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Let China's big planes soar in the blue sky

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COMAC MARKET FORECAST

2024 - 2043

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MARKETFORECAST 2024 - 2043 COMAC

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1 Preface

In 2023, as the shadow of the pandemic nearly dissipated, the global aviation industry continued its rapid recovery, with transportation indicators approaching pre-pandemic levels. According to data from the International Air Transport Association (IATA), global revenue passenger kilometers (RPK) grew by 36.9% compared to 2022, reaching 94.1% of the 2019 level. Among these, international passenger traffic reached 88.6% of the 2019 level, while domestic passenger traffic increased by 3.9% compared to 2019. The Asia-Pacific region experienced the fastest growth, with China's domestic market achieving a staggering annual growth rate of 138.8%. On the cargo side, measured by cargo tonne kilometers (CTK), global air cargo demand in 2023 was 3.6% lower than in 2019, with full-year cargo demand essentially flat compared to 2022, indicating that the global air cargo industry is gradually returning to normal. The recovery in aviation demand has significantly enhanced the prospect for airlines to achieve profitability, but due to uneven economic recovery across regions, the profitability of airlines varies. North America, Europe, and the Middle East were the first to return to profitability in 2023. The Asia-Pacific region was expected to achieve profitability in 2024, while Africa and Latin America were expected to end their deficits as late as 2025.

Looking ahead, the global aviation industry will face opportunities for positive market growth and technological innovation. According to IATA's forecast, the aviation industry will continue its strong recovery momentum in 2024, with global air passenger traffic expected to reach 4.96 billion, approaching or surpassing pre-pandemic levels of 2019. The industry is actively embracing technological innovation and digitalization, with artificial intelligence (AI) expected to continue driving smart operations at airports and airlines, from biometric boarding to AI-driven data analysis systems. In the aviation manufacturing sector, technologies such as smart factories, digital factories, and additive manufacturing will help the industry produce, design, and deliver aircraft more efficiently. However, the industry still faces numerous challenges: the global economy is undergoing profound changes, geopolitical tensions, elevated jet fuel prices, energy structure transitions, supply chain issues, labor shortages, low airline net profits, high regulatory pressure, and high infrastructure costs all add significant uncertainty to the development of the aviation industry.

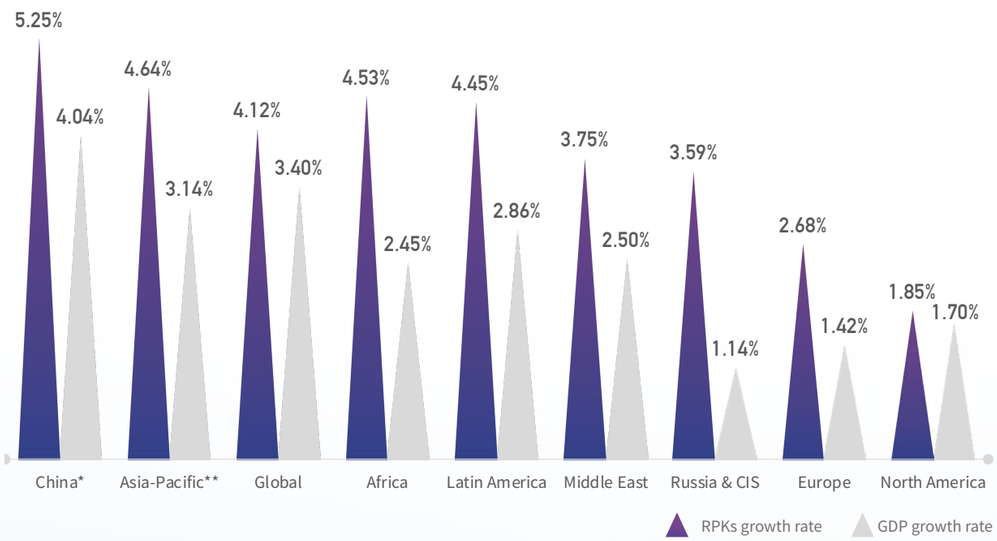
For the past fifteen years, COMAC has closely monitored changes in the aviation market, conducting in-depth global market development, research, and forecasting. The "COMAC Market Forecast Annual Report (CMF) (2024-2043)" provides a deep analysis of future trends in the global and Chinese domestic aviation markets. The report predicts that over the next twenty years, the global RPKs will grow at an average annual rate of 3.75%, with an expected delivery of 43,863 jet airliners worth an estimated $6.6 trillion. Additionally, 3,077 new freighters and converted freighter aircraft are expected to be delivered. The report aims to share our insights and expectations for the aviation market through scientific data analysis and a deep understanding of the industry. COMAC will work hand in hand with industry partners to jointly create a new chapter in air transport history. In the aviation manufacturing sector, technologies such as smart factories, digital factories, and additive manufacturing will help the industry produce, design, and deliver aircraft more efficiently. However, the industry still faces numerous challenges: the global economy is undergoing profound changes, geopolitical tensions, elevated jet fuel prices, energy structure transitions, supply chain issues, labor shortages, low airline net profits, high regulatory pressure, and high infrastructure costs all add significant uncertainty to the development of the aviation industry.

2024-2043 Overview of Forecast Data

	China*	Asia-Pacific**	Europe	Latin America	Middle East	North America	Russia& CIS	Africa	Global
Average GDP Growth Rate	4.04%	3.14%	1.42%	2.86%	2.45%	1.70%	1.14%	3.40%	**2.50%**
Average RPKs Growth Rate	5.25%	4.64%	2.68%	4.45%	4.53%	1.85%	3.59%	4.12%	**3.75%**
2042RPKs (Trillion)	**4.52**	**4.56**	**3.72**	**1.27**	**2.44**	**3.05**	**0.74**	**0.53**	**20.83**
Deliveries									
Regional Jet	821	564	330	167	58	1,423	281	248	**3,892**
Single-Aisle	6,881	6,960	7,148	2,043	1,711	6,250	636	869	**32,498**
Twin-Aisle	1,621	1,812	1,224	284	1,316	806	130	280	**7,473**
Freighter	152	43	177	13	53	491	11	8	**948**
Total	**9,475**	**9,379**	**8,879**	**2,507**	**3,138**	**8,970**	**1,058**	**1,405**	**44,811**
Market Value B$									
Regional Jet	42	29	17	9	3	69	15	13	**197**
Single-Aisle	827	853	849	250	212	775	69	99	**3,934**
Twin-Aisle	537	613	402	90	498	243	38	90	**2,511**
Total	**1,406**	**1,495**	**1,268**	**349**	**713**	**1,087**	**122**	**202**	**6,642**
2023Fleet* **									
Regional Jet	150	132	163	56	52	1,514	207	153	**2,427**
Single-Aisle	3,398	2,401	3,835	1,263	651	4,700	675	467	**17,390**
Twin-Aisle	713	931	913	123	676	665	92	147	**4,260**
Freighter	279	197	382	156	82	1,059	104	66	**2,325**
Total	**4,540**	**3,661**	**5,293**	**1,598**	**1,461**	**7,938**	**1,078**	**833**	**26,402**
2043 Fleet									
Regional Jet	831	572	330	206	97	1,424	428	332	**4,220**
Single-Aisle	7,499	7,338	8,032	2,320	2,008	6,997	923	1,262	**36,379**
Twin-Aisle	1,731	1,828	1,363	359	1,505	979	204	363	**8,332**
Freighter	444	321	742	257	147	1,396	101	97	**3,505**
Total	**10,505**	**10,059**	**10,467**	**3,142**	**3,757**	**10,796**	**1,656**	**2,054**	**52,436**

*China includes Hong Kong, Macau and Taiwan ** Asia-Pacific excludes China ***Excluding 'In Storage' Source: COMAC, Cirium, IHS

Global Forecasts of RPKs and GDP Growth Rates for the Next Two Decades



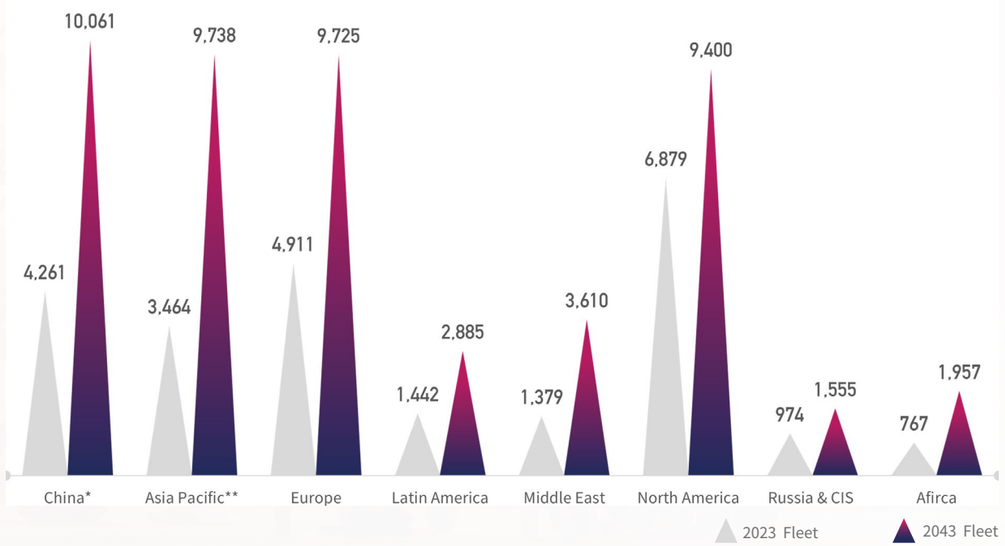
*China includes Hong Kong, Macau and Taiwan**Asia Pacific excludes China
RPKs growth rate is based on 2019's standard

Source: COMAC, IHS

2 Executive Summary

In the next twenty years, global revenue passenger kilometers (RPKs) are expected to grow at an average annual rate of 3.75%. This projection is primarily based on the assumption that the global economy will maintain an average annual growth rate of 2.50% through 2043. It is also anticipated that China's RPKs will grow at an average annual rate of 5.25% over the next twenty years.

Global Fleet Forecast



*China includes Hong Kong, Macau and Taiwan ** Asia-Pacific excludes China

Source: COMAC, Cirium

Passenger Jet Fleet and Traffic Forecast Summary

	Global Total		China		
	Fleet	RPKs (trillion)	Fleet	% of global total	RPKs (trillion)
2023	24,077	7.8	4,261	17.7%	1.2
2028F	31,542	11.8	5,764	18.3%	2.1
2033F	37,463	14.3	6,980	18.6%	2.8
2038F	42,913	17.4	8,286	19.3%	3.6
2043F	48,931	20.8	10,061	20.6%	4.5
2024–2043 CAGR	**3.60%**	**3.75%**	**4.40%**	--	**5.25%**

Source: COMAC, Cirium

It is expected that the total air passenger demand in 2043 will be 2.7 times that of 2023. The fleet size is forcast to reach 48,931 aircraft by 2043, which is more than twice of the current operating fleet of 24,077 aircraft.

It is expected that out of the current operating fleet, 19,009 aircraft (around 78.9%) will be retired from commercial passenger services in the next twenty years. They will be converted to business aircraft, freighters and other roles, or permanently scrapped and subsequently replaced. Additionally, there is a need of 24,854 new aircraft in the global fleet market. Therefore, we expect that there will be a need for the delivery of over 43,863 new aircraft worth $6.6 trillion over the next two decades for both replacement and growth, 74.3% of which will be single-aisle jets. It is estimated that China-based airlines will take 9,323 of the total delivery, worthing around $1.4 trillion.

2024-2043 Passenger Jet Delivery Forecast Summary

		Global Total		China
		Deliveries	Market value (hundred million $)	New deliveries
Regional Jets	SMALL	110	25	0
	MEDIUM	413	197	0
	LARGE	3,369	1,747	821
Single-Aisle	SMALL	2,751	2,525	260
	MEDIUM	19,169	22,500	5,070
	LARGE	10,578	14,318	1,551
Twin-Aisle	SMALL	5,225	15,683	1,062
	MEDIUM	1,506	5,845	477
	LARGE	742	3,593	82

Source: COMAC

3 Development Environment Of Air Transportation

3.1 Global Economy

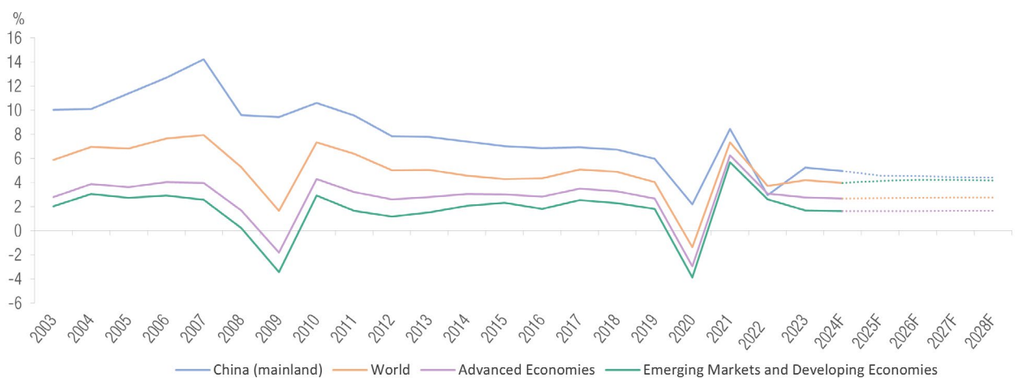
In 2023, as the COVID-19 pandemic gradually subsides and global inflation eases, the global economy shows signs of recovery and economic activities grow steadily. The global GDP growth rate was 5.8% in 2021, and the growth rate dropped slightly to 3.1% in 2022. In 2023, the growth rate continues to slow down to 2.71%. In 2024, interest rates in countries around the world remain high, conflicts further escalate, international trade weakens, and climate disaster increase. The combination of various risk factors brings huge challenges to global growth, and also tests the economic resilience and recovery momentum of various countries. IHS predicts that global economic growth will slow down for the third consecutive year, from 2.75% in 2023 to 2.56% in 2024, and the global economy will tend to a soft landing.

Among major economies, the US consumer spending is relatively strong, the labor market remains resilient, inflation has eased, and the probability of the US economy falling into recession has decreased. However, the public is still troubled by high inflation. As the high interest rate environment continues, fiscal policy slows down, and the trade deficit widens, the economic growth rate will decline to a certain extent. The US economic growth rate is expected to rise to 2.39% in 2024, but as fiscal policy gradually tightens and the softening labor market slows down total demand, the growth rate will then slow to 1.58% in 2025. Eurozone economic growth will accelerate, but as a result of tight monetary policy, the lingering impact of past energy costs, and planned fiscal consolidation, the rate of change will be low. Eurozone growth is expected to pick up from a low growth rate of 0.5% in 2023 to 0.73% in 2024 and 1.49% in 2025. The recovery is expected to be driven by stronger household consumption as the impact of the energy price shock fades and falling inflation supports real income growth.

In 2023, the Asia-Pacific region (including China) will lead the economic growth of all regions. In 2024, despite the uncertainty of the external environment, factors such as the end of the interest rate hike cycle in major economies and the continued recovery of commodity trade will boost Asia's economic growth, leading to a postive overall outlook for the Asia-Pacific region. The economic growth rate in the Asia-Pacific region is expected to slow down slightly to 4.16% in 2024. In 2024, China's economy will decline slightly to 4.96% due to factors such as increasing pressure from global fragmentation and deepening adjustments in the real estate industry. However, as China accelerates the development of new quality productive forces, improves the labor market enviroment, and increases residents' income, the rising consumption will boost China's economic growth. In 2024, China will still be the largest engine of world economic growth.

In general, the global recovery process is steady but slow, with regional differences. The economic performance of different regions varies greatly. The economic growth of China and the Middle East slows down, Europe and the Americas grow slowly, Asia-Pacific, Latin America and parts of Africa maintain sustained rapid growth, and Russia is undergoing economic transformation affected by the war and may boost the economic growth in 2024. According to IHS forecasts, in the next 20 years, the global economy will maintain a growth rate of 2.50% (based on 2019), of which China mainland will grow by 3.93%, developed economies will grow by 1.51%, and emerging and developing economies will grow by 3.80%.

