Commercial Services Market Outlook

2025-2044

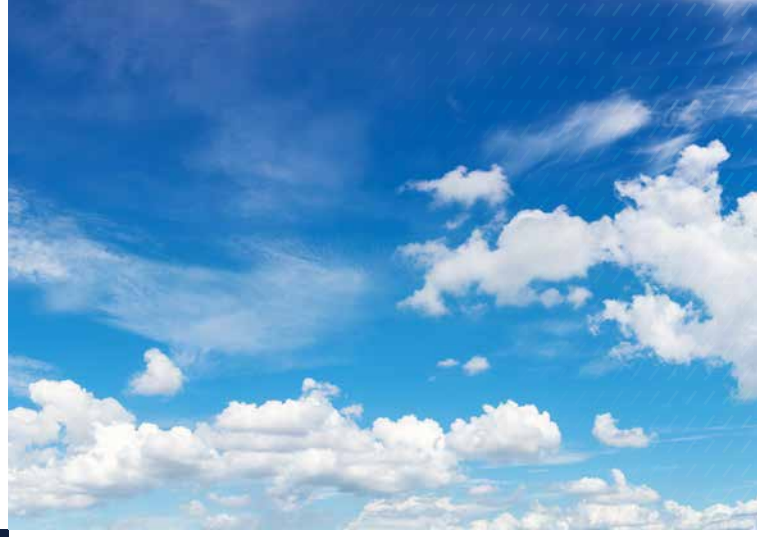


Table of contents

Commercial services introduction

For more than six decades, Boeing has produced an annual Commercial Market Outlook (CMO), drawing upon our deep understanding of global aviation with a long-term forecast for the future of the industry. The Commercial Services Market Outlook (SMO) has been integrated with the Commercial Market Outlook for nearly three decades, underscoring the significance of the aviation industry as a whole.

2025 — A quarter century of aviation

The year 2000 doesn't seem that long ago, but a quarter century of aviation has changed a lot!

- The active fleet has more than doubled
- Passenger air traffic (RPKs) have more than tripled
- Commercial fleet flight hours has more than doubled

> Aftermarket services valued at $4.7 trillion through 2044

The Boeing Commercial Services Market Outlook (SMO) covers the support and services functions commonly found in the aviation market today. The SMO is a 20-year forecast, serving to guide business planning as well as to share with the public our view of industry trends in the commercial market. Boeing models for projecting the size of services markets are analytically linked to the proprietary models we use in forecasting world airline fleet and government budgets. They also are linked to independent assessments of the forces driving specific markets.

Overall, Boeing expects the market for support and services to be worth $4.7 trillion in the 20-year period between 2025 and 2044. Support and services functions are diverse in terms of sales, activity scope, capital intensity, and competitive environments. We segment these service functions as: maintenance, repair, overhaul, and modifications; parts and supply chain; training and professional services; and digital solutions and analytics.

