

GLOBAL FLEET AND MRO MARKET FORECAST 2023-2033

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Global air transport fleet and MRO

| | |
|-----------------------------|----------------|
| Fleet size | 27,385 |
| 2023–2033 fleet growth rate | 2.9% |
| MRO market size | \$93.9 billion |
| 2023–2033 MRO growth rate | 2.9% |

Global civil MRO employment

| | |
|---------------------------------|---------|
| Firms | 4,968 |
| Small/midsize enterprises (SME) | 81% |
| Maintenance employees | 389,840 |

US civil MRO employment

| | |
|---------------------------------|---------|
| Firms | 4,006 |
| Small/midsize enterprises (SME) | 85% |
| Maintenance employees | 178,933 |

US economic activity

| | |
|----------------------------------|----------------|
| MRO market size | \$43.2 billion |
| Parts manufacturing/distribution | \$21.3 billion |
| Total economic activity | \$64.6 billion |

FOREWORD

Oliver Wyman's *Global Fleet and MRO Market Forecast 2023–2033* marks our firm's 23rd 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 reveals how well aviation managed to perform in 2022, despite a litany of challenges. We've essentially moved beyond COVID-19, but if the industry expected 2022 to be a year of unfettered recovery, it was wrong. From Russia's invasion of Ukraine and rising inflation to ongoing supply chain irregularities and labor shortages that made the industry curtail capacity, 2022 tested aviation's resilience. In this year's report, we examine and measure the impact of the many mounting pressures facing the industry, insights that should lead to well-informed business decisions and better navigation of the complex economic landscape.

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

A special note: Late last year, Oliver Wyman elevated the firm's commitment to the aerospace and defense sectors with our acquisition of Avascent, a leading management consulting firm and boutique private equity and M&A adviser for these sectors. With the acquisition, Oliver Wyman added 130 professionals, along with 10 seasoned partners. Please contact us to find out more about our new capabilities.

Meanwhile, we hope you find the data and insights in this year's *Global Fleet and MRO Market Forecast* valuable as you refine your business models and develop strategies moving forward. Oliver Wyman's 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.

Looking forward to working with you this year.

Best regards,



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EXECUTIVE SUMMARY

AVIATION TAKES OFF AGAIN, BUT BUCKLE YOUR SEATBELT

By the beginning of this year, global aviation had recovered much of the territory it lost to the COVID-19 pandemic — despite 2022's widespread labor shortages, the Russian invasion of Ukraine, COVID-19 lockdowns in China, inflation, and dysfunctional supply chains. The global fleet is at 98% of where it was pre-pandemic, airlines are returning to profitability, and aerospace manufacturers are gearing up for their most productive years yet.

In Oliver Wyman's *Global Fleet and MRO Market Forecast 2023-2033*, we project the worldwide commercial fleet to expand 33% to over 36,000 aircraft by 2033 — a compound annual growth rate of 2.9%. Today it numbers almost 27,400, just short of its size in January 2020 — the last month before COVID changed the economy and everyday lives around the globe. And even with 2022's war, global inflation, and higher interest rates, the in-service fleet still managed to increase 7% between January 2022 and January 2023.

Aviation's global aftermarket, which provides the maintenance, repair, and overhaul (MRO) services to keep the fleet flying, expanded 18% in 2022. It's anticipated to grow 22% this year, topping \$94 billion — a mere 2% below its 2019 peak. By 2033, it will reach \$125 billion — a compound annual growth rate of 2.9%. Meanwhile, we expect a record number of aircraft deliveries over the next 10 years, despite current supply chain constraints that will make it hard to meet this year's targets.

And despite rising airfares and a year of delays and cancellations in many of the world's biggest markets, travelers seem undeterred. By December, global passenger traffic — domestic and international combined — reached 82% of the 2019 total. That's the highest level since the pandemic.