Comparison of GDP Growth Rate Trends of Major Global Economic Entities(2003-2028)



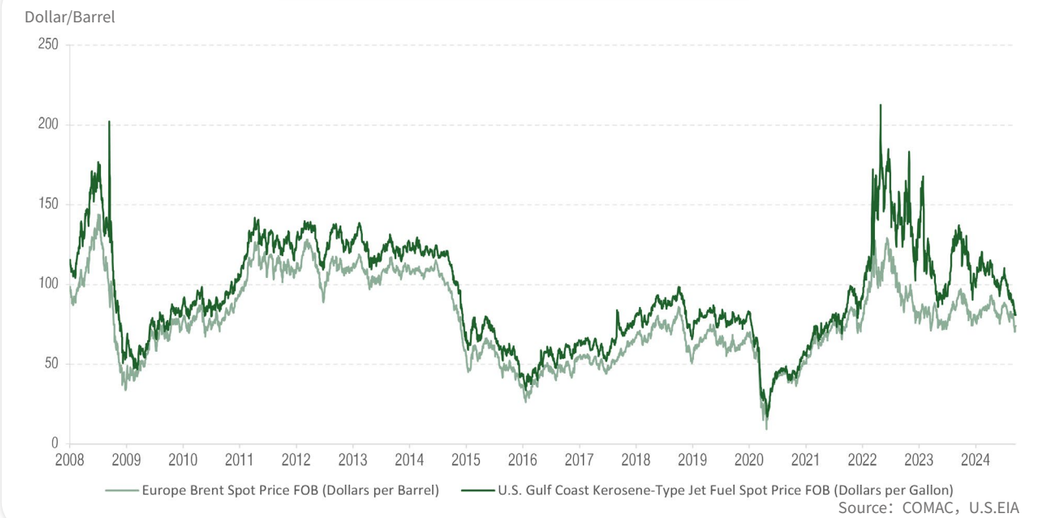
Source：COMAC，IHS

3.2 Oil Price

In the post-pandemic era, major international geopolitical events such as the Russia-Ukraine conflict, the Israeli-Palestinian conflict, and the Sudanese armed conflict have emerged one after another, driving the global oil and gas market to continue to be profoundly reshaped. Although the overall international oil price has slightly fallen, the oil and gas prices are still fluctuating at a high level. According to official data from the U.S. Energy Administration, in 2023, the average annual prices of Brent and USGC oil is US$82.5/barrel and US$113.4/barrel respectively, decreased 18.2% and 20.0% year-on-year.

In 2024, OPEC+ maintains oil prices by deepening and extending the production cut plan, while non-OPEC+ oil producers,such as the United States, seize market share by increasing production. The flow of international oil and gas trade shifts from "counterclockwise" to "clockwise", and the supply sources of Asia-Pacific and Europe also shifts. European oil and gas will "leave Russia and rely on the United States", while Russian oil and gas exports will "turn east to south". The United States and OPEC form a bipolar pattern and become the main source of new global production. The growth of global oil demand is mainly driven by the rapid growth of developing economies (especially in Asia). However, as the new supply from non-OPEC+ arrives this year, it is expected that the global oil market will be oversupplied by the end of 2024. Due to the increased demand from emerging economies (especially China), the oil price level is expected to remain close to US$90 per barrel (Brent crude oil) in the first half of the year, and will decline slightly by the end of 2024. As economic activities in major countries weaken, the growth rate of global oil demand will slow down. Under energy security concerns, upstream investment in oil and gas has reached the highest level in 9 years. The rise of emerging energy, the transformation and upgrading of traditional energy, and the reconstruction of the global energy governance system are profoundly affecting the pattern and development trend of the global energy market.

WTI International Crude Oil Futures Price (2008-2024)



Source：COMAC，U.S.EIA

3.3 Regulations and Policies

Changes in global aviation policies often have a profound impact on the aviation market. Since the onset of the COVID-19 pandemic, the global aviation market has been severely affected. To promote recovery and development, several regions and countries have signed Open Skies agreements and adopted more flexible air rights policies, gradually relaxing restrictions on flights operated by foreign airlines. These measures have led to an increase in flights and passenger traffic.

Open Skies and liberalized air rights policies aim to reduce government intervention in the aviation market and foster free competition among airlines. As international travel slowly recovers post-pandemic, China has signed new bilateral Open Skies agreements with multiple countries, further opening its aviation market and driving the recovery of international flights and passenger flow.

In 2023, the United States signed an Open Skies agreement with Mongolia, bringing the total number of countries with which the U.S. has signed such agreements to over 130 by the end of the year. In Latin America, several countries have promoted the integration and liberalization of the aviation market through regional agreements, such as the Southern Common Market (MERCOSUR) and the Caribbean Community (CARICOM) Air Transport Agreement. These agreements aim to enhance regional aviation connectivity and market development through a unified policy framework. In the European Union, in addition to internal agreements, the EU has signed Open Skies agreements with multiple countries and regions, promoting market liberalization and competition in the aviation sector. For instance, agreements between the EU and the United States, Canada, and some Latin American countries have led to an increase in transatlantic flights and the opening of the market.

In 2023, the ASEAN-EU Comprehensive Air Transport Agreement (ASEAN-EU CATA) was officially implemented. This agreement is expected to boost tourism and commercial activities between the two regions, bringing significant economic benefits. As the world's first inter-bloc air transport agreement, ASEAN-EU CATA represents a significant milestone in the EU's external aviation policy and is seen as a crucial step in the post-pandemic recovery of the aviation market. This agreement sets an example for other regions and may pave the way for more inter-bloc Open Skies agreements, promoting the liberalization and integration of the global aviation market. It holds great historical significance, offering new opportunities and possibilities for the future development of the global aviation industry.

It is believed that countries and regions will continue to optimize policies and enhance regional cooperation to promote the healthy development and sustainable growth of the aviation market in the future.

3.4 Sustainable Development

In order to keep temperature increases within the 1.5 °C (2.7 °F) set out in the Paris Agreement and to prevent the worst effects of climate change, the world needs to achieve net-zero carbon emissions around mid-century. Aviation accounts for 2% of total global carbon emissions, and in 2021 the International Air Transport Association (IATA) at its 77th Annual Conference endorsed a resolution for the global air transportation industry to achieve net-zero carbon emissions by 2050.

IATA released the "World Aviation Industry Zero Carbon Emission Pathway Comparison Report"(hereinafter referred to as the "Report" in this section), pointing out that the realization of "zero carbon emission" by 2050 is the biggest challenge in history faced by the whole industry. The paths to achieve this goal include: upgrading aviation energy, breakthroughs in aircraft technology and fleet optimization, improving operational efficiency, promoting green finance, and providing necessary policy support. In addition, in order to enhance passengers' motivation to participate in environmental protection, domestic and international airlines such as China Eastern Airlines and Swiss International Air Lines have adopted blockchain technology to ensure the transparency and traceability of carbon credit transactions.

Sustainable Aviation Fuels ("SAF"), the first option for carbon reduction and decarbonization, is expected to achieve emission reductions of between 24% and 70% (median 53%). However, feedstock availability and fluctuating production costs relative to fossil fuels make SAF capacity uncertain. It will take longer for hydrogen and electric aircraft to become widespread than SAF. Some agencies also projected reductions in carbon emissions due to reduced travel demand, but the reductions were limited to less than 10 percent. In addition, all agencies unanimously concluded that market regulation and other means of carbon removal, such as afforestation, would be necessary to achieve the intended emission reduction targets.

COMAC has always been committed to providing customers with safer, more economical, more comfortable and more environmentally friendly commercial aircraft, and contributing to the country's "dual-carbon" goal. In 2022, COMAC carried out SAF applied research and testing; in February 2024, it received airworthiness approval from the Civil Aviation Administration of China (CAAC); and in June 2024, China's domestically developed regional jet and large passenger jet successfully completed their first SAF refueling demonstration flights.

3.5 Technological Innovation

In 2023, generative artificial intelligence (AI) emerged in the aviation industry, becoming a focal point for airports and airlines. Civil Aviation Resource Net predicts that around 97% of airlines plan to develop generative AI. The metaverse, which garnered significant attention in 2022, is no longer a hot topic in the industry. The industry focus gradually shifting towards Urban Air Mobility (UAM). With the advent of electric vertical take-off and landing (eVTOL) aircraft and drones, the UAM industry is expected to experience substantial growth. By 2030, investments in the UAM sector are projected to increase from $5 billion in 2022 to $28 billion. Additionally, digital identity and biometric technologies will be adopted by 82% of airlines by the end of 2026, with 67% of companies utilizing contactless technology. Undoubtedly, new technologies are transforming the aviation industry at an unprecedented pace..

3.5.1 New Power Technology

The EHang 216, an eVTOL electric vertical take-off and landing aircraft developed by EHang, completed multiple passenger test flights in 2023. It launched the first Urban Air Mobility (UAM) pilot project in Guangzhou, offering short-distance passenger and logistics services.

In December 2023, EcoPulse, a hybrid-electric prototype developed in collaboration between Dassault, Safran, and the French National Aerospace Research Center, successfully completed its maiden flight. This milestone marks significant progress in the application of hybrid-electric aircraft technology in civil aviation. The project aims to explore the use of hybrid-electric propulsion system to reduce carbon emissions, noise pollution, and fuel consumption in civil aviation.

3.5.2 Artificial Intelligence (AI)

In 2023, China Eastern Airlines introduced artificial intelligence (AI) and machine learning technologies to optimize flight scheduling and resource allocation. By analyzing historical flight data, weather forecasts, and passenger bookings, the AI system can predict flight demand and potential delays in advance, thereby optimizing aircraft and personnel scheduling, improving operational efficiency, and reducing delays.

Delta Air Lines in the United States implemented an AI-driven customer service system, significantly enhancing passenger service efficiency. Delta's AI customer service system handles common issues such as flight status inquiries, baggage tracking, and seat change requests. The introduction of this system not only reduced the workload of human customer service agents but also improved passenger satisfaction.The project aims to explore the use of hybrid-electric propulsion system to reduce carbon emissions, noise pollution, and fuel consumption in civil aviation.

3.5.3 Drones and Autonomous Driving Technology

Shanghai Pudong International Airport has introduced drone technology for runway and apron inspections. Equipped with high-definition cameras and infrared sensors, these drones can monitor runway conditions and detect potential safety hazards in real-time, improving airport safety and efficiency.

Amsterdam Schiphol Airport has incorporated autonomous driving technology into its ground service vehicles. The use of autonomous baggage tugs and refueling trucks has increased the efficiency of ground services and reduced the safety risks associated with human operation.

In 2023, technological innovations have made significant strides in the global civil aviation industry, enhancing operational efficiency, improving passenger experience, and promoting sustainable development. Both domestic and international airlines have advanced by adopting technologies such as AI and drones. These innovations have not only boosted airline competitiveness but also provided passengers with more convenient and comfortable flying experiences while advancing green aviation. Looking ahead, with ongoing technological advancements, the civil aviation industry is expected to see further innovations and transformations, further improving operational efficiency, passenger experience, and environmental friendliness.

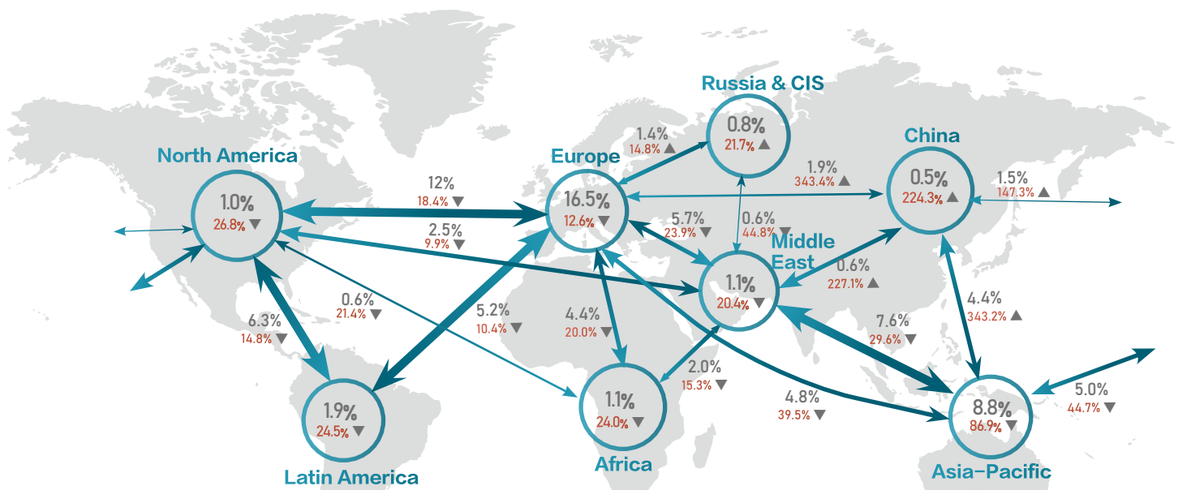
4 Global Aviation Market

4.1 Changes in Route Networks

In 2023, the global aviation industry experienced a recovery. With countries fully lifting travel restrictions and some implementing visa-free policies to boost tourism, international route networks expanded significantly, and capacity notably increased. Airlines added flights and expanded routes to meet the rapidly growing demand from passengers.

Domestic route ASKs (Available Seat Kilometers) globally increased by 11.8% compared to 2022, while international route ASKs grew by 33.5% relative to 2022. Following the lifting of travel bans in the Asia-Pacific region and China at the end of 2022, the growth rate of ASKs for flights from China to Europe and China to Asia-Pacific exceeded 300%, with capacity growth for flights from China to the Middle East exceeding 277% and from China to North America exceeding 100%. The Asia-Pacific region, having experienced rapid growth in the previous year, continued to show strong growth in 2023, with ASKs for routes from Asia-Pacific to Russia and neighboring countries growing by 175%, internal Asia-Pacific routes, as well as those to Europe and Latin America, saw growth of over 70%. International ASKs between the North Atlantic region, Europe, Africa, and Latin America saw significant growth compared to 2022, with ASKs for flights from Europe to Africa and the Middle East increasing by over 20%, and internal European and transatlantic routes growing by over 10%. Notably, due to the impact of the Russia-Ukraine conflict, capacity for routes to Russia and neighboring areas, except for North America and Latin America, showed a growth trend. The distribution and growth of major international route ASKs by region are illustrated in the figure.

Major International Passenger Flows and Changes by Region in 2023



The circular area represents the international market within the region
The arrows represent international markets across regions, with the thickness of the arrows being directly proportional to the size of passenger traffic
The black text indicates the market's share of global ASKs
The red text indicates the growth rate of ASKs in the market compared to 2022
▲ Indicates a growth rate higher than the 2022 level
▼ Indicates a growth rate lower than the 2022 level

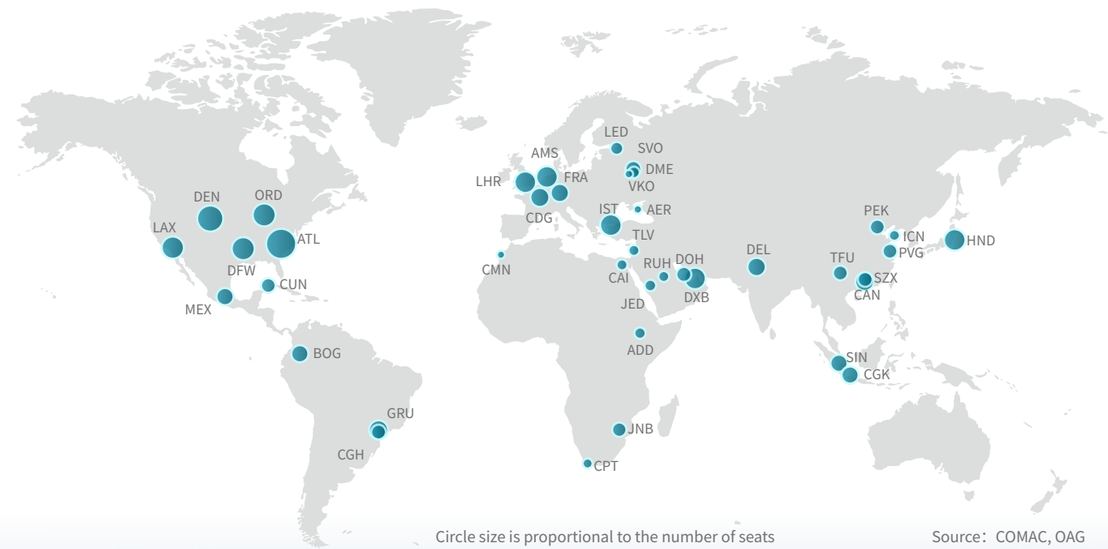
Source：COMAC, OAG

4.2 Changes in Airports

Compared to 2022, the majority of countries have seen a rapid recovery in international flights. With the gradual recovery of the global economy and the resurgence of the tourism market, major international hub airports have resumed their crucial roles after enduring the impacts and challenges of the pandemic. When comparing airport throughput rankings by region, the top five airports in North America, Europe, Africa, and the Middle East in 2023 remain largely unchanged from 2019. However, in regions such as Asia-Pacific, China, Latin America, and the CIS (Commonwealth of Independent States), the relaxation of travel restrictions has affected the rankings of airports that previously higher domestic market shares. For instance, airports like Jakarta, Shenzhen, Chengdu Tianfu, Cancun, São Paulo, and Sochi have entered the top five in their respective regions.