Executive summary

Global outlook

$4.7T

2025-2044 Services

20 year growth 3.8%

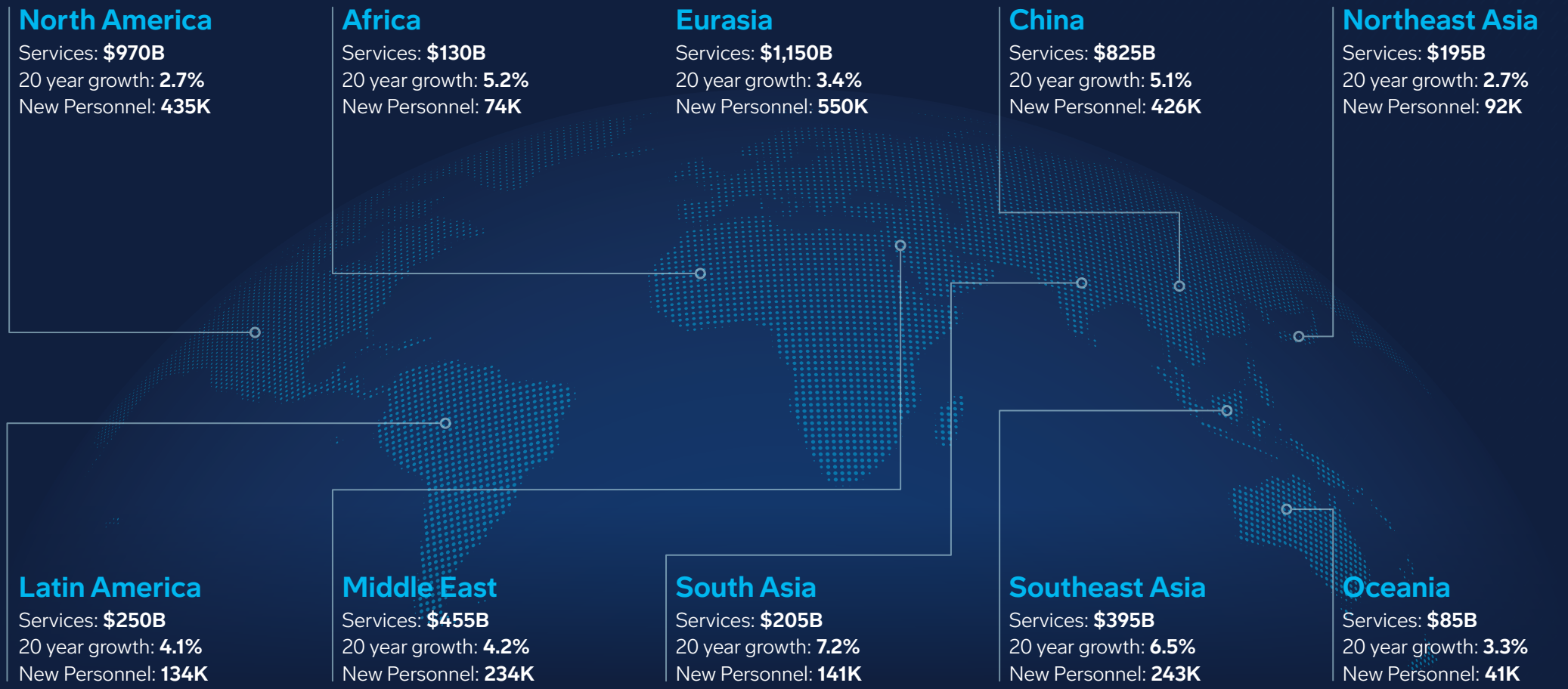
- Maintenance, Repair, Overhaul and Modifications
- Parts and Distribution Services
- Training and Pilot Services
- Digital Services

2.4M

New Personnel

- New Pilots
- New Technicians
- New Cabin Crew

Regional highlights



North America
Services: **$970B**
20 year growth: **2.7%**
New Personnel: **435K**

Africa
Services: **$130B**
20 year growth: **5.2%**
New Personnel: **74K**

Eurasia
Services: **$1,150B**
20 year growth: **3.4%**
New Personnel: **550K**

China
Services: **$825B**
20 year growth: **5.1%**
New Personnel: **426K**

Northeast Asia
Services: **$195B**
20 year growth: **2.7%**
New Personnel: **92K**

Latin America
Services: **$250B**
20 year growth: **4.1%**
New Personnel: **134K**

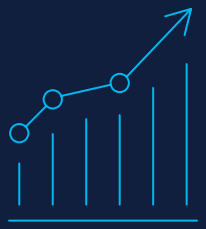
Middle East
Services: **$455B**
20 year growth: **4.2%**
New Personnel: **234K**

South Asia
Services: **$205B**
20 year growth: **7.2%**
New Personnel: **141K**

Southeast Asia
Services: **$395B**
20 year growth: **6.5%**
New Personnel: **243K**

Oceania
Services: **$85B**
20 year growth: **3.3%**
New Personnel: **41K**

Market forces



As the worldwide airline fleet continues to grow along with the pace of economic expansion, demand has grown for aftermarket services designed to increase aircraft reliability and availability while extending the economic lives of airplanes, especially since one-third of platform life-cycle costs are attributed to services.

Additional challenges such as the need for pilots and technicians to not only replace the aging workforce but also increase with the pace of fleet growth will require new and innovative approaches. The addition of new airplane models to an airline's fleet may require that flight decks and interior configurations in older retained airplanes be modified to achieve commonality. Often, the systems on older airplanes require updates to drive operational efficiency or meet new regulatory requirements. Improvements in these areas will drive continued growth in airport and route infrastructure services.

Enhanced productivity and efficiency

By 2044, over 80% of the global aircraft fleet is expected to be e-enabled, highlighting the significant value for operators. The vast amount of data generated by these aircraft is too extensive for manual analysis, making analytical tools essential for quickly identifying issues and recommending solutions.

Operators aim to maximize fleet value and efficiency throughout the aircraft's lifecycle. Predictive maintenance and real-time connectivity during flights can reduce disruptions and minimize delays.

The growing use of mobile devices, such as tablets, among flight and cabin crews reflects the shift towards in-flight connectivity. Electronic flight bags are now standard, enabling pilots to swiftly update navigation charts, monitor weather, optimize fuel use, and enhance situational awareness with real-time maps, especially in congested or low-visibility conditions.