NOT ENOUGH AVIATION WORKERS

But while aviation is most assuredly on a growth trajectory after a devastating two years of losses, it's currently carrying a lot of baggage that can't be easily checked. With COVID-19 ostensibly behind us, the industry will be dealing with a series of new and old challenges over the next 10 years that will test its resilience and may temper how fast it continues to expand.

First, there are tight labor markets affecting all regions and all aspects of aviation. In North America, the industry is facing two potentially severe shortfalls in the ranks of commercial airline pilots and aircraft mechanics. By our analysis, the supply gaps will amount to 18% of the total pilot workforce in 2023 and 14% of aviation mechanics. The outlook is for those deficits to grow or at least linger through 2033. The gap between the number of pilots needed and those available has already led to reductions in service to less popular and more rural destinations and has hit regional airlines hardest.

But the shortfall of aviation workers is a global problem. European ground crew shortages were so ubiquitous and severe in 2022 they led to the imposition of capacity limits at some European airports, including London's Heathrow and Amsterdam's Schiphol. In India — the fastest-growing aviation market, according to our latest *Fleet and MRO Forecast* — the desperate need is for more air traffic controllers. But because so many aviation jobs are critical to operations, any ongoing shortage can eventually result in the industry's growth being limited not by a lack of demand but by supply constraints.

PRODUCTION DELAYS

Next, the industry faces hard-to-remedy supply chain snarls that have already led to longer lead times on parts — sometimes of more than a year. As the industry gradually recovered in 2021 and 2022, production and maintenance were both hindered by suppliers unable to fulfill orders and provide products or services in a timely manner. Not surprisingly, much of the breakdown was related to insufficient numbers of workers.

But supplier capacity problems are only likely to multiply once Airbus and Boeing, the globe's largest aircraft manufacturers, begin to implement planned higher production goals, which would be difficult to meet even if supply chains were functioning well. Some of their biggest suppliers have already suggested the elevated production may be beyond what they and the rest of the supply chain can handle.

Without doubt, the higher production reflects the growing demand for aircraft. In February, Air India placed the largest aircraft order in history — 470 aircraft, with a price tag around \$70 billion, based on an Air India statement. Airbus will supply 250 aircraft, and Boeing 220. The order is primarily for narrowbody aircraft, but it also included 787 Dreamliners from Boeing and A350s from Airbus, both widebodies. The carrier reportedly has an option to buy an additional 370. Overall, Oliver Wyman forecasts 20,600 new production aircraft to be delivered over the next 10 years.

HIGHER OPERATING COSTS

As might be expected, the tight supply of many things has pushed prices and operating costs significantly higher. The price increases have touched everything from jet fuel and salaries to aircraft parts, putting pressure on airline earnings in 2022. Still, the International Air Transport Association (IATA) predicts the global airline sector will turn in profits for 2023.

Some price pressures may ease as the global economy begins to cool under the weight of a series of significant interest rate hikes, prompted by rising inflation. The slowdown is particularly pronounced in the advanced economies, among the biggest markets for air travel.

How the economic slowdown will affect aviation is unclear. While air travel demand has been historically linked to economic growth, it managed to outperform the economy during the decade before COVID. Given the expanding middle classes in so many nations, eager to travel, and a [new supersize cohort of Generation Z workers](#) with discretionary cash, our analysis assumes that trend will continue.

WHAT ABOUT EMISSIONS?

Longer term, a major issue facing the industry is climate change and the need to reduce greenhouse gas emissions. While it has been overshadowed by more immediate pressures like COVID-19, labor shortages, and the supply chain, it will likely become a more important issue for aviation to tackle as the decade progresses. Just recently, France enacted legislation that would prohibit air flights between destinations which are served by a train ride of 2.5 hours or less. Several other European countries are working on similar rules. While not onerous, the new prohibition may be a sign of more restrictions to come, particularly in Western Europe.

