, that percentage would still not fully offset the anticipated expansion in air travel. A fuel mix of at least 15% SAF by 2030 would be needed to just keep the industry at its 2019 level of carbon dioxide emissions — far from the halving of global emissions called for at the recent COP26 climate conference in Glasgow, Scotland.

The other problem is SAF's economics: SAF is three times more expensive than conventional jet fuel for airlines and yet less profitable to produce than the renewable diesel used for road transport and ships. That makes it unattractive to both users and producers. Only substantial government subsidies or tax incentives could level the playing field to encourage sufficient airline consumption, investment in SAF production, and ultimately a reduction in the price difference with conventional fuel.

As unimaginably bad as COVID-19 has been for aviation, the next challenge may prove almost as disruptive unless smart strategies are employed today to better position the industry for the 2030s. While aviation is almost guaranteed to keep expanding over the next decade, its ability to carve out profits and remain sustainable will be much more uncertain, given these challenges.

FLEET AND MRO FORECAST SUMMARY

Region	Africa	Middle East	Asia Pacific	China	India	Latin America	North America	Eastern Europe	Western Europe	World
2022 Fleet										
Narrowbody	430	505	1,690	3,142	478	997	4,062	1047	2,884	15,235
Widebody	142	624	1,021	505	39	143	1,314	155	896	4,839
Regional jet	164	54	205	159	5	218	1,834	269	367	3,275
Turboprop	307	28	631	0	83	197	552	110	321	2,229
TOTAL	1043	1,211	3,547	3,806	605	1,555	7,762	1,581	4,468	25,578
2032 Fleet										
Narrowbody	549	1,213	3,408	5,246	1,238	1,414	5,395	2,024	3,798	24,285
Widebody	178	1071	1,784	783	68	208	1,779	269	1,207	7,347
Regional jet	217	51	253	543	14	225	1,698	425	362	3,788
Turboprop	384	47	742	107	134	186	733	90	346	2,769
TOTAL	1,328	2,382	6,187	6,679	1,454	2,033	9,605	2,808	5,713	38,189
Fleet growth rates										
2020–2026	1.1%	3.5%	1.7%	4.5%	9.7%	0.7%	1.2%	5.1%	-0.3%	2.0%
2026–2032	1.5%	5.6%	3.6%	6.3%	5.4%	1.8%	1.7%	5.9%	1.4%	3.3%
2020–2032	1.3%	4.5%	2.6%	5.4%	7.5%	1.3%	1.4%	5.5%	0.6%	2.7%
2022 MRO (US\$ in billions)										
Airframe	\$0.7	\$1.3	\$3.3	\$2.4	\$0.3	\$0.9	\$5.0	\$1.1	\$3.6	\$18.5
Engine	\$1.0	\$4.3	\$6.1	\$4.1	\$0.4	\$1.6	\$8.8	\$1.7	\$6.0	\$34.1
Component	\$0.5	\$0.8	\$1.8	\$2.1	\$0.2	\$0.8	\$4.5	\$0.9	\$2.8	\$14.4
Line	\$0.3	\$0.7	\$1.5	\$1.7	\$0.2	\$0.6	\$3.1	\$0.7	\$2.8	\$11.6
TOTAL	\$2.5	\$7.1	\$12.7	\$10.2	\$1.2	\$3.9	\$21.4	\$4.5	\$15.1	\$78.6
2032 MRO (US\$ in billions)										
Airframe	\$0.7	\$1.5	\$4.0	\$3.6	\$0.6	\$1.0	\$4.8	\$1.4	\$3.6	\$21.1
Engine	\$1.7	\$11.1	\$12.8	\$8.9	\$2.5	\$2.5	\$12.4	\$3.4	\$9.9	\$65.3
Component	\$0.7	\$1.7	\$3.9	\$3.7	\$0.9	\$1.1	\$4.9	\$1.6	\$3.5	\$21.9
Line	\$0.4	\$1.3	\$2.9	\$3.0	\$0.6	\$0.8	\$4.0	\$1.4	\$3.7	\$18.2
TOTAL	\$3.5	\$15.6	\$23.6	\$19.2	\$4.6	\$5.4	\$26.2	\$7.9	\$20.6	\$126.6
MRO growth rates										
2019–2026	0.5%	0.8%	2.8%	9.0%	5.2%	-1.1%	2.2%	4.2%	-0.1%	2.4%
2026–2032	1.5%	6.0%	3.0%	3.4%	10.9%	2.4%	0.8%	4.6%	0.9%	2.8%
2019–2032	0.9%	3.2%	2.9%	6.4%	7.8%	0.5%	1.5%	4.4%	0.4%	2.6%