Industry spend and drive for profit

The International Air Transport Association (IATA) compiles the expenses of International Civil Aviation Organization (ICAO) member airlines, which totaled $904 billion in 2024. For 2025, we estimate that world airline expenses, including nonscheduled airlines and airlines of non-ICAO member countries, will total nearly $1 trillion.

Profitability has returned with IATA projecting an EBIT margin of 6.7%, which would represent the highest nominal EBIT in the industry's history at USD 66 billion. A key factor impacting profitability is the decline in yields. Historically, airlines have passed fluctuations in oil prices onto passengers while also absorbing some of the costs. With fuel accounting for 30% of airlines' cost structure, the recent drop in oil prices offers some potential for improved profitability.

Future tariff developments and supply chain disruptions may likely persist in the near-term, impacting passenger and fleet growth rates, thereby exerting pressure on the supply/demand balance and sustaining high load factors.

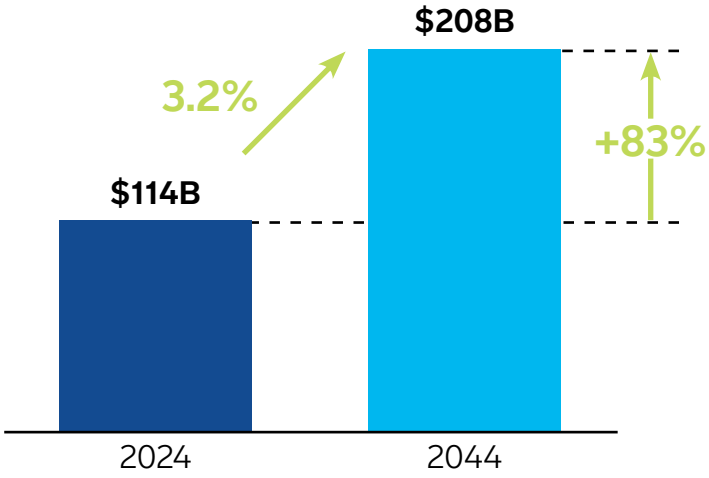
Emphasis on sustainability

The aftermarket sector is increasingly aligning with sustainability goals by focusing on reducing environmental impact and enhancing operational efficiency.

Key initiatives include recycling to minimize waste, incorporating eco-friendly materials, utilizing advanced analytics to enhance aircraft performance, partnering with industry suppliers and stakeholders and adapting to evolving regulations and standards.

By focusing on these areas, the aftermarket sector aims to contribute to the broader sustainability objectives of the aerospace industry, ultimately leading to reduced environmental impact and improved economic performance.

Maintenance, Repair, Overhaul and Modifications



$3,180 Billion
Market 2025-2044

3.2%
growth

This market segment includes all of the parts, engineering and labor for the functions that provide modifications as well as maintaining, repairing and overhauling (MRO) the in-service fleet. A majority of the MRO activities are driven by fleet utilization and cycles. In total, the MRO market is nearly 70% of our $4.7 trillion served market.

Modifications enhancing efficiency and experience

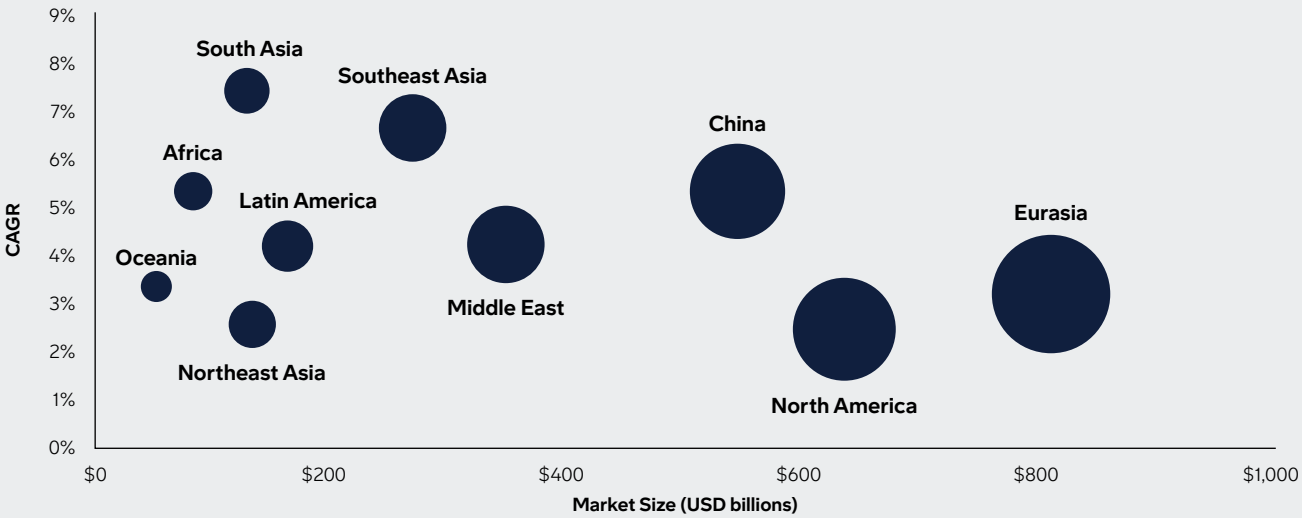
Growing emphasis of fuel efficiency and reducing emissions coupled with aging aircraft are driving operators to invest in modifications that help improve aerodynamics and performance.