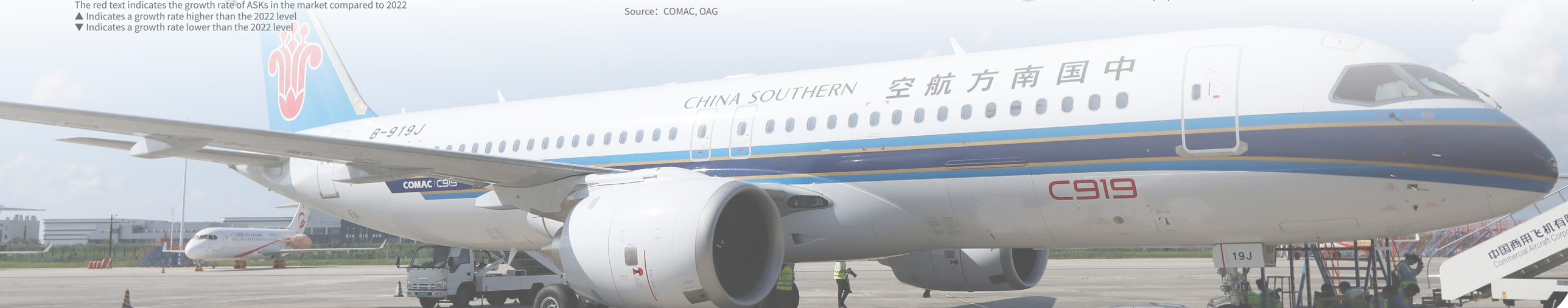
Compared to 2013, some regions have seen the emergence of new hub airports, such as Addis Ababa Airport in Africa, Sochi Airport in Russia and the CIS, Cancun Airport in Latin America, and Delhi and Incheon airports in the Asia-Pacific region. This indicates rapid growth in the African, Latin American, and Asian markets. The emergence of these new airports has led to a decrease in market concentration in some regions. Except for the Middle East, Latin America, and Africa, the proportion of seats at the top five airports in other regions in 2023 is lower than in 2013, with the largest decreases observed in Russia/CIS and China, approaching 20%.

2023Top Five Airports in Terms of Global Seats Capacity by Regions



Circle size is proportional to the number of seats

Source：COMAC, OAG

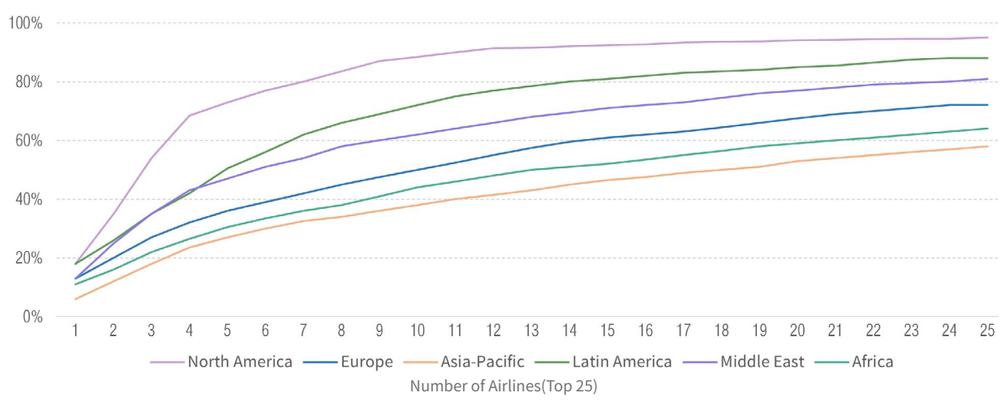


4.3 Development of Airlines

In 2023, the global aviation industry experienced a full recovery, with passenger traffic increasing by 36.9% year-over-year, reaching 94.1% of the 2019 levels. International passenger traffic grew by 41.6% year-over-year, approaching pre-2019 levels, while domestic passenger traffic increased by 30.4% year-over-year, surpassing 2019 levels. Airline revenue for 2023 was approximately $896 billion, a 21.7% increase compared to the previous year, surpassing 2019 revenue levels by 7%. Net profit reached $23.3 billion, exceeding levels seen in 2010. Financial conditions for airlines across regions showed significant improvement, with notable performance in the Asia-Pacific, North American, and European regions. The rapid recovery of markets like China has driven a 126.1% year-over-year increase in international passenger traffic for Asia-Pacific airlines, making it a key driver of global aviation growth.

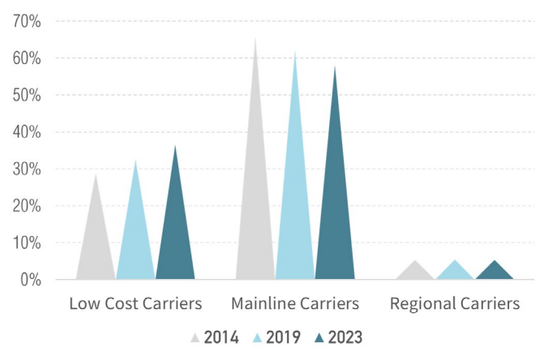
Examining the cumulative number of reserved seats for the top 25 airlines in different regions reveals distinct market structures. According to IATA data, the three largest global markets—North America, Europe, and Asia-Pacific—display markedly different levels of market concentration in 2023. In North America, the top three airlines account for 50% of the region's reserved seats, and the top ten airlines hold 89%, indicating the highest market concentration. In Europe, the top three airlines account for 27%, and the top ten account for 50%, with market concentration lower than in North America, Latin America, and the Middle East. In the Asia-Pacific region, the top three airlines hold only 18%, and the top ten airlines account for 38%, representing the lowest market concentration.

Cumulative Market Share of Reserved Seats by Airlines in Different Regions (2023)



Source: COMAC, IATA

Changes in Seat Capacity Share of the Three Major Types of Airlines Over the Past Decade



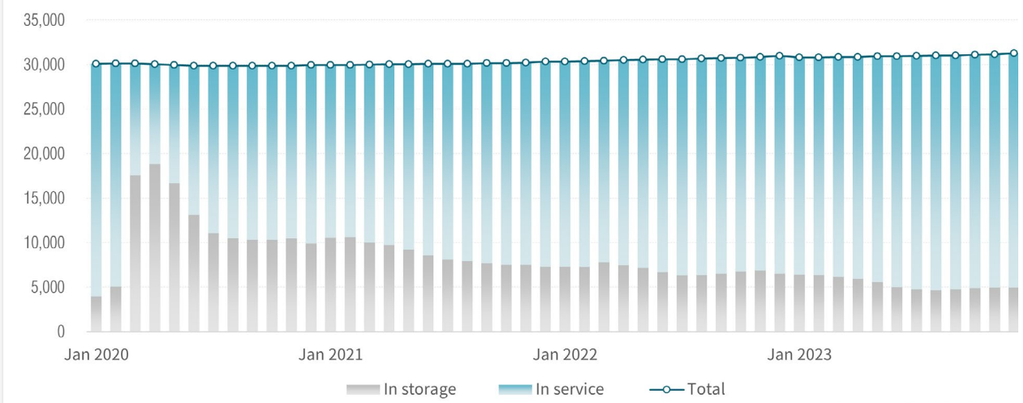
Source: COMAC, OAG

Compared to 2014, there have been significant changes in seat capacity allocation among different types of airlines in 2023. While the share of seat capacity for low-cost carriers and regional carriers has continuously increased, the share for mainline carriers has declined. Specifically, low-cost carriers saw a 69% increase in seat capacity over the past decade,along with an 8% rise in market share; regional carriers' seat capacity grew by 35%, achieving a market share of 5%; and mainline carriers' seat capacity increased by 18%, but their market share decreased by 8%.

4.4 Global Fleet Development

Since 2020, the number of global fleet has been steadily growing. In 2023, the fleet expanded to 31,269 aircraft, with 84.23% of the fleet in service. The lowest in-service rate during the pandemic was 37.4%. Currently a majority of aircraft have resumed operations.

Trends in the Global Passenger Aircraft Fleet since January 2020

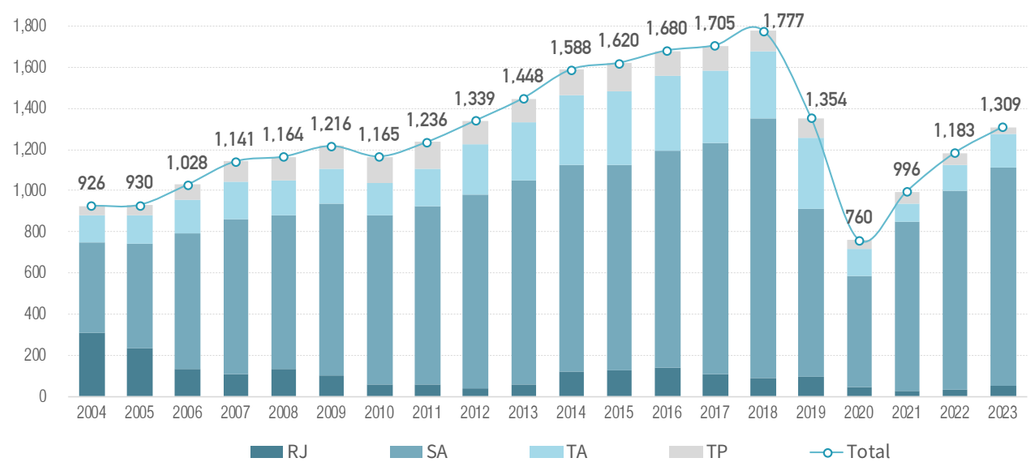


Source: COMAC, Cirium

Delivery

Global aircraft deliveries had been on an upward trend, reaching a peak of 1,777 in 2018. However, due to the pandemic, deliveries plummeted to 996 in 2020. In 2023, global deliveries reached 1,309, including 1,062 single-aisle jets, 166 twin-aisle jets, 50 regional jets, and 31 turboprop jets. The proportion of turboprop deliveries has continued to decline. Since the outbreak of COVID-19, the global aircraft manufacturing industry has faced persistent supply chain disruptions, that have negatively impacted aircraft deliveries. Nevertheless, as the economy recovers and aviation demand grows, aircraft deliveries will continue rising.

Historical Passenger Fleets Delivery Trends(2004-2023)



Source：COMAC，Cirium

Retirement

In 2023, a total of 575 passenger aircraft worldwide were permanently retired. Retirements have followed a pattern of first increasing and then decreasing, reaching a peak of 832 in 2013. The average retirement age has declined, falling to 22.63 years in 2023, a decrease of 7 years compared to the highest average retirement age in the past two decades.

Single-aisle jets have seen the highest number of retirements, with 337 in 2023, accounting for 58.60% of the total. Twin-aisle jets have seen retirements of 90, while turboprop regional jets have seen retirements of 89. The trend of declining retirement ages and increasing retirement numbers indicates an accelerated process of fleet renewal globally. As new aircraft models are introduced, older models are increasingly being replaced. Undoubtedly, fluctuations in international oil prices over the past decade have been a significant factor influencing airlines' fleet retirement decisions. The pressure of declining profits will force more airlines to replace older aircraft with newer, more fuel-efficient models.

Historical Passenger Fleets Retirement Trends(2004-2023)

Source：COMAC，Cirium

5 China Air Travel Industry Overview

- 5.1 Market Overview (Mainland China)
- 5.2 Recent Trends in China's Route Changes (Mainline - Regional)
- 5.3 Grow Together with the "Belt and Road"

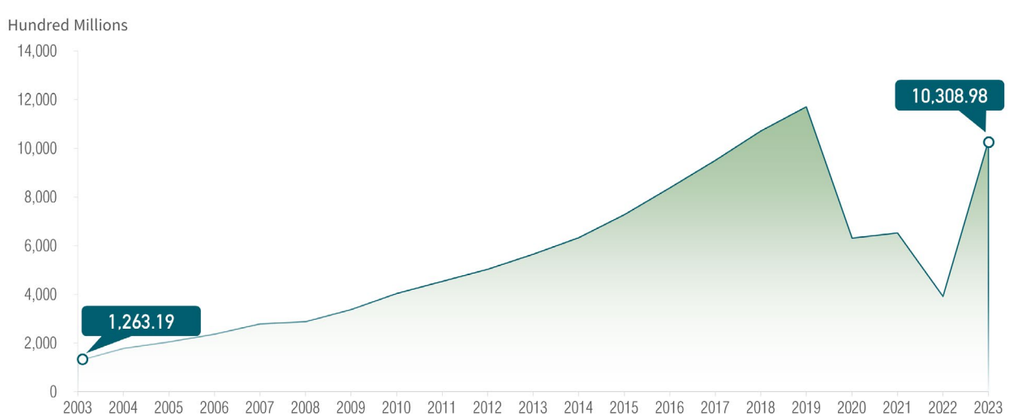
5.1 Market Overview (Mainland China)

5.1.1 Review of China's Aviation Market in 2023

China's national economy showed a positive trend and maintained high-quality development in 2023. The national GDP reached 12.61 trillion yuan, up 5.2% from the previous year on a constant price basis, marking a 2.2% percent acceleration from 2022. In 2023, the per capita disposable income of urban and rural residents reached 39,218 yuan, up 6.1% in real terms, reflecting steady income growth for both urban and rural residents. This increase in per capita disposable income laid a solid foundation for further development of the aviation market. In 2023, China's civil aviation industry completed 1.188 trillion kilometers of total transport turnover, up 98.3% from the previous year. The industry completed 620 million passenger trips, a 146.1% year-on-year increase, reaching 93.93% of pre-pandemic levels. International routes experienced significant growth, with 29.06 million passenger trips completed, an increase of 1461.7% over 2022.

In 2023, China's civil aviation industry achieved a robust recovery,with various production and operation data showed a rapid growth trend compared to the previous year. China's civil aviation industry actively promoted the construction of an aviation transportation network system that connects urban and rural areas, improved the standard of “Tongcheng flights”, enhanced network interconnection capacity and increased the convenience of transfer services, expanding the network connectivity by 23%. Fixed asset investment reached 115 billion yuan, with six new runways and 193 new aircraft stands completed. It is estimated that by 2025, the number of civil transport airports in China will exceed 270, an increase of more than 30 compared to the end of the 13th Five-Year Plan period. The total turnover of transport is expected to reach 175 billion ton-kilometers, with the number of passengers transported projected to reach 930 million.

China RPKs Trends(2003-2023)



Source: COMAC, CAAC

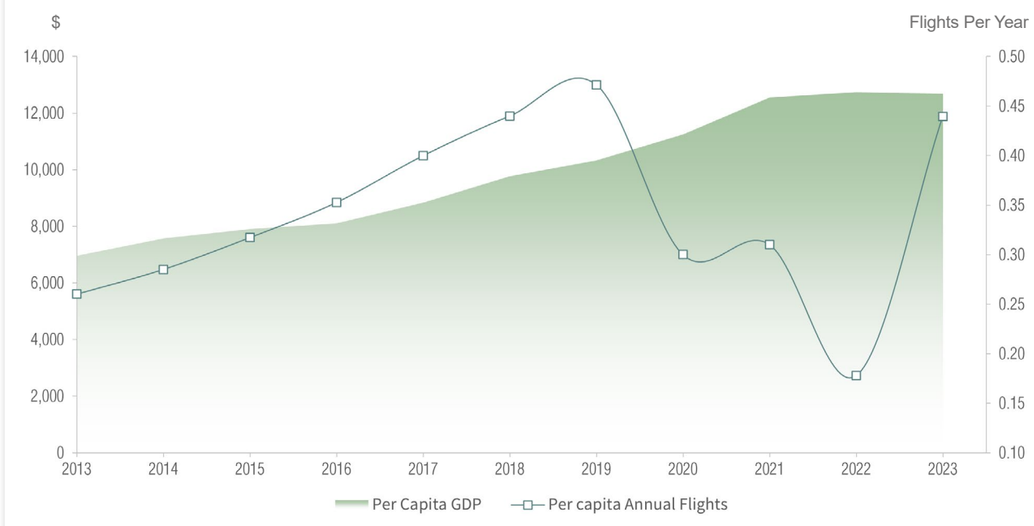
China Real GDP an Passenger Traffic Trends(2003-2023)

Source: COMAC, CAAC

5.1.2 Per Capita GDP and Per capita Annual Flights

The number of flights per Capita reflects the frequency of air travel by residents. Over the past decade, per capita GDP has continued to grow, reaching $12,700 in 2023. Due to the impact of the COVID-19 pandemic, the number of flights per capita in China dropped for the first time in 2020, falling to 0.18 per year in 2022, and recovering to the 2018 level of 0.44 per year in 2023.In the United States, per capita annual flights declined to 1.11 in 2020 but rebounded to 2.57 by 2023.