Despite improvements in engine efficiency and the anticipated switching out of older, less efficient aircraft for new ones, aviation still faces the likelihood of rising emissions, given strong demand for air travel — especially from growing markets like India. The problem for the industry is the lack of solutions to reduce emissions. For instance, Oliver Wyman has no electric-powered, hydrogen-powered, or other alternatively powered aircraft in its forecast. That's because no commercially viable replacement for internal combustion jet engines on commercial airliners is expected this decade and maybe not even the next.

Based on that, aviation will likely need to depend on solutions like sustainable aviation fuel (SAF). SAF, which emits 50% to 80% fewer greenhouse gases, is currently a pricey substitute to traditional jet fuel. Here, too, supply problems exist. Based on our calculations, the best-case scenario for a 2030 supply is 5.4 billion gallons when the industry would [require 16 billion just to keep airline emissions at 2019 levels](#).

RUSSIA AND CHINA

Geopolitical tensions also had an inordinate impact on aviation last year. Russia's invasion of Ukraine resulted in sanctions that limited the amount of Russian raw materials like titanium and aluminum and oil and gas in the market. Sanctions have also blocked Russia's access to Western-manufactured aircraft and parts.

Ultimately, while only 3% of the global market now, the Russian commercial fleet is likely to be upended by these penalties. The sanctions also may thwart Russia's plans to produce its own narrowbody aircraft. By 2033, the Russian fleet is expected to shrink 25% because of the sanctions, based on our analysis. Russian carriers are already being forced to harvest parts from their current fleets to keep other planes flying.

In addition, Russia is apt to find Western companies reluctant to do business with it after President Vladimir Putin prohibited leased Western planes from leaving Russia, essentially expropriating the aircraft. That led to Western countries suspending the airworthiness certificates of these aircraft, making them impossible to sell to non-Russian buyers. Many of them will end up being scraped for parts anyway, but those that aren't will probably never leave Russia again.

China also may have lost some of its luster as an aviation business partner after its strict zero-COVID policy led to lockdowns that closed off MRO capacity Western airlines depended on. Also, affecting aviation aircraft orders and the supply chain may be the increasing competition between the dominant Western aerospace manufacturers and China's still young aerospace industry.

Over the next decade, aviation's drive to expand is likely to bump up against various limitations from an overloaded supply chain, labor shortages, and new rules on emission reduction. For aviation, that will require developing innovative solutions if it is to avoid scaling back on growth. While the demand for air travel will be there, the capacity to meet it may not always be — a challenge the industry can't afford to ignore.