Further, airlines are increasingly focusing on enhancing passenger experience through cabin modifications. This includes upgrading seating, in-flight entertainment systems, and connectivity options to meet the expectations of modern travelers.

Teardown trends and cost savings

The trend of delayed aircraft retirements has been notable in recent years, with many operators opting to extend the lifespan of their fleets. However, as the decade progresses, an increase in aircraft teardowns is anticipated, driven by the need to replace aging aircraft. This shift is expected to lead to a greater availability of Used Serviceable Materials (USM), which can provide cost-effective alternatives for MRO operations. As operators and MROs increasingly adopt these lower-cost material options, overall material costs for shop visits may decline, benefiting the aviation industry as a whole.

Maintenance, Repair, Overhaul and Modifications



Rounded to nearest $5billion.

Technology driven MRO

The aviation industry continues to advance its digital transformation, as operators and MROs face increasing demands for efficiency, sustainability, and parts availability. Operators and asset owners continue to leverage data and advanced technological tools to modernize maintenance across their vast global networks.

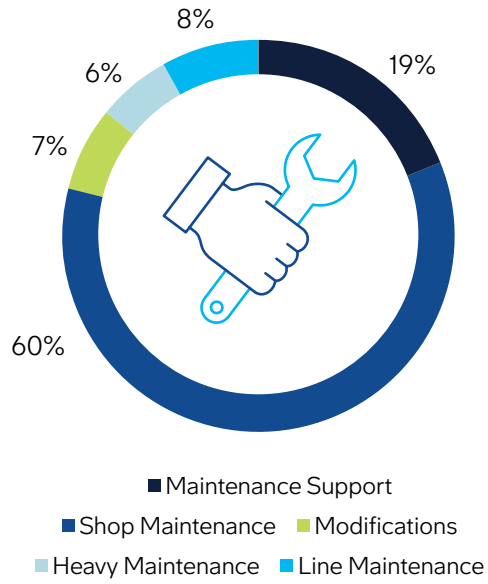
The industry adoption of Artificial Intelligence (AI) and other machine learning tools, AI powered predictive maintenance with proactive health management systems, enable operators to reduce unplanned downtime, increase asset utilization and pre-position inventory accordingly.

Supply chain challenges have increased demand for USM. While USM has traditionally been a logistics and supply based solution, the integration of digital tools, data systems, and automation is now redefining how USM is sourced, certified, managed, and trusted.

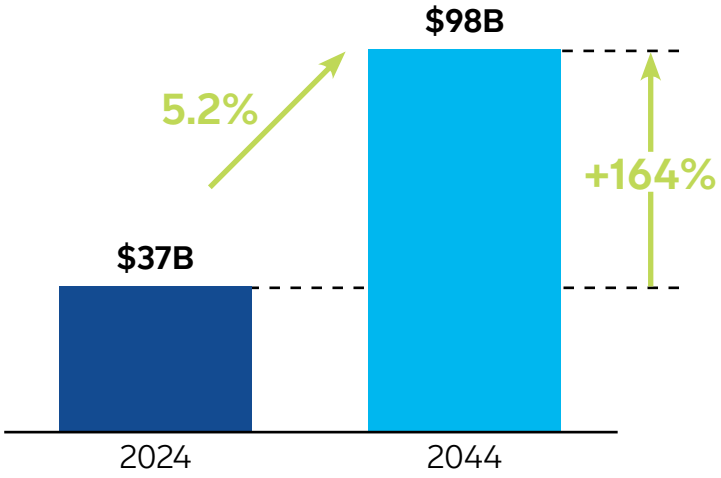
Industry investments in Digital Twins, augmented and virtual reality, drones and robotics which support streamlined inspections, improve training, and reduce labor intensive processes continue to grow. Products like Aviator and Maintenance Performance Toolbox embrace mobile-first cloud-based solutions which enable real-time data access, paperless workflows, and increase collaboration across operations.