China Per Capita GDP and Per capita Annual Flights Trends(2013-2023)

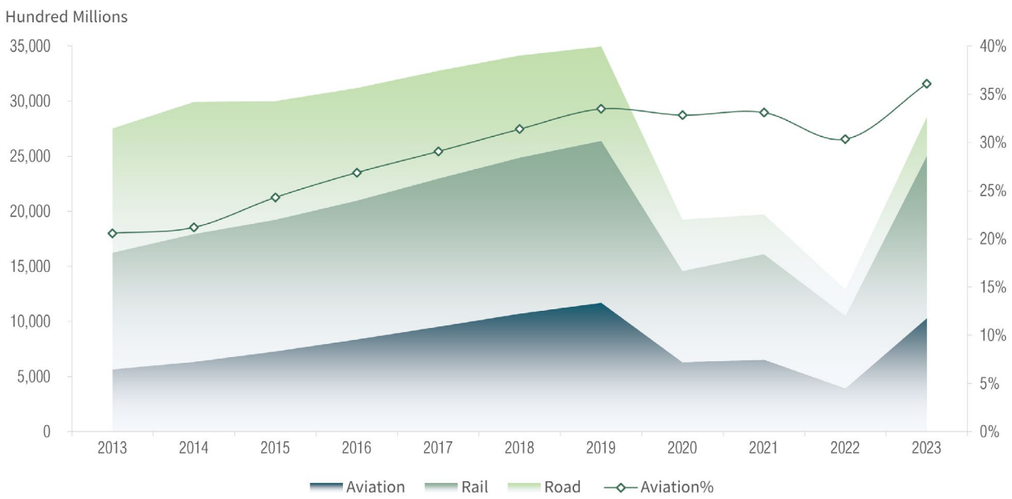


Source: COMAC, CAAC, NBSC

5.1.3 Comparison of Major Transportation Modes

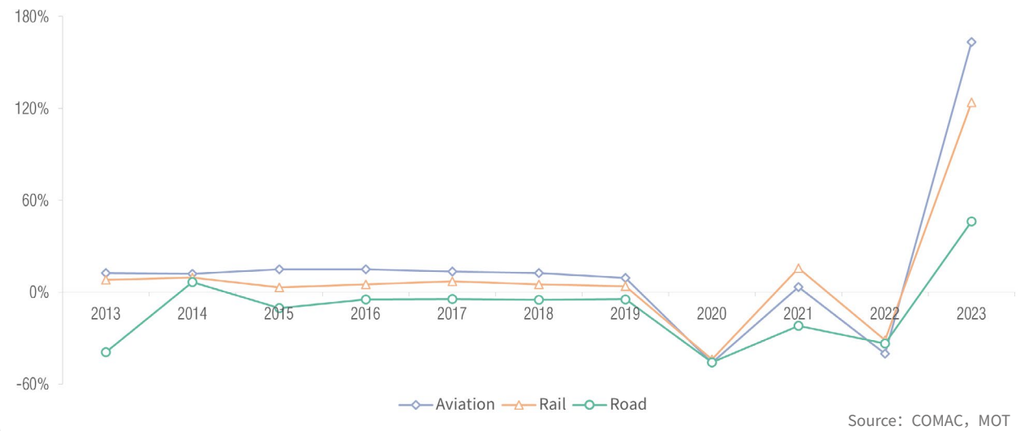
From 2011 to 2019, the number of passenger kilometers for all types of transportation in China continued to increase, and the transportation industry maintained rapid growth. Due to the pandemic, air passenger turnover in 2022 was only 33.4% of that in 2019. In 2023, China's major transportation modes recovered rapidly, with air passenger turnover growing the most at 163.4% compared to the previous year, followed by a 123.9% increase in railway passenger turnover. The transport industry has largely recovered, with railway passenger turnover returning to pre-pandemic levels, and air passenger turnover reaching 88.07% of pre-pandemic levels . The share of air passenger turnover in the total passenger turnover of all modes of transport in China has further increased to 36.10%. In 2023, the volume and turnover of cargo and mail in civil aviation increased by 20.95% and 11.61% respectively, outpacing other modes of transportation.

Major Transport Modes RPKs Trends in Mainland China (2013-2023)



Source: COMAC, MOT

Growth Rate of Major Transportation in Mainland China(2013-2023)



Source: COMAC, MOT

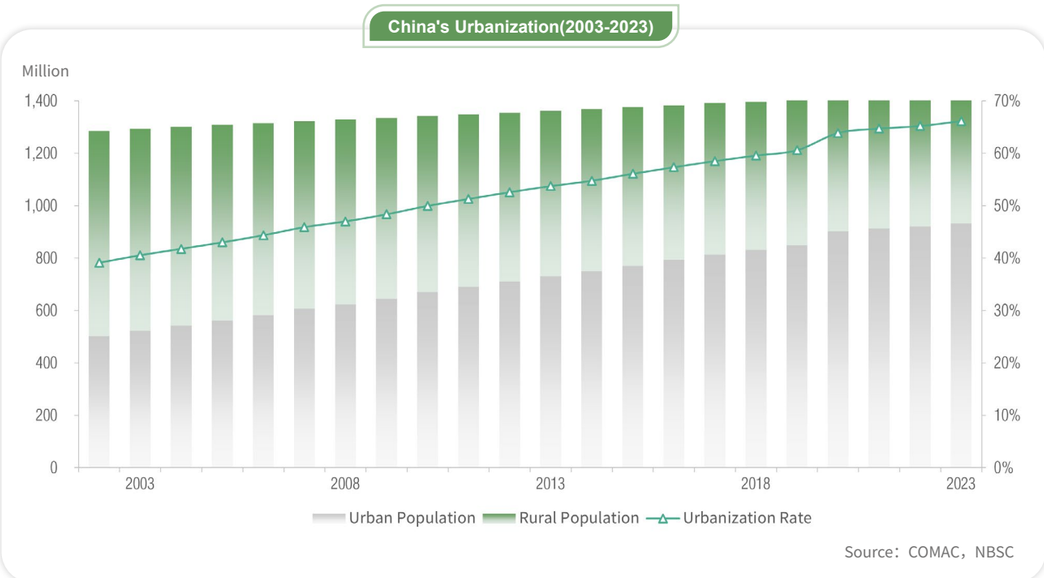
Different Transport Modes' Freight Volume and Growth in 2023

Index	Freight Volume (Hundred Million Ton)	Rail (Hundred Million Ton)	Road (Hundred Million Ton)	Aviation (Hundred Million Ton)	Freight Turnover (Hundred Million Ton-Km)	Rail (Hundred Million Ton-Km)	Road (Hundred Million Ton-Km)	Aviation (Hundred Million Ton-Km)
2023	556.8	50.1	403.4	735.4	247,712.7	36,437.6	73,950.2	283.6
2022	506.1	49.3	371.2	608.0	226,121.8	35,906.5	68,958.0	254.1
Growth Rate(%)	10.0	1.6	8.7	21.0	9.6	1.5	7.2	11.6

Source: COMAC, MOT

5.1.4 Urbanization

At the end of 2023, China's total population was 1.41 billion, a decrease of 2.08 million from the end of 2022. The urban permanent resident population reached 933 million, with an urbanization rate of 66.16%, marking a continuous increase. The rising urbanization rate drives local economic development, promotes the construction of urban aviation infrastructure, increases the number of air travelers,and thus stimulates the growth of aviation market demand.



5.1.5 Recovery of China's Aviation Market

With the economic recovery and the optimization of pandemic prevention policies, China's civil aviation market has been rapidly recovering and developing. According to the Civil Aviation Administration of China (CAAC), China's passenger volume on domestic routes has exceeded the pre-pandemic level in 2023, up 1.5% compared to 2019, recovering the fastest among all types of transport. In 2024, domestic passenger transportation will continue to grow steadily, with an estimated total of 630 million passenger trips, an increase of over 7% compared to 2019. The international passenger market will accelerate its recovery, with an estimated 6,000 flights per week by the end of 2024, reaching to about 80% of the pre-pandemic levels.

The demand for public travel has been continuously increasing, and the overall operation of the civil aviation industry has gradually recovered. According to the third-quarter financial reports of domestic listed airlines, including Air China, Eastern Airlines, Southern Airlines, Hainan Airlines, Spring Airlines,Juneyao Airlines, and China Express Air, all seven airlines turned a profit for the first time in three years. The total profit of the seven listed airlines in the third quarter was approximately 17.54 billion yuan. Another highlight of the civil aviation market is the entry of domestically produced large aircraft, with the world's first C919 commercial passenger flight in May 2023. The smooth operation of the aircraft has laid a solid foundation for the subsequent mass delivery and commercial operation of domestic aircraft. In the future, China's civil aviation industry will accelerate its recovery process and contribute to the development of the global aviation industry.

5.2 Recent Trends in China's Route Changes (Mainline - Regional)

In 2023, with the lifting of domestic travel restrictions, China's domestic civil aviation market experienced significant recovery. National airport throughput reached 93.2% of the levels seen in 2019 levels, with hub airports recovering to 93.0%, mainline airports to 90.9%, and regional airports to 99.2%. Since international routes have not fully recovered, the actual recovery level for domestic mainline routes has surpassed that of regional routes.

(1) Domestic Mainline Market

The domestic mainline market has seen significant recovery post-pandemic. In 2023, there were 3,182 mainline routes, accounting for 43.8% of the total domestic routes. The number of flights on these routes represented 79.8% of the total, and passenger transport volume accounted for 85.8%, underscoring the core role of mainline routes in aviation transport. Among these, hub-to-hub routes have the highest capacity and passenger demand, with both flight and passenger volume shares surpassing those of other types, indicating a continued increase in flight density and travel demand between hub cities. The load factor for mainline routes has significantly increased compared to 2022, reaching over 90% of the 2019 levels. The average passenger kilometer fare for mainline routes is 0.69 yuan, up 8.6% from 2019, reflecting strong economic recovery and high demand in the mainline market.

Domestic mainline direct flights are predominantly operated by single-aisle jet aircraft, with large single-aisle jet flights accounting for 12% of the total, and twin-aisle jet aircraft flights reaching 7%, showing a growth trend.

In 2023, Xi'an, Shanghai Pudong, Beijing Daxing, and Chengdu Tianfu airports excelled in hub, mainline, and regional coverage, becoming the top tier of national hub capabilities. Xi'an Airport is the only hub capable of covering the three remote regions of Inner Mongolia, Xinjiang, and Tibet simultaneously. Guangzhou, Chongqing, Beijing Capital, and Kunming airports follow as the second tier. Shanghai Hongqiao, Chengdu Shuangliu, Nanjing, and Xiamen airports mainly serve premium mainline routes.

(2) Domestic Regional Market

In 2023, the recovery of the domestic regional market was slightly lower than that of the hub airports. The regional market operated 4,088 routes, accounting for 56.2% of the total domestic routes. These routes represented 20.2% of the total number of flights and 14.2% of passenger transport volume. Among regional routes, hub-to-regional airport routes (hub-to-regional routes) are the most numerous and have the highest capacity and volume, making up 46.7% of the route count, 17.8% of the flights, and 12.9% of passenger transport volume, thus serving as the backbone of the regional market. The average load factor for regional routes is close to 90% of the 2019 levels, which, although lower than that of mainline routes, has shown significant improvement compared to 2022. The average passenger kilometer fare for regional routes is 0.68 yuan, a slight increase from 2019, but revenue per seat kilometer remains below 2019 levels, indicating a weaker fare increase in the regional market and a slower economic recovery compared to the mainline market.

Domestic regional direct flights are primarily operated by single-aisle jet aircraft, with small single-aisle jets accounting for 42% and regional jets making up 11% of the total, representing a 4.4% increase from the previous year. With the entry of domestic aircraft into the regional market, the landscape of regional routes operated by regional jets is gradually evolving.

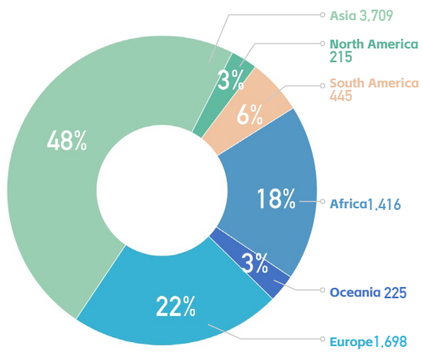
In 2023, among the national regional airports, 70 airports had an average daily flight volume of no more than 5 flights, accounting for 38%, and 104 airports had no more than 10 destinations, accounting for 62%. There are significant regional differences, with higher flight volumes and more destinations in North China, Northeast China, Southeast China, and central regions like Henan and Hubei. Conversely, regions such as Inner Mongolia, Jiangxi, Sichuan, Guizhou, and Xinjiang show uneven development, while regional airports in Northeast Liaoning, Fujian, and Northwest Qinghai and Ningxia are relatively weaker, with average daily flights not exceeding 10.

5.3 Grow Together with the "Belt and Road"

By December 2023, China had signed more than 200 Belt and Road cooperation documents with 153 countries and 32 international organizations, accounting for 78 percent of the countries in the world. By the end of 2023, 122 Belt and Road countries had passenger aircraft fleets, with a total of 7,708 aircraft in service across Asia, Europe, Africa, South America, Oceania and North America.

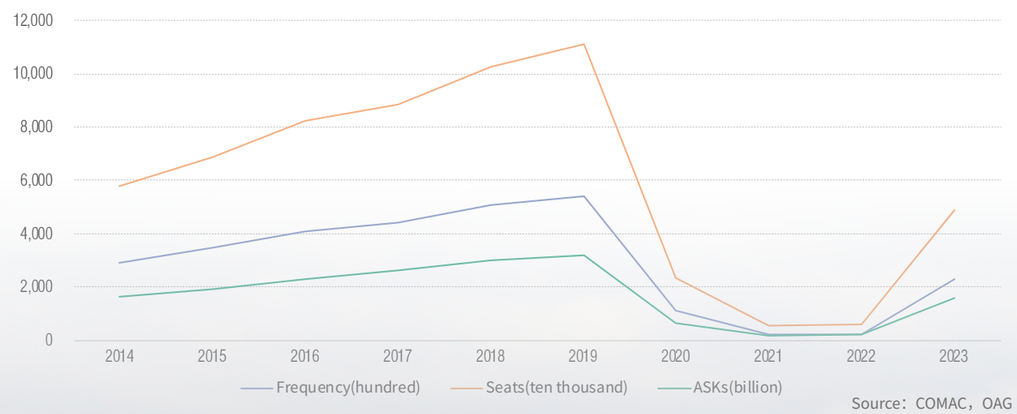
Since the implementation of the "Belt and Road" strategy, China's civil aviation has taken the lead in creating a new model of regional civil aviation cooperation in terms of air transport policy communication, infrastructure connection, security and technology cooperation, and business environment optimization, which has directly driven the rapid development of the regional air transport market. China has signed bilateral air transport agreements with 104 countries participating in the Belt and Road Initiative (BRI) and established direct air flights with 57 of them. In 2023 alone, Chinese enterprises participated in 20 overseas airport construction projects. From 2014 to 2019, ASKs between China and BRI countries grew at a compound annual growth rate of 14.5%, higher than the growth rate of capacity between BRI countries and other international routes. Affected by the pandemic, ASKs shrank to 5.65% of 2019 levels in 2021 but recovered to 49.64% by 2023.