GET INTERACTIVE WITH THE FORECAST DASHBOARD

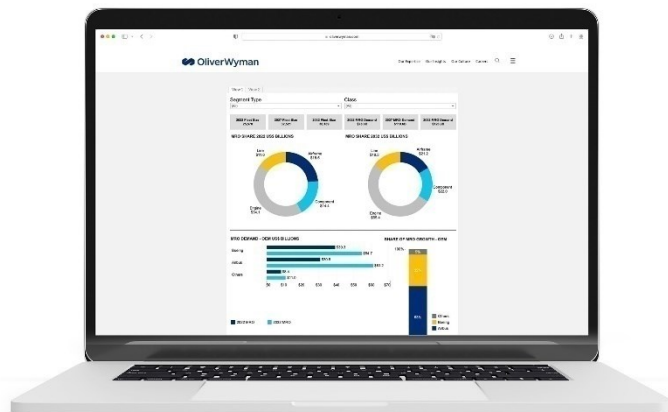
To enhance the *Global Fleet & MRO Market Forecast 2022–2032*, we have created an interactive dashboard that lets users explore online the results of the forecast in a deeper fashion. Employing a filter of their choice, readers can view the data from Oliver Wyman's forecast in the ways most relevant to them.

The dashboard is made up of two views. The first is a summary view that looks at the size, growth, and share of the global maintenance, repair, and overhaul (MRO) market. With the ability to filter by aircraft class and specific MRO segments, users can identify changing trends and the relative size of MRO demand by market.

The second view provides more granular insight into the size of the MRO market by year and growth by geographical region. A breakdown of fleet growth in terms of deliveries, retirements, and removals from storage is also provided. By filtering for region or MRO segment, users can identify growth trends and potential vulnerabilities for various geographies and sectors.

This dashboard highlights the strength and flexibility of the Oliver Wyman Global Fleet & MRO Forecast models. For questions on the report or how to get the most out of the dashboard, please reach out to AviationMarketIntelligence@oliverwyman.com.

To view the Fleet & MRO Forecast Interactive Dashboard, [please click here](#)



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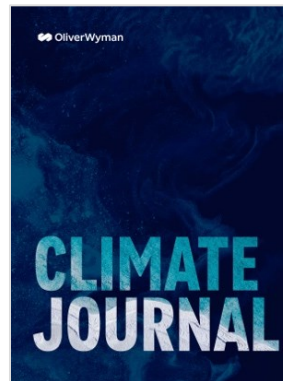
Aviation's Emissions Problem

On Oliver Wyman's Forbes channel, Oliver Wyman looks at why aviation cannot rely on sustainable aviation fuel as a means of reducing the industry's rising emissions



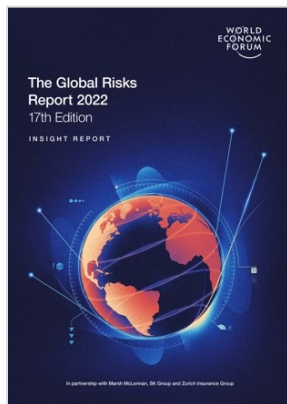
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The New People Shaping Our Future

From extensive research conducted by the Oliver Wyman Forum, here are profiles of the various consumers businesses may bump into in the coming decade



MRO Survey 2021 Recover and Rebuild

This is Oliver Wyman's last survey of executives in aviation's maintenance, repair, and overhaul industry. Our next will be issued in April 2022



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Our aviation, aerospace, and defense experts advise global, regional and cargo carriers; aerospace and defense manufacturers and suppliers; airports; maintenance, repair and overhaul companies; and other service providers in the transport and travel sector. We grow shareholder and stakeholder value, optimize operations, and maximize commercial and organizational effectiveness.

The team's capabilities also include: CAVOK, technical consulting on safety and compliance, maintenance programs, and certification (www.cavok.oliverwyman.com); analytical data tools at PlaneStats.com; and strategies and modeling for market share, network, and fleet planning analyses via our Network Simulation Center.

This deep industry expertise and our specialized capabilities make us a leader in serving the needs of the sector.

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For more information about this study, please contact Brian Prentice at brian.prentice@oliverwyman.com

Authors: Brian Prentice, Anthony DiNota, Derek Costanza, Ian Reagan, Carlo Franzoni, and Madeline Stelle

Editorial: Pat Wechsler

Marketing oversight: Birgit Andersen, Michael Kokias

Design: Melissa Ureksoy, Alvaro Gonzalez, Alejandra Espinosa

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