Innovations such as 3D printing, blockchain for parts traceability, and enhanced cybersecurity protocols support advances in USM that results in improved quality, efficiency, and reduced turnaround times. Industry demand continues to fuel a technology driven evolution to meet an agile and resilient MRO ecosystem for the future.

$3,180B 2025-2044



Digital Services



$1,290 Billion
Market 2025-2044

5.2%
growth

Within the digital solutions and analytics market are products and services to generate, analyze, and leverage data in a safe and secure way. Solutions range from flight navigation software to aircraft health management systems to enterprise resource planning solutions.

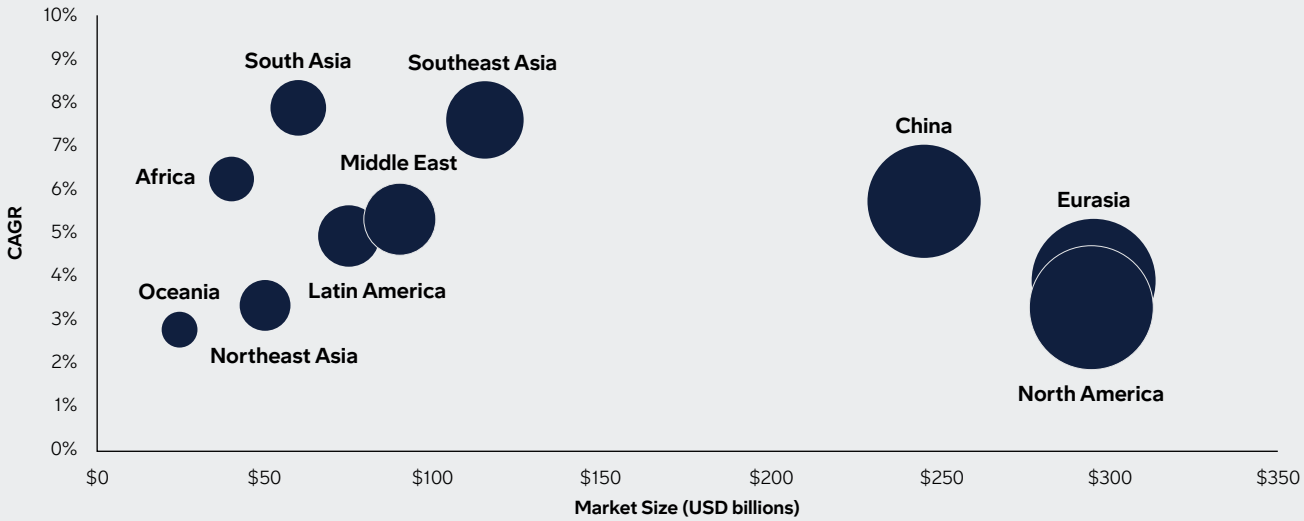
Real-time data systems

Real-time data systems are transforming the aviation industry by enhancing operational efficiency and improving passenger experiences. These systems enable airlines and airports to monitor and manage baggage handling and passenger flow to reduce costly delays and mishandling rates. Additionally, real-time data integration supports informed decision-making, allowing for proactive management of resources and operations. As a result, both airports and airlines can reduce operational expenses by optimizing resource allocation, and decreasing labor costs associated with manual monitoring and troubleshooting of issues.