B&R Coutries Regional Distribution of Fleet Size



Source：COMAC，Belt and Road Portal

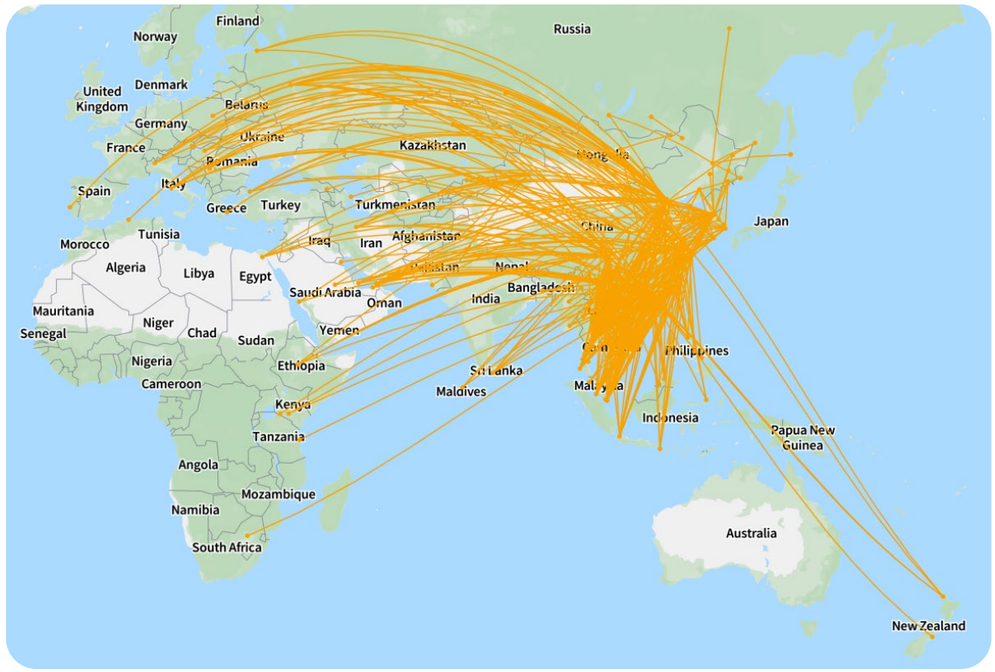
Capacity Trends between BRI Countries and China (2014-2023)



Source：COMAC，OAG

In 2023, China and Belt and Initiative(BRI) countries opened 636 routes, connecting 53 BRI countries, with a total of 231,000 flights, playing an irreplaceable role in facilitating personnel mobility, commodity trade, and cultural exchanges among BRI countries. Before the pandemic, the annual growth rate of flights frequency between China and BRI countries was 13.07%, while the annual growth rate of flights frequency between China and Southeast Asia reached 20.63%, higher than the average. In 2023, there were 327 routes connecting Southeast Asia, accounting for 55.57% of the total number of routes. In the future, Southeast Asia will deepen its connectivity with China, and the BRI initiative will further facilitate connectivity and development in the region.

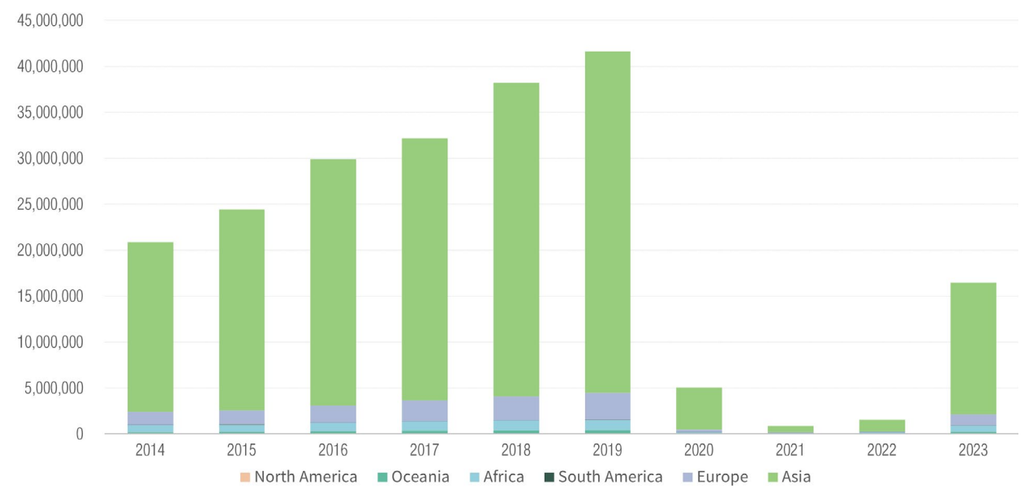
Routes between China and BRI Countries



Source：COMAC，OAG

In 2023, the number of passengers traveling from China to BRI countries was 16.46 million, only 39.54% of the total in 2019. In terms of region, Asia accounted for the largest proportion of passengers, consistently exceeding 90% before the pandemic. In the five years prior to the pandemic, Oceania had the fastest annual growth rate, followed by Europe and Asia, both exceeding 15% annually. Thailand, South Korea, Singapore, Malaysia, and Vietnam remained the top five destinations for Chinese tourists before and after the pandemic.

China to BRI Countries Trafffc Trends



Source：COMAC,IATA

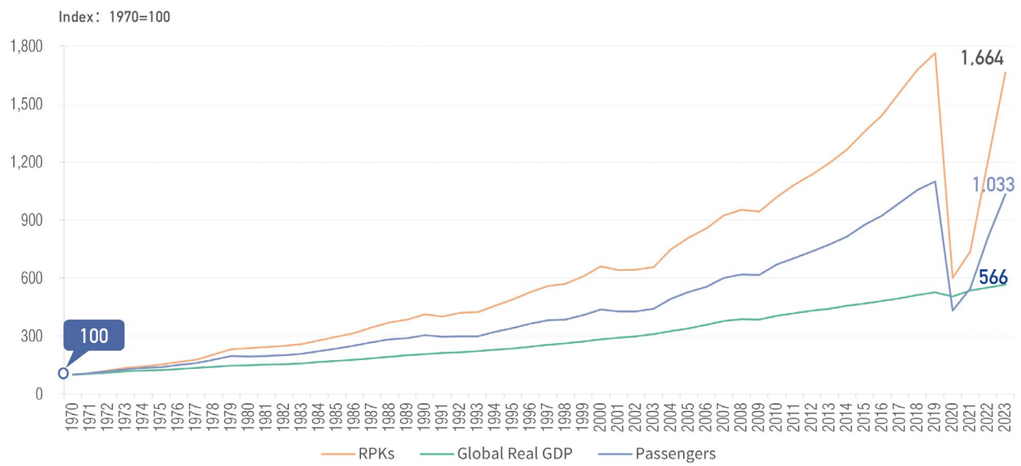
With the promotion of the Belt and Road Initiative, the volume of goods trade between China and countries along the routes has increased significantly, which in turn has promoted the rapid growth of air cargo. In 2023, China's imports and exports with BRI countries reached 19.47 trillion yuan, an increase of 2.8%, accounting for 46.6% of China's total foreign trade value, marking the highest level since the initiative was launched in terms of both scale and proportion. The "14th Five-Year Plan for the Development of Civil Aviation" proposes prioritizing the construction of the "Air Silk Road" and enhancing international air cargo capacity. With China's sustained economic development and the in-depth promotion of the BRI, it is expected that the aviation market between China and regions along the BRI will continue to grow rapidly.

6 Global Aviation Market Forecast

6.1 Global Air Passenger Turnover Forecast

In 2023, the global civil aviation industry recovered from the hard hit of the COVID-19 pandemic. Global air passenger turnover has recovered to 90% of its pre-pandemic level, up 29.9% from the previous year. In particular, global passenger turnover has reached 96.8% of the 2019 level for domestic markets and 87.9% for international markets. Last year's figures for this indicator were 77.0% and 66.2%, respectively.

Trends of Global Passengers, RPKs and Real GDP (1970-2023)



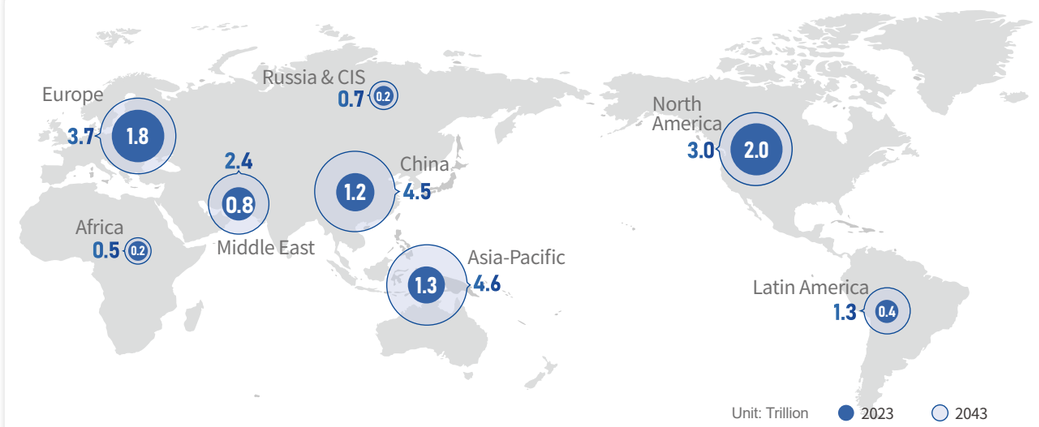
Source：COMAC，MOT

The fundamentals of the airline industry are a key determinant of the extent of recovery. In 2023, North American RPKs have recovered to pre-pandemic levels;and the European market has also recovered to 90% of its pre-pandemic levels. The combined passenger traffic of the two markets accounts for nearly half of the global total. As growth in North America and Europe continues to slow, the focus of global passenger growth is shifting toward the opening up of the Asia-Pacific region and China.

Air travel demand rebounded rapidly in early 2023 as the impact of the pandemic faded away in the Chinese market. 2023 RPKs in the China market recovered to 88.5% of 2019 levels, increasing by 41.3% year-on-year. By 2024, with the introduction of the 144-hour visa-free transit policy, the number of foreian tourists visiting China via visa-free entry is expected to increase significantly , driving a rapid recovery in international routes.

The growth of the aviation market is closely linked to the state of economic development and the stability of trade relations between countries. According to the IHS forecast, the global economy will maintain a growth rate of 2.56% over the next two decades (using 2019 as a baseline). Based on this economic forecast, global air passenger turnover will maintain a growth rate of 3.8%, reaching 20.9 trillion passenger kilometers by 2043. China (including Hong Kong, Macao and Taiwan) and the Asia Pacific (excluding China) will account for a comparable share, both close to 22.0%, ranking in the top two globally; Europe will rank third with 17.9%; North America, with 14.6%, will only rank fourth following the Middle East, Latin America, Russia and CIS, and African regions follow.

Global Traffic in 2023 and 2043



Source: COMAC,ICAO,IATA,OAG
Based on the underlying assumptions, intra- and cross-regional flows are allocated to distinct regions.

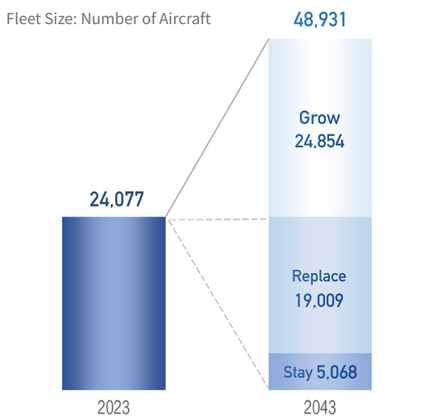
6.2 Global Fleet Market Forecast

6.2.1 Fleet Forecast Summary

There were 24,077 aircraft in service in 2023, which represented an increase of 2,049 aircraft, reflecting a growth of 9.3% compared to 2022. In terms of regions, the fleet growth rate of the Middle East was higher than that of other regions, increasing by 14.6% in 2023. However, regarding the in-service fleet, the number of passenger jets in North America accounted for the largest share, with 6,879 aircraft in 2023, exceeding the level of 2019 for 6,689 aircraft. With the optimization of pandemic prevention policy, the fleet scale in China gradually enlarged to 4,261 aircraft in 2023, surpassing the 2019 level of 3,863 aircraft.

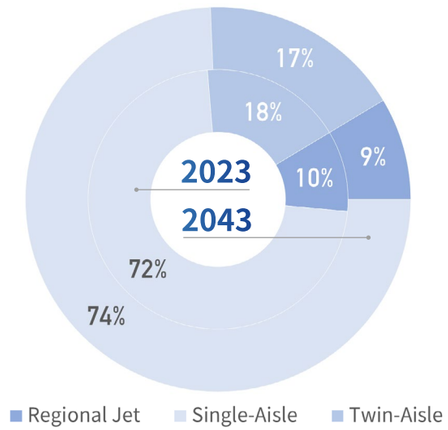
In the next two decades, COMAC expects the average annual growth rate of the global fleet to be 3.6%. By the end of 2043, the number of global passenger jets is expected to reach 48,931. A total of 43,863 new aircraft will be delivered globally, while 19,009 aircraft (78.9% of the current fleet) will be retired by 2043.

Global Fleet Forecast Outlook



Source：COMAC，Cirium

Current and Forecast Fleet by Category



Source：COMAC，Cirium

Global Fleet Forecast by Category

	Regional Jet	Single-Aisle Jet	Twin-Aisle Jet	Total
2023	2,427	17,390	4,260	24,077
2028 F	2,507	23,537	5,498	31,542
2033 F	2,738	28,039	6,686	37,463
2038 F	3,179	32,039	7,695	42,913
2043 F	4,220	36,379	8,332	48,931

Source：COMAC

The single-aisle category will continue to be the largest among the three passenger jet categories, accounting for 74% of the total in 2043. The shares of the regional jets and twin-aisle aircraft fleet is expected to slightly decrease from 10% and 18% in 2023 to 9% and 17% in 2043,respectively.

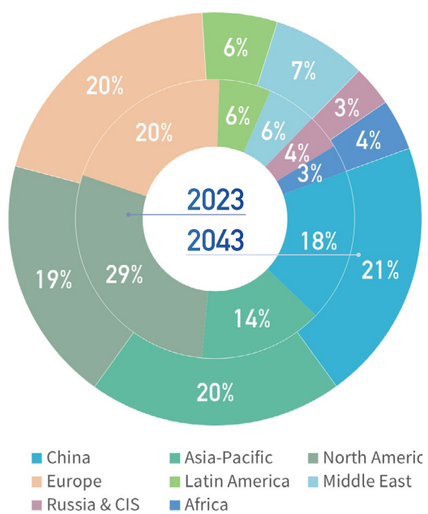
Asia Pacific (including China) is the fastest-growing market, with its share of the global fleet expected to increase from 32.1% to 40.5% by 2043. The proportion of China's passenger aircraft fleet will rise from 17.7% to 20.6%. With the shrinkage of mature markets, North America's current largest share of the fleet size, which stands at 28.6%, is projected to decline to about 19.2%. Over the next 20 years, the fleet sizes in Latin America will remain at the same level as 2023. The fleet size in Russia and the CIS region will decrease from the current level of 4.0% to around 3.2% by 2043.

Global Passenger Aircraft Fleet Forecast by Region

	2023		2043 F		2024-2043
	Fleet	% of global total	Fleet	% of global total	Annual growth rate
China*	4,261	17.7%	10,061	20.6%	4.9%
Asia-Pacific**	3,464	14.4%	9,738	19.9%	5.3%
North America	6,879	28.6%	9,400	19.2%	1.6%
Europe	4,911	20.4%	9,725	19.9%	3.5%
Latin America	1,442	6.0%	2,885	5.9%	3.5%
Middle East	1,379	5.7%	3,610	7.4%	4.9%
Russia & CIS	974	4.0%	1,555	3.2%	2.4%
Africa	767	3.2%	1,957	4.0%	4.8%
Global	**24,077**	**100%**	**48,931**	**100%**	**3.6%**

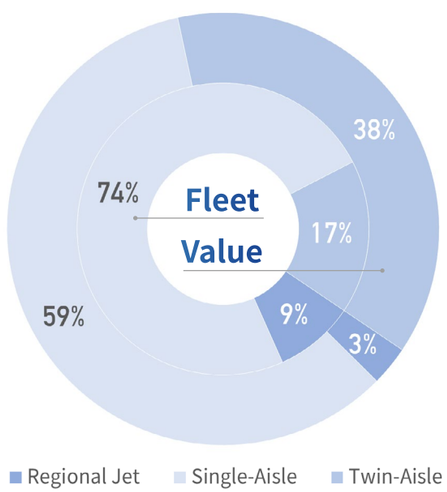
*China includes Hong Kong, Macao and Taiwan **Asia-Pacific excludes China, Hong Kong, Macao and Taiwan Source：COMAC，Cirium

Current and Forecast Fleet by Region



Source：COMAC，Cirium

2024-2043 Global Delivery Forecast by Category



Source：COMAC

6.2.2 Delivery Forecast Summary

Over the next two decades, driven by the replacement demand of the current fleet and new demand in the aviation market, approximately 43,863 jetliners, valued at about $6.6 trillion (based on 2023 aircraft list prices), are projected to be delivered globally.