FLEET AND MRO FORECAST SUMMARY

| Region | Africa | Middle East | Asia Pacific | China | India | Latin America | North America | Eastern Europe | Russia | Western Europe | World |
|------------------------------------|--------------|---------------|---------------|---------------|--------------|---------------|---------------|----------------|--------------|----------------|----------------|
| 2023 Fleet | | | | | | | | | | | |
| Narrowbody | 463 | 521 | 2,114 | 3,206 | 502 | 1,134 | 4,369 | 455 | 427 | 3,178 | 16,369 |
| Widebody | 164 | 748 | 1,333 | 463 | 41 | 167 | 1,409 | 51 | 66 | 1,080 | 5,522 |
| Regional jet | 167 | 51 | 211 | 152 | 4 | 233 | 1,782 | 76 | 211 | 367 | 3,254 |
| Turboprop | 293 | 27 | 651 | 0 | 79 | 177 | 562 | 75 | 32 | 344 | 2,240 |
| TOTAL | 1,087 | 1,347 | 4,309 | 3,821 | 626 | 1,711 | 8,122 | 657 | 736 | 4,969 | 27,385 |
| 2033 Fleet | | | | | | | | | | | |
| Narrowbody | 644 | 1,058 | 2,925 | 4,839 | 1,153 | 1,619 | 6,078 | 895 | 200 | 3,953 | 23,364 |
| Widebody | 223 | 1,070 | 1,564 | 682 | 53 | 225 | 1,666 | 105 | 39 | 1,257 | 6,884 |
| Regional jet | 234 | 58 | 270 | 618 | 19 | 240 | 1,359 | 114 | 313 | 313 | 3,538 |
| Turboprop | 368 | 24 | 782 | 182 | 125 | 148 | 554 | 96 | 2 | 238 | 2,519 |
| TOTAL | 1,469 | 2,210 | 5,541 | 6,321 | 1,350 | 2,232 | 9,657 | 1,210 | 554 | 5,761 | 36,305 |
| Fleet growth rates | | | | | | | | | | | |
| 2023–2028 | 3.6% | 7.3% | 2.8% | 4.8% | 9.9% | 2.2% | 1.6% | 8.6% | -10.8% | 1.7% | 2.8% |
| 2028–2033 | 2.6% | 2.9% | 2.3% | 5.5% | 6.1% | 3.2% | 1.9% | 4.0% | 5.9% | 1.3% | 2.9% |
| 2023–2033 | 3.1% | 5.1% | 2.5% | 5.2% | 8.0% | 2.7% | 1.7% | 6.3% | -2.8% | 1.5% | 2.9% |
| 2023 MRO (US\$ in billions) | | | | | | | | | | | |
| Airframe | \$0.8 | \$1.4 | \$3.0 | \$2.6 | \$0.2 | \$0.9 | \$5.3 | \$0.5 | \$0.3 | \$4.1 | \$19.3 |
| Engine | \$1.2 | \$6.1 | \$10.1 | \$3.1 | \$0.6 | \$2.3 | \$9.6 | \$0.6 | \$0.5 | \$9.0 | \$43.0 |
| Component | \$0.6 | \$1.3 | \$3.1 | \$2.1 | \$0.3 | \$1.0 | \$5.5 | \$0.4 | \$0.5 | \$3.6 | \$18.5 |
| Line | \$0.3 | \$0.8 | \$2.0 | \$1.6 | \$0.3 | \$0.7 | \$3.4 | \$0.3 | \$0.4 | \$3.3 | \$13.1 |
| TOTAL | \$3.0 | \$9.6 | \$18.2 | \$9.4 | \$1.4 | \$4.9 | \$23.8 | \$1.8 | \$1.7 | \$20.0 | \$93.9 |
| 2033 MRO (US\$ in billions) | | | | | | | | | | | |
| Airframe | \$0.8 | \$1.8 | \$3.9 | \$3.1 | \$0.6 | \$1.1 | \$5.1 | \$0.7 | \$0.4 | \$4.1 | \$21.6 |
| Engine | \$2.4 | \$10.6 | \$11.5 | \$8.3 | \$2.5 | \$3.2 | \$13.4 | \$1.6 | \$0.9 | \$8.9 | \$63.4 |
| Component | \$0.8 | \$1.9 | \$3.7 | \$3.9 | \$0.8 | \$1.3 | \$5.8 | \$0.7 | \$0.3 | \$3.5 | \$22.8 |
| Line | \$0.4 | \$1.2 | \$2.6 | \$2.9 | \$0.5 | \$0.9 | \$4.3 | \$0.6 | \$0.3 | \$3.8 | \$17.5 |
| TOTAL | \$4.4 | \$15.5 | \$21.7 | \$18.2 | \$4.5 | \$6.6 | \$28.6 | \$3.6 | \$1.9 | \$20.3 | \$125.3 |
| MRO growth rates | | | | | | | | | | | |
| 2023–2028 | 3.2% | 6.9% | 2.8% | 12.3% | 16.4% | 1.3% | 1.3% | 7.0% | -7.0% | 1.8% | 3.9% |
| 2028–2033 | 4.6% | 3.0% | 0.7% | 1.7% | 8.6% | 4.7% | 2.4% | 7.1% | 9.9% | -1.5% | 1.9% |
| 2023–2033 | 3.9% | 4.9% | 1.8% | 6.9% | 12.4% | 3.0% | 1.8% | 7.1% | 1.1% | 0.2% | 2.9% |