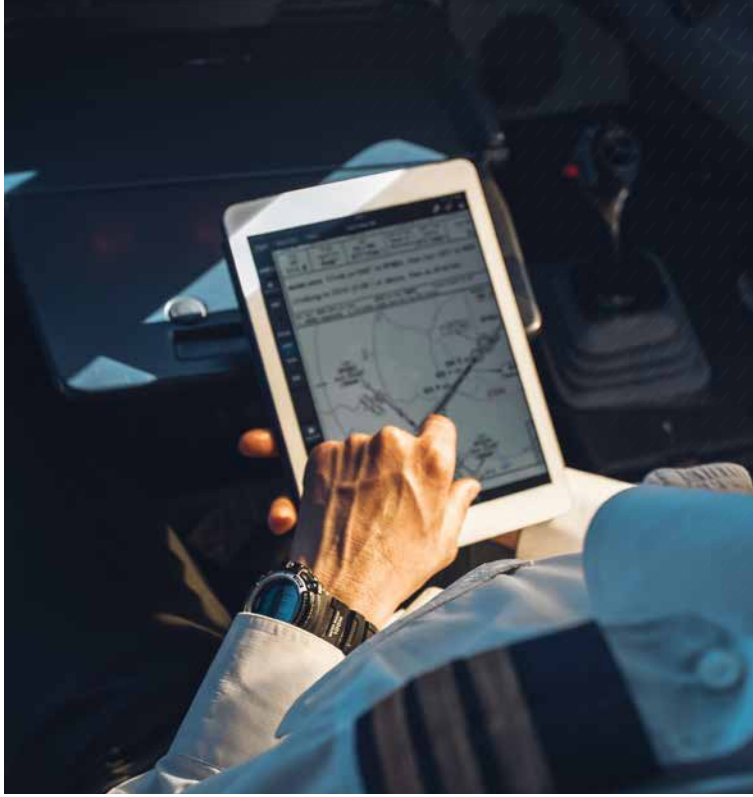
Cybersecurity

Cybersecurity is becoming increasingly critical as the sector faces rising threats, including ransomware and data breaches. Organizations are prioritizing robust cybersecurity measures, such as identity and access management, third-party risk management, and the adoption of Zero Trust architecture. These strategies aim to protect sensitive data and ensure the integrity of digital solutions, from flight navigation software to enterprise resource planning systems.

Digital Services



Rounded to nearest $5billion.



Artificial intelligence

The integration of AI is transforming the aviation industry by optimizing flight navigation, enhancing aircraft health management, and streamlining resource planning. AI-driven tools enable airlines to synthesize large data sets and enhance their ability to make informed decisions. This capability facilitates predictive maintenance, reducing downtime and improving aircraft reliability. As a result, airlines can boost operational efficiency, leading to cost savings and improved service quality.

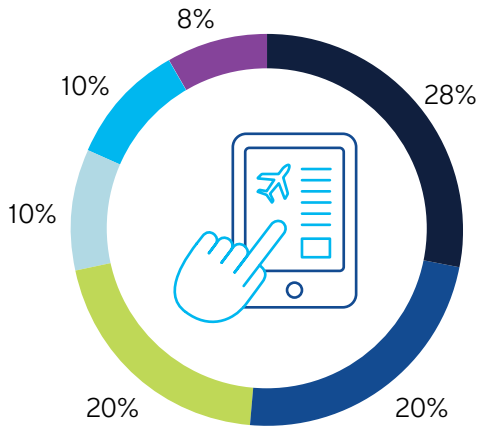
Flight operations

Operations Control Center (OCC) operations are being transformed by generative AI and AI-driven solutions. These technologies optimize flight routes, allowing airlines to reduce fuel consumption and minimize delays, Additionally, AI algorithms are being used to predict weather patterns, allowing flight crews to make informed decisions and adjust plans proactively. The integration of these advanced solutions streamlines real-time decision-making and resource management within the OCC. Consequently, flight operations become more agile and responsive, ultimately leading to a better overall experience for passengers.

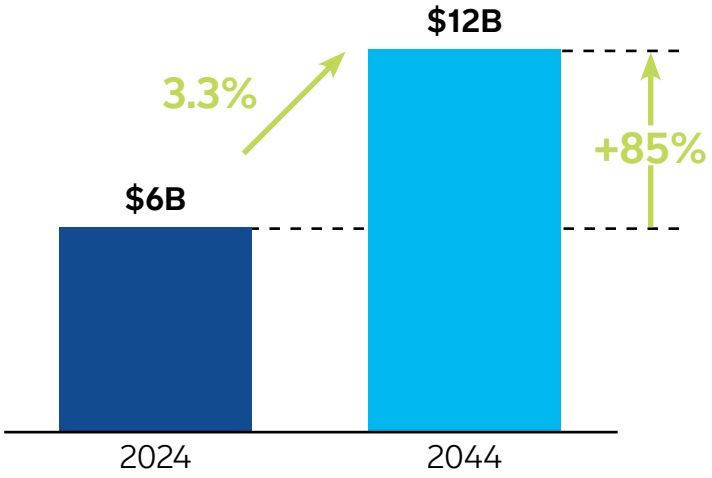
Maintenance

Generative AI is also transforming maintenance operations by helping technicians troubleshoot and analyze maintenance records. This integration streamlines maintenance processes and reduces errors, enhancing aircraft reliability and safety. Additionally, insights support proactive maintenance strategies, enabling airlines to tackle potential issues before they escalate. By improving both planned and unplanned maintenance, AI ensures that aircraft remain in optimal condition and minimizes operational disruptions.

$1,290B 2025-2044



Training and Pilot Services



$190 Billion
Market 2025-2044

3.3%
growth

The training and pilot services market includes flight, maintenance and cabin crew training, simulator products and services, and pilot provisioning services. Effective training and an adequate supply of personnel will remain critical to maintaining the health and safety of the entire aviation ecosystem.