2024-2043 Global Delivery Forecast by Category

	Regional Jet	Single-Aisle Jet	Twin-Aisle Jet	Total
2024-2043 Deliveries	3,892	32,498	7,473	**43,863**
Market Value Billion $	197	3,934	2,511	**6,642**

Source：COMAC

Single-aisle aircraft types will account for around 74.1% of the forecast deliveries, while around 17.0% will be twin-aisle types, and 8.9% will be regional jets. In terms of delivery value, twin-aisle deliveries will account for 37.8%, whereas single-aisle deliveries will account for 59.2%, and only 3.0% for regional jets.

Global Historical and Forecast Delivery by Region

	2004–2023historical deliveries		2024–2043forecast deliveries	
China*	4,380	18.9%	9,323	21.3%
Asia-Pacific**	3,691	15.9%	9,336	21.3%
North America	5,877	25.4%	8,479	19.3%
Europe	4,958	21.4%	8,702	19.8%
Latin America	1,385	6.0%	2,494	5.7%
Middle East	1,332	5.8%	3,085	7.0%
Russia & CIS	824	3.6%	1,047	2.4%
Africa	711	3.1%	1,397	3.2%
Global	**23,158**	**100%**	**43,863**	**100%**

*China includes Hong Kong, Macao and Taiwan **Asia-Pacific excludes China, Hong Kong, Macao and Taiwan Source：COMAC，Cirium

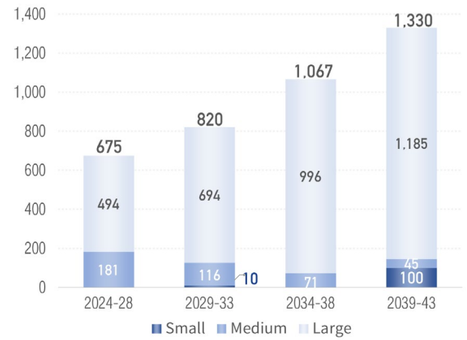
In the next two decades, Asia Pacific (including China) is projected to become the largest market for aircraft deliveries, with a total of 18,659 deliveries, accounting for 42.6% of the overall amount. China is expected to contribute 21.3% to the world's forecasted deliveries. The two mature markets, namely Europe and North America, are anticipated to receive 8,702 and 8,479 aircrafts respectively. Additionally, Middle Eastern airlines are also poised for substantial fleet expansions, with an estimated share of new deliveries reaching 3,085 aircrafts.

6.2.3 Regional Jets Forecast

By the end of 2023, regional jets accounted for 10.1% of the global passenger aircraft fleet. It is projected that this proportion will decrease to 8.6% by 2043. The future market demand will primarily emphasize larger regional jets.

Over the next two decades, approximately 93.9% of the current regional jets will be gradually retired. The estimated delivery volume for regional jets during this period is about 3,892, with large regional jets accounting for 86.6% (approximately 3,369) of this total. By the end of 2043, the fleet size of regional jets is expected to reach 4,220.

2024-2043 Global Regional Jet Forecast Delivery by Seat Size



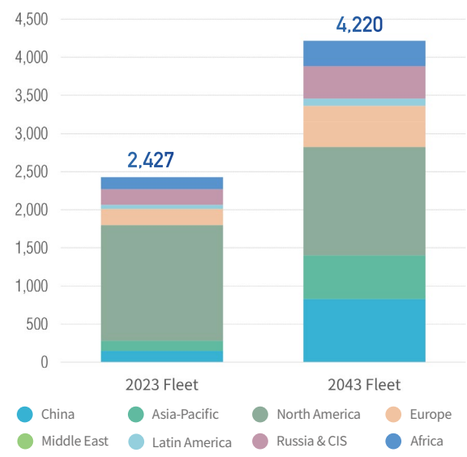
Source：COMAC

	Small	Medium	Large
2024-28	0	181	494
2029-33	10	116	694
2034-38	0	71	996
2039-43	100	45	1,185
2024-2043 deliveries	110	413	3,369
Market Value (hundred million $)	**25**	**197**	**1,747**

Source：COMAC

In terms of fleet size, North America is expected to maintain its position as the market with the highest demand for regional jets over the next 20 years, accounting for 33.7% of the global fleet in this category. The regional jet fleet in China is projected to experience rapid growth, with the proportion of passenger aircraft in this category increasing from 6.2% in 2023 to 19.7% by 2043. Conversely, the regional airline fleet in the Middle East remains the smallest globally, and the global fleet size is anticipated to remain at approximately 2.3% over the next 20 years.

Current and Forecast Regional Jet Fleet by Region



Source：COMAC，Cirium

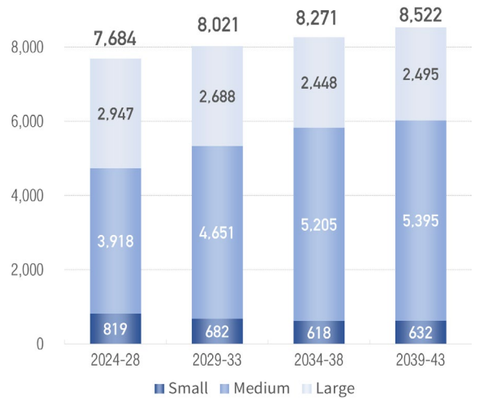
	End 2023 Fleet	End 2043 Fleet
China*	150	831
Asia-Pacific**	132	572
North America	1,514	1,424
Europe	163	330
Latin America	56	206
Middle East	52	97
Russia & CIS	207	428
Africa	153	332
Global	**2,427**	**4,220**

*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China, Hong Kong, Macao and Taiwan
Source：COMAC，Cirium

6.2.4 Single-Aisle Passenger Jet Forecast

Over the next two decades, the single-aisle passenger jets is projected to maintain the largest market demand. By the end of 2043, approximately 84.9% of the single-aisle jets within the in-service fleet are anticipated to be replaced by new, more fuel-efficient single-aisle jets. In the next 20 years, a total of 32,498 single-aisle jets are anticipated to be delivered globally, with medium-sized single-aisle jets constituting 59.0% of this figure.

2024-2043 Single-Aisle Jet Forecast Delivery by Seat Size



Source：COMAC

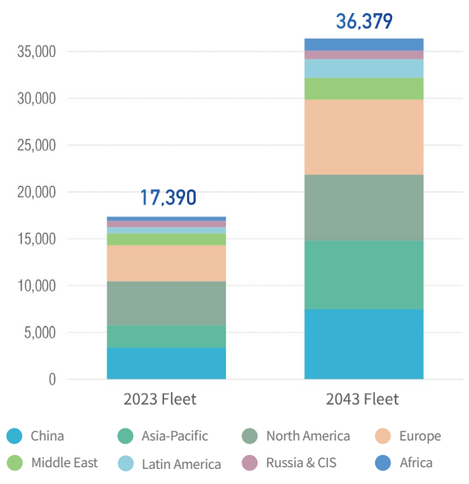
	Small	Medium	Large
2024-28	819	3,918	2,947
2029-33	682	4,651	2,688
2034-38	618	5,205	2,448
2039-43	632	5,395	2,495
2024-2043 deliveries	2,751	19,169	10,578
Market Value (hundred million $)	**2,525**	**22,500**	**14,318**

Source：COMAC

Asia Pacific (including China) is predicted to emerge as the leading market for single-aisle aircraft deliveries. The entire region is projected to account for 42.6% of global new aircraft deliveries over the next 20 years. China alone is anticipated to receive 21.2% of the global total deliveries. Given that a majority of emerging economies are situated in the Asia-Pacific region, including China, the domestic and intra-regional markets within and among countries such as China, India, and Southeast Asia are all well-suited markets for the operation of single-aisle aircraft.

Europe and North America will continue to serve as the primary markets for single-aisle jets, contributing 22.0% and 19.2% respectively to global deliveries. The demand for replacing older models within these mature markets, coupled with the proliferation of low-cost airlines and their expansion, will still be key drivers for the growth of single-aisle jet fleet.

Current and Forecast Single-Aisle Jet Fleet by Region



Source：COMAC，Cirium

	End 2023 Fleet	End 2043 Fleet
China*	3,398	7,499
Asia-Pacific**	2,401	7,338
North America	4,700	6,997
Europe	3,835	8,032
Latin America	1,263	2,320
Middle East	651	2,008
Russia & CIS	675	923
Africa	467	1,262
Global	**17,390**	**36,379**

*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China, Hong Kong, Macao and Taiwan

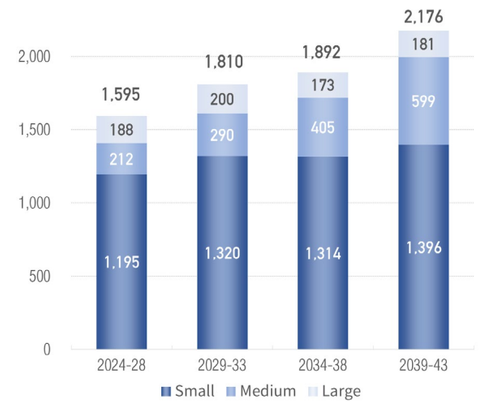
Source：COMAC，Cirium

6.2.5 Twin-Aisle Jet Forecast

In 2023, international passenger traffic increased by 41.6% year-over-year, reaching 90% of pre-pandemic levels. This indicates a significant release of pent-up demand for international travel as countries reopened their borders and lifted travel restrictions. Against this backdrop, the fleet of twin-aisle jets grew by 13% in 2023 compared to 2022.

Over the next 20 years, it is expected that 7,473 twin-aisle jets, with a total value of approximately $2.5 trillion, will be delivered globally. About 70% of these will be smaller twin-aisle jets with 200-300 seats, providing high operational flexibility and wide route adaptability. The fleet of twin-aisle jets is projected to grow at an average annual rate of 3.4%, with the average number of seats per aircraft increasing from 296 to 327. Over the next 20 years, it is expected that around 80% of the existing twin-aisle jet fleet will be replaced.

2024-2043 Global Twin-Aisle Jet Forecast Delivery by Seat Size



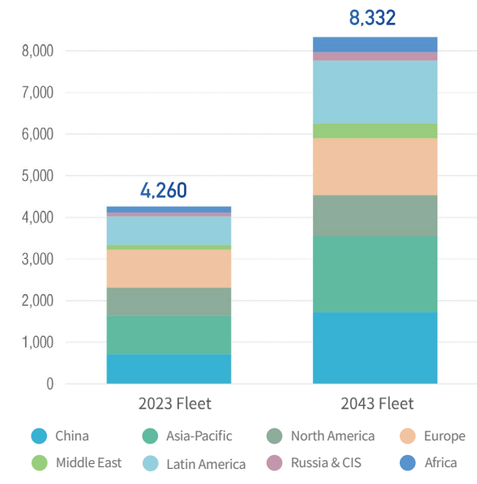
Source：COMAC

	Small	Medium	Large
2024-28	1,195	212	188
2029-33	1,320	290	200
2034-38	1,314	405	173
2039-43	1,396	599	181
2024-2043 deliveries	5,225	1,506	742
Market Value (hundred million $)	**15,683**	**5,845**	**3,593**

Source：COMAC

High-density domestic and intra-regional markets (particularly in the Asia Pacific region) will be the target markets for these twin-aisle jets. Over the next 20 years, it is expected that the delivery of twin-aisle jets to airlines in the Asia-Pacific region (including China) will account for 45.9% of the world's twin-aisle jet deliveries. There will also be significant demand for this type of aircraft in Europe and the Middle East.

2023 and 2043 Twin-Aisle Passenger Jet Fleet by Region



Source：COMAC，Cirium

	End 2023 Fleet	End 2043 Fleet
China*	713	1,731
Asia-Pacific**	931	1,828
North America	665	979
Europe	913	1,363
Latin America	123	359
Middle East	676	1,505
Russia & CIS	92	204
Africa	147	363
Global	**4,260**	**8,332**

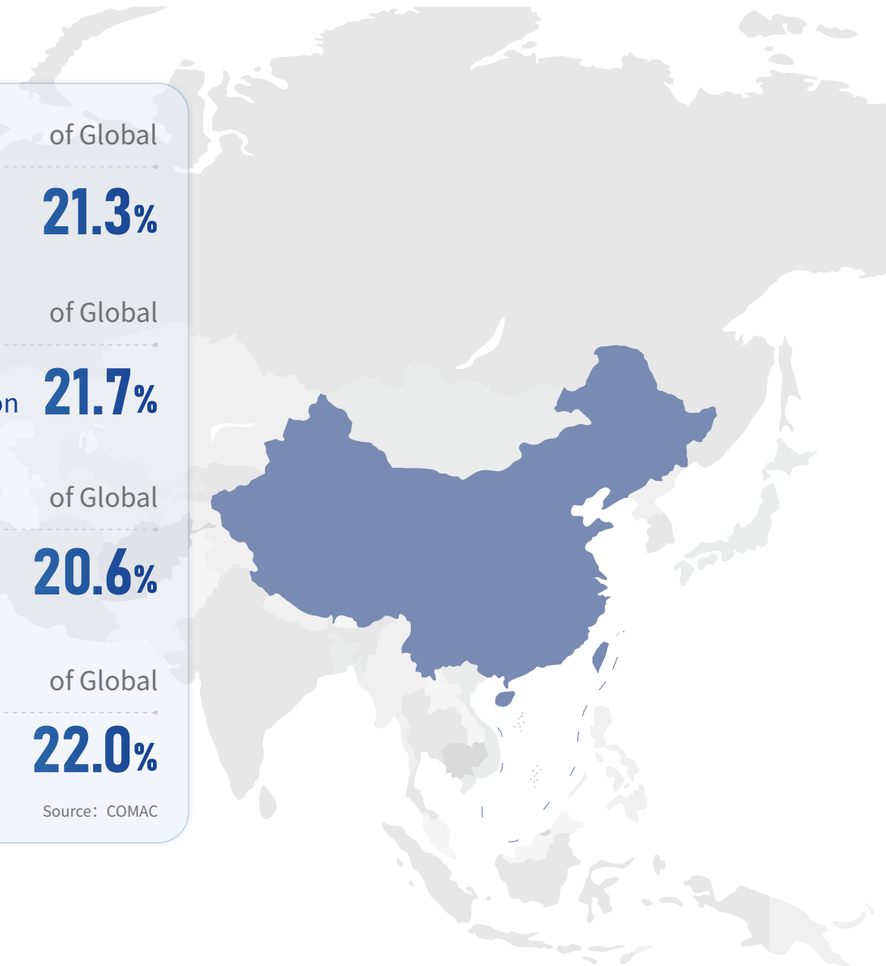
*China includes Hong Kong, Macao and Taiwan
**Asia-Pacific excludes China, Hong Kong, Macao and Taiwan

Source：COMAC，Cirium

6.3 China

Deliveries	of Global
9,323	21.3%
Value	**of Global**
$1,406.1 Billion	21.7%
Fleet	**of Global**
10,061	20.6%
RPKs	**of Global**
4.52 Trillion	22.0%

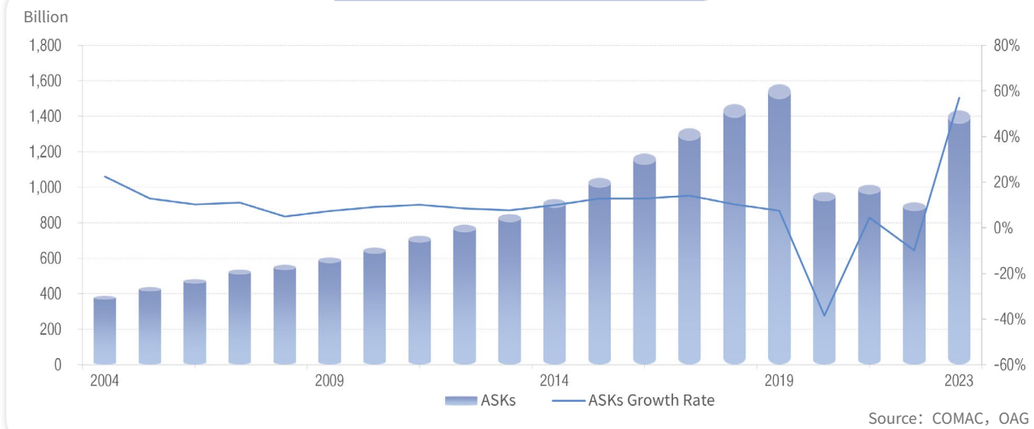
Source：COMAC



6.3.1 Market

In 2023, China's GDP reached 126.06 trillion yuan, an increase of 5.2 percent over the previous year. According to IHS, China's economy will maintain a growth rate of 4.04% over the next two decades, higher than the global average. In 2023, the domestic air passenger transportation scale has surpassed pre-pandemic level, and the recovery and development of international routes have become the focus of future attention. The Civil Aviation Administration of China (CAAC) will facilitate a substantial increase in direct flights between China and the United States, expand air traffic rights arrangements with countries participating in the Belt and Road Initiative, and optimize visa and entry-exit policies. While ensuring the steady development of domestic routes, the CAAC will further promote the recovery and development of international routes. China's civil aviation will also enter a new cycle of sustained, rapid and healthy development, transport production will return to growth, and the industry will comprehensively enter the stage of improving quality and efficiency. The CAAC will continue to advance the construction of aviation hubs, promote the export of domestically produced civil aircraft, accelerate the implementation of key civil aviation projects outlined in the 14th Five-Year Plan, and foster high-quality development of the civil aviation industry.

China Historical ASKs Trends(2004-2023)



Source：COMAC，OAG

6.3.2 Network

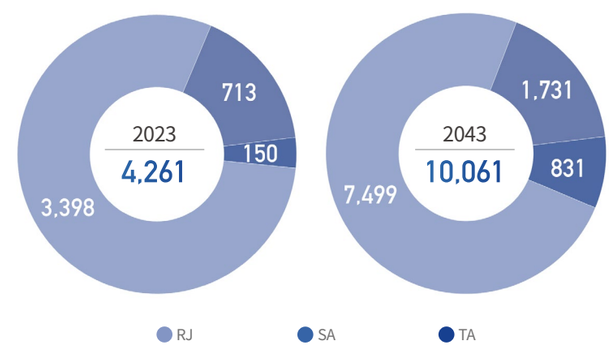
According to OAG, the number of domestic routes in China reached 3,924 in 2023, 119.86% of the 2019 level. However, the number of international routes was only 58.01% of that in 2019. In 2023, China's domestic ASKs were 96.27% of the 2019 level, basically recovering to pre-pandemic levels, with flight volume and seat capacity increasing by 1.93% and 3.56% respectively. The primary driver of this growth in flight volume was domestic routes, while international route flight volume was only 41.03% of pre-pandemic levels.

6.3.3 Fleet

By 2043, China's aviation market is expected to have 10,061 passenger aircraft including 7,499 single-aisle jets,1,731 twin-aisle jets and 831 regional jets. China's aviation market will become the world's largest single aviation market leading the future growth of the global aviation market.

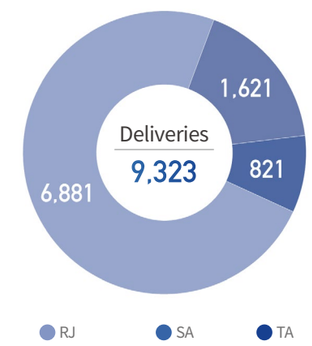
In the next 20 years, 9,323 aircraft are expected to be delivered to the Chinese market, including 6,881 single-aisle jets, accounting for 70% of the total deliveries over the next two decades. Among them, 73.68% of the single-aisle jet fleet is medium-sized single-aisle jet. 1,621 twin-aisle jets will be delivered, accounting for 20% of total deliveries, while the rest will be regional jets.

China fleet growth



Source：COMAC，Cirium

China Delivery by Category 2024-2043



Source：COMAC

6.4 Asia-Pacific

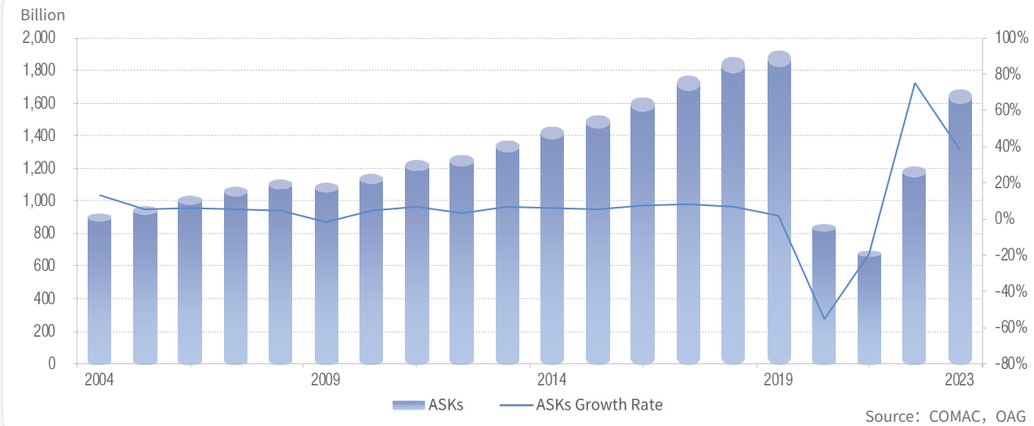
Deliveries	of Global
9,336	21.3%
Value	**of Global**
$1,494.5 Billion	22.5%
Fleet	**of Global**
9,738	19.9%
RPKs	**of Global**
4.60 Trillion	22.8%

Source: COMAC

6.4.1 Market

2023 is another challenging year for the global economy, with the tightening of monetary policy and Russia-Ukraine conflict continuing to drag on global economic expansion. However, Asia-Pacific(excluding China) remains a dynamic region. According to IHS statistics, the GDP growth rate of Asia-Pacific is 2.9% in 2023, which the data will grow to 3.6% in 2024 according to IHS forecast. Among them, the economic growth rate of advanced economies is expected to reach 1.6%, and 5.2% in emerging markets and developing economies. Near-term risks are now balanced, as the downward trend in global inflation and prospect of monetary policy easing increase the possibility of a soft landing for the economy.

Asia-Pacific Historical ASKs Trends(2004-2023)



Source: COMAC, OAG

6.4.2 Network

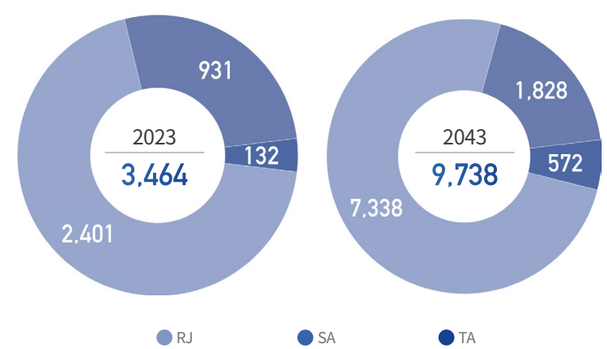
In 2023, the ASKs growth rate has increased by 38.6% compared to 2022, in terms of available seats, the overall capacity of the Asia-Pacific market increased by 21.4%, the aviation industry has illustrated the strong recovery trend in 2023. The capacity on international routes gradually recovered as well, the ASKs of international routes increased 67.1%. The number of internationl routes has increased 224 in 2023.

6.4.3 Fleet

The fleet size of Asia-Pacific reached 3,464 in 2023, which has increased by 150 aircraft than 2022. It is forecast the fleet scale will enlarge to 9,738 by the end of 2043. 9,336 new jets will be delivered in Asia-Pacific, with the value of 1,494.5 billions dollars.

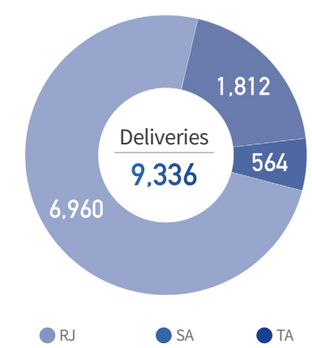
The growth of single-aisle fleet takes the largest amount of Asia-Pacific market demands, 6,960 single-aisle jets will be delivered in next 20 years, accounting for 214% of global share. In next 20 years, 523 new regional jets will be delivered in Asia-Pacific, accounting for 12.9% of global share. 1,690 new twin-aisle passenger jets will be delivered by end of 2042, with the share of 23.0% of global market.

Asia-Pacific Fleet Growth



Source: COMAC, Cirium

Asia-Pacific Delivery by Category 2024-2043

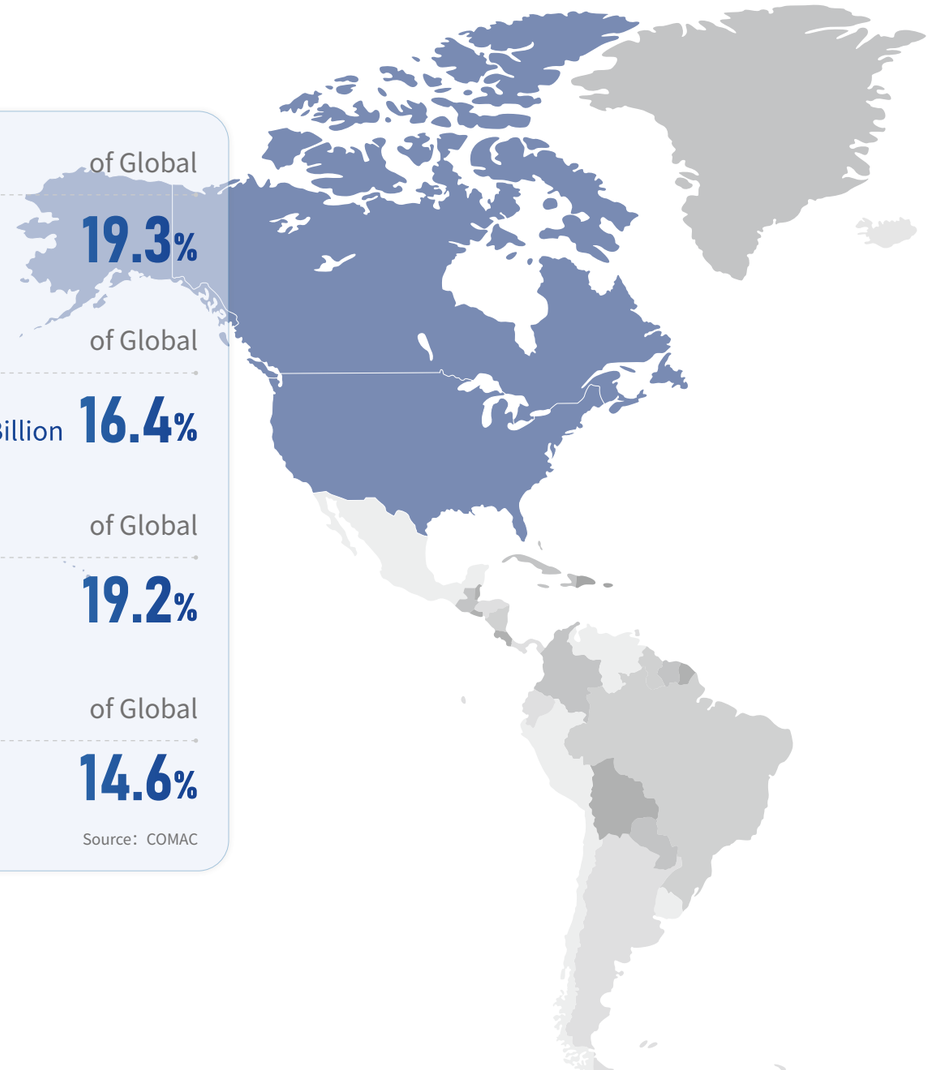


Source: COMAC

6.5 North America

Deliveries		of Global
8,479		19.3%
Value		of Global
$1,087.7	Billion	16.4%
Fleet		of Global
9,400		19.2%
RPKs		of Global
3.05	Trillion	14.6%

Source：COMAC

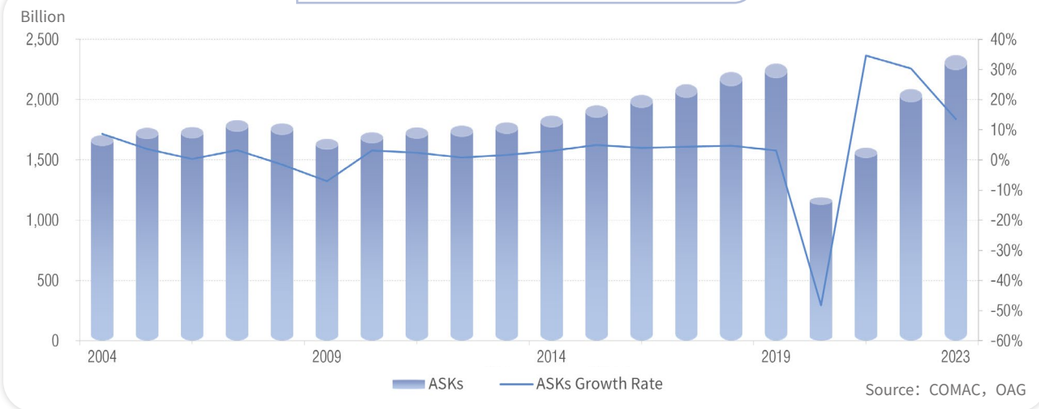


6.5.1 Market

In 2023, the U.S. economy grew by 2.5%. Consumer spending remained strong, the labor market showed resilience, and inflation eased, reducing the likelihood of a recession in the U.S. However, the general public continued to be troubled by high inflation, and with high-interest rates persisting, the market expects significant economic slowdown in the U.S. in 2024. The Federal Reserve previously revised its 2024 U.S. economic growth forecast down to 1.4%. In 2023, Canada's economy grew by only 1.2%. Although the first quarter of the year saw strong growth, various factors such as rising interest rates, inflation, wildfires and droughts, and strikes weighed down the country's overall economic growth for the year.

In 2023, North American airlines saw a 28.3% increase in passenger traffic compared to 2022. Capacity grew by 22.4%, and the load factor increased by 3.9 percentage points, reaching 84.6%. In December, passenger traffic increased by 13.5% compared to the same period in 2022. Although IATA expects North American airlines to achieve a net profit of $14.8 billion in 2024, the highest in the world, they still face challenges such as rising fuel costs, expensive labor, and reduced domestic travel demand.

North America Historical ASKs Trends(2004-2023)



Source：COMAC，OAG

6.5.2 Network

In 2023, available seat kilometers (ASKs) in North America increased by 13.5% compared to 2022. Carriers in the region operated a total of 6,763 routes, covering approximately 20.5% of the global route network, with the number of routes increasing by 21.5% compared to 2019. Of the routes operated by North American carriers, 78.2% were within the North American region.

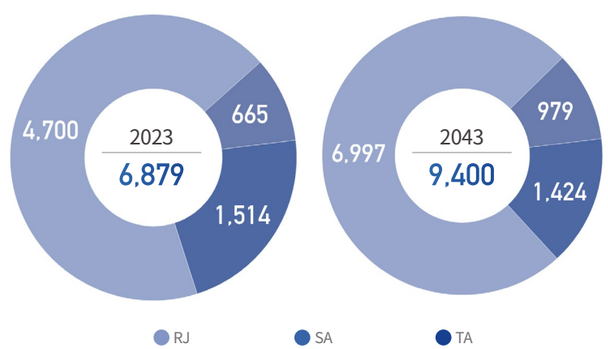
In terms of available seat capacity, in 2022, North American carriers allocated 85.7% of their total capacity within the North American region, a year-over-year increase of 9.2%. The capacity in cross-regional markets grew by 16.2% year-over-year, with the top three markets being North America-Latin America, North America-Europe, and North America-Asia-Pacific, accounting for 9.0%, 3.7%, and 0.9% of the total capacity, respectively.

6.5.3 Fleet

In 2023, there were 6,879 active aircraft in the North American region, with single-aisle jets accounting for 68.3% and turbofan regional jets making up 22.0%. By 2043, the fleet size in this region is expected to reach 9,400 aircraft, representing 19.2% of the global fleet.