Competency-based training and assessment

Competency Based Training and Assessment (CBTA) is becoming the standard, as global acceptance rates and regulatory approvals continue to rise. Airlines, flight schools and maintenance organizations are realizing the benefits of higher efficacy of CBTA training programs and tools. Successful implementation of CBTA is an important enabler to raising training performance and outcomes.

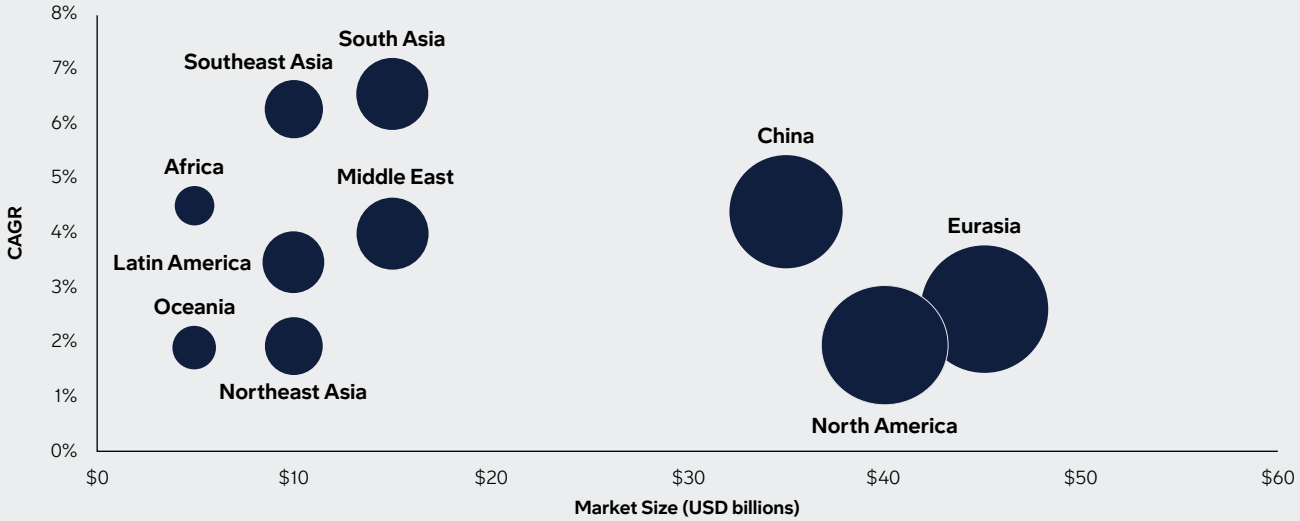
Technology and data integration

Similar to other aftermarket segments, technology integration continues to proliferate across the training market. Digital training has become the norm, with real-time data feedback enhancing flexibility, customization and effectiveness of training. Improved technology in training devices coupled with innovative learning programs and tools will lead to increased acceptance of credit for training performed on lower level devices. Adoption of new technologies to augment maintenance training will strengthen technician capabilities and provide qualified personnel to support a growing need in the market.

Juniority in the workforce

Airlines and MROs are experiencing increasing juniority in the workforce, due to retirements and attrition over the past few years. Along with efficient training programs and technologies, companies that focus on culture, growth and development can increase retention of their workforce in a challenging market.

Training and Pilot Services



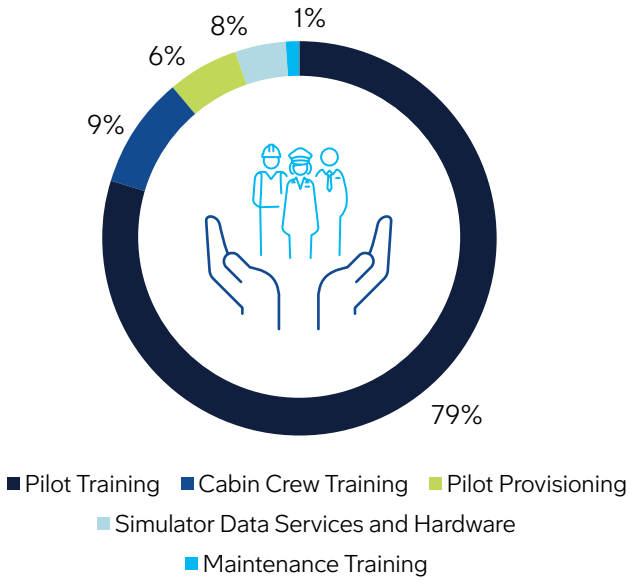
Rounded to nearest $5billion.