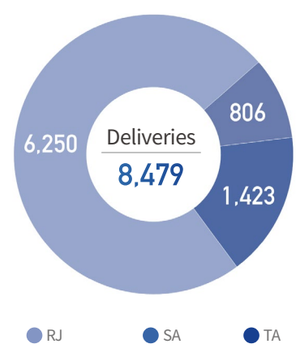
Over the next twenty years, 8,479 new aircraft are expected to be delivered to this region, with a total value of approximately $1,087.7 billion. Single-aisle jets will continue to be the primary driver of fleet growth, with 6,250 units delivered, accounting for 19.2% of the global single-aisle jet deliveries. Turbofan regional jets will see 1,423 units delivered, representing 36.5% of global turbofan regional jet deliveries. Twin-aisle jets will have 806 units delivered, making up 10.8% of global twin-aisle jet deliveries.

North America Fleet Growth



Source：COMAC，Cirium

North America Delivery by Category 2024-2043

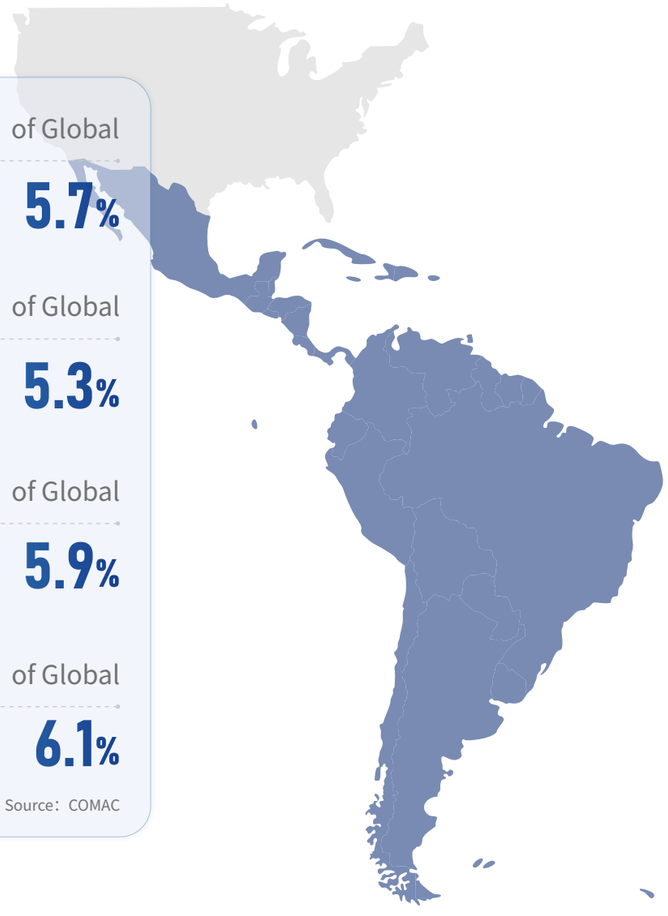


Source：COMAC

6.6 Latin American

Deliveries	of Global
2,494	5.7%
Value	**of Global**
$349.3 Billion	5.3%
Fleet	**of Global**
2,885	5.9%
RPKs	**of Global**
1.27 Trillion	6.1%

Source: COMAC

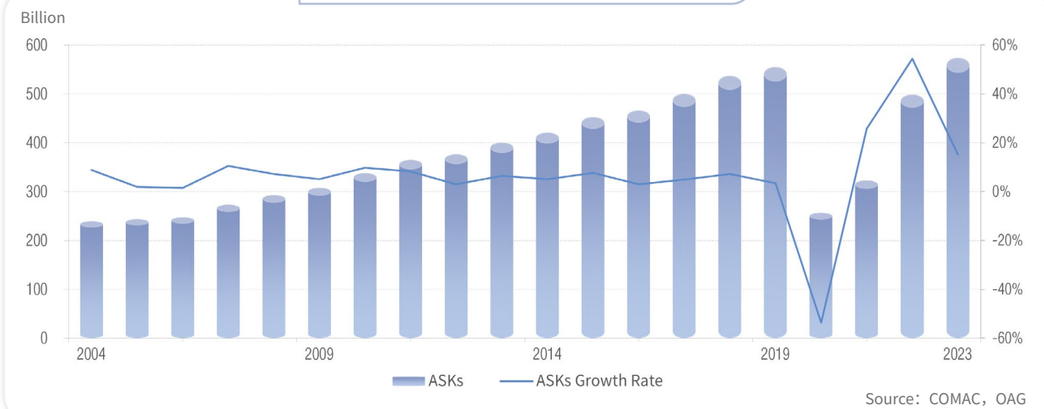


6.6.1 Market

Latin American countries, particularly those in South America, are highly dependent on exports of primary products and natural resources. In 2023, as commodity prices declined, Latin America's export revenues significantly decreased. Additionally, factors such as low investment and domestic consumption levels, rising interest rates, high fiscal deficits, geopolitical tensions, the blockage of the Suez Canal, and the El Niño phenomenon further suppressed economic growth in the region. As a result, Latin American countries experienced an economic growth rate of 2.1% in 2023. In 2024, while commodity prices in the region are expected to remain stable, the lack of vitality in trade and economic growth persists due to the global economic slowdown and insufficient effective demand, leading to a continued low growth outlook for Latin America. Although the overall economic growth in the region is slowing, there is significant divergence among economies within the region, with Brazil and Mexico exceeding growth expectations.

According to an IATA report, Latin American airlines incurred a loss of $600 million in 2023. Although some markets, such as Mexico, performed strongly, other markets faced economic and social turmoil, negatively impacting the airlines' performance. Central American countries, particularly Mexico, El Salvador, Guatemala, and Honduras, were the main sources of profit growth in the region. Recently, there have been reports of a potential merger among Brazil's three major airlines—LATAM, Azul, and GOL. If successful, the combined fleet would exceed 400 aircraft.

Latin America Historical ASKs Trends(2004-2023)



Source: COMAC, OAG

6.6.2 Network

In 2023, available seat kilometers (ASKs) in the Latin American region increased by 15.2% compared to 2022. Latin American carriers operated a total of 2,184 routes, covering approximately 6.6% of the global route network, with the number of routes increasing by 180 compared to 2022. Of the routes operated by Latin American carriers, 82.6% were within the Latin American region.

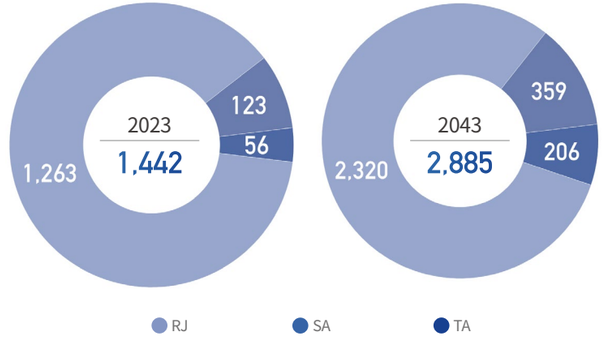
In terms of available seat capacity, in 2023, Latin American carriers allocated 90.3% of their total capacity within the Latin American region, a year-over-year increase of 10%. Capacity in cross-regional markets grew by 21.6% year-over-year, with the top three markets being Latin America-North America, Latin America-Europe, and Latin America-Asia-Pacific, accounting for 7.6%, 1.9%, and 0.09% of the total capacity, respectively.

6.6.3 Fleet

Latin America has a fleet size of 1,442 aircraft in 2023, of which 87.6% are single-aisle jetliners and 8.5% are twin-aisle jets. By 2043, the region's fleet size will reach 2,885 aircraft, accounting for 5.9% of the global fleet.

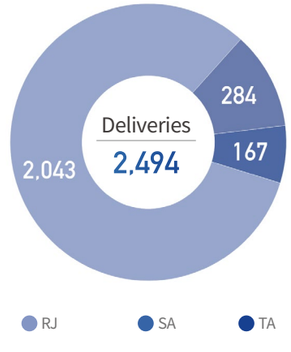
Over the next two decades, 2,494 aircraft will be delivered to Latin America, including 167 turbofan regional airliners, accounting for 6.7% of the region's passenger aircraft deliveries, and the number of turbofan regional airliners in the region is expected to reach 206 by 2043. Single-aisle jetliners will deliver 2,043 aircraft, accounting for 87.6% of deliveries in the region, and the fleet size will increase from 1,442 in 2023 to 2,885 aircraft. 284 twin-aisle jetliners will be delivered, bringing the fleet size to 359.

Latin America Fleet Growth



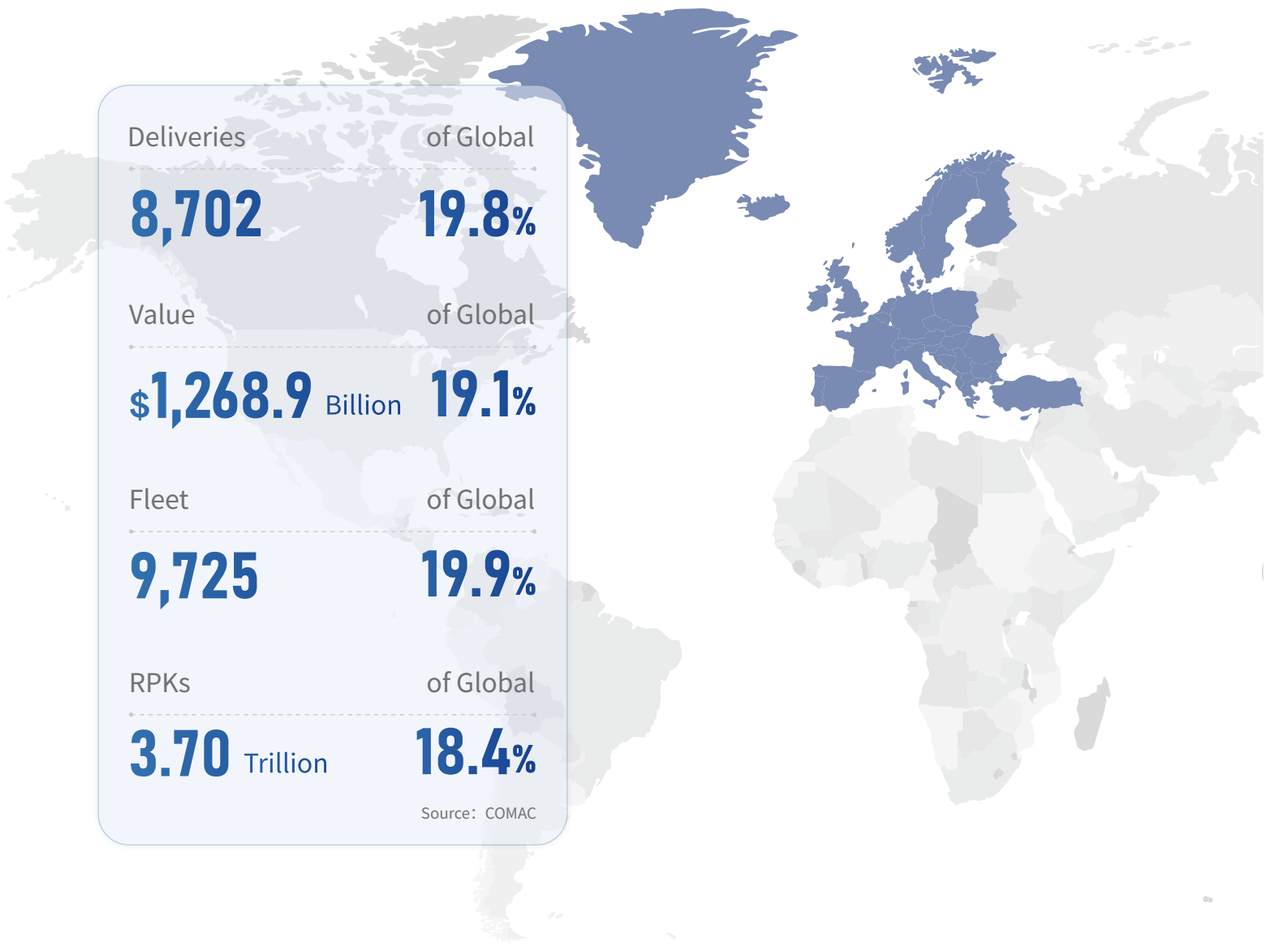
Source: COMAC, Cirium

Latin America Delivery by Category 2024-2043



Source: COMAC

6.7 Europe



Deliveries	of Global
8,702	19.8%
Value	of Global
$1,268.9 Billion	19.1%
Fleet	of Global
9,725	19.9%
RPKs	of Global
3.70 Trillion	18.4%

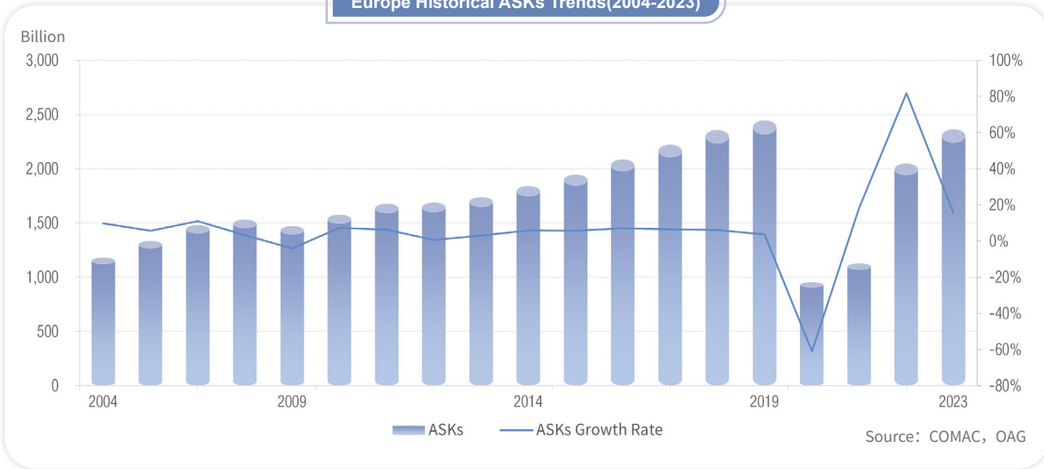
Source：COMAC

6.7.1 Market

In 2023, facing multiple challenges such as global geopolitical tensions, the European economy is struggling and the recovery is weak. The real GDP growth rate in the eurozone grew by 0.4%, slightly declined by 0.1% from IMF expectations. As the impact of the energy price shock fades and inflation falls, stronger household consumption will support real income growth, which is expected to drive the economic recovery.

European markets announced to reopen borders and lift entry restrictions in the earlier time, although the aviation market demand recovered quickly due to the spread of Omicron variant and the Russia-Ukraine conflict. According to IATA statistics,the RPKs in domestic Europe and the Europe-North America market recovered to 84.2% and 87.3% compared to the same period of 2019. In addition, European airlines have returned to profitability in 2022, and will further strengthened in 2023. Compared to 2022, the RPKs and ASKs of European airlines increased by 19.6% and 18.8% respectively.

Europe Historical ASKs Trends(2004-2023)



Source：COMAC，OAG

6.7.2 Network

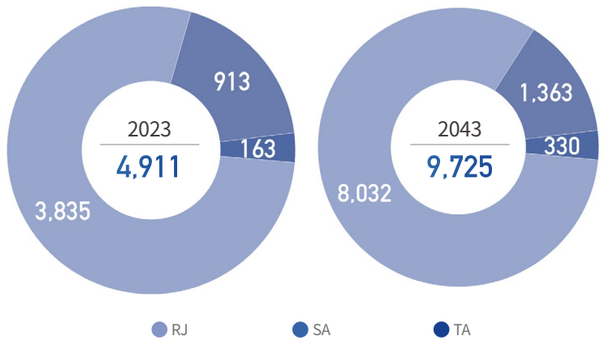
European carriers gained steady recovery in 2023, international routes are the focus of European carriers' capacity deployment. In terms of the ASKs, the share of European carriers accounted for 93.0%. In terms of the number of international routes, the number of routes in the European region increased by 165 compared to 2022. In terms of available seats, the overall capacity of the European market increased by 13.1% compared to the previous year.

6.7.3 Fleet

In 2023, there were 4,911 passenger aircraft in service in Europe, increased by 125 compared with 2022, accounting for 20.4% of the global fleet. 8,702 new jets will be delivered in next 20 years, the fleet size in this region will reach 9,725 by 2043, accounting for 19.9% of the global share, with a delivery value of $1.27 trillion.