Challenges in the pilot labor market

While the pilot labor supply has increased in recent years, demand will continue to rise amid global air traffic growth, leading to challenges for the industry in recruiting and retaining qualified pilots and flight instructors. Pilot provisioning services can fill temporary shortfalls in staffing, while crew planning and scheduling tools can assist in ensuring an adequate number of flight crew are available at the right time and location.

Flight crew salaries comprised roughly 10 percent of an airline's total operating cost in 2024, and upward wage pressures are expected to continue as the labor market remains competitive and union contracts come up for renewal. A wave of retirements in North America and several other regions of the world will exacerbate the challenge as the impact ripples across the industry. Regional markets that have relied heavily on recruiting pilots from outside their home location are increasingly seeking to recruit, train, and develop locally sourced pilots through increased investments in educational outreach and initial training programs. With pilot training forecast to be a $150 billion market in the next two decades, rising training costs coupled with a tight labor market will continue to spur changes to how pilots are trained and retained.

$190B 2025-2044



New Personnel Demand

In 2024, the global airline industry achieved a significant milestone, surpassing pre-pandemic traffic levels first achieved in 2019. This resurgence signals a strong recovery and a return to growth for the sector. Over the past 25 years, the airline industry has demonstrated remarkable resilience, navigating through various regional and global crises. The industry also experienced a period of contraction driven by high attrition.

Looking ahead, the active commercial airplane fleet is projected to nearly double, approaching 50,000 active commercial airplanes by 2044, up from the 2024 fleet of just over 27,000 aircraft. It is expected that nearly 80% of the airplanes currently in service will be replaced over the next 20 years. This increased focus on fleet renewal and replacement will drive a new set of skills required to support the next generation aircraft.

Deliveries are expected to be nearly evenly distributed between emerging markets—such as China, South Asia, and Africa—where a larger proportion will be allocated for growth, and mature markets, where the focus is replacing existing fleets. As emerging markets continue to expand and retirements continue to impact the commercial aviation industry, demand for new personnel will remain critical. Effective training and a sufficient supply of personnel are essential to uphold the health, safety, and prosperity of the global aviation ecosystem.

The Boeing 2025 Pilot and Technician Outlook (PTO) forecasts that 2.4 million new personnel will be required to operate and maintain the global commercial aviation fleet over the next 20 years.

> Commercial aviation will need **2.4 million** new personnel over the next two decades

Forecast on a page

Boeing Commercial Services Market Outlook 2025-2044

	Africa	China	Eurasia	Latin America	Middle East	North America	Northeast Asia	Oceania	South Asia	Southeast Asia	World
Airline Traffic Growth (RPK) (2024-2044)	6.0%	5.3%	3.1%	4.3%	4.4%	2.8%	2.4%	3.0%	7.0%	7.0%	4.2%
Airline Fleet Growth (2024-2044)	4.4%	4.0%	2.4%	3.0%	3.9%	1.3%	1.6%	2.2%	6.7%	6.6%	3.1%
Aircraft Deliveries (2025-2044)											
Regional Jet	90	365	120	25	30	820	20	45	< 10	30	1,545
Single Aisle	865	6,910	7,195	2,110	1,430	6,640	770	565	2,875	3,925	33,285
Widebody	240	1,540	1,415	215	1,370	905	640	185	395	910	7,815
Freighter	10	185	180	15	120	315	80	5	20	20	955
Total	**1,205**	**9,000**	**8,910**	**2,365**	**2,950**	**8,680**	**1,515**	**800**	**3,290**	**4,885**	**43,600**
Services (2025-2044 $B)											
Maintenance, Repair, Overhaul and Modifications	$85	$545	$810	$165	$350	$635	$135	$55	$130	$270	$3,180
Digital Services	$40	$245	$295	$75	$90	$295	$50	$25	$60	$115	$1,290
Training and Pilot Services	$5	$35	$45	$10	$15	$40	$10	$5	$15	$10	$190
Total	**$130**	**$825**	**$1,150**	**$250**	**$455**	**$970**	**$195**	**$85**	**$205**	**$395**	**$4,660**
Services Growth (USD 2024-2044)	**5.2%**	**5.1%**	**3.4%**	**4.1%**	**4.2%**	**2.7%**	**2.7%**	**3.3%**	**7.2%**	**6.5%**	**3.8%**
New Personnel (2025-2044)											
Total Demand	**74,000**	**426,000**	**550,000**	**134,000**	**234,000**	**435,000**	**92,000**	**41,000**	**141,000**	**243,000**	**2,370,000**

For more information, visit our website:

boeing.com/commercial/market/services-market-outlook/

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Boeing Global Services
Services Market Analysis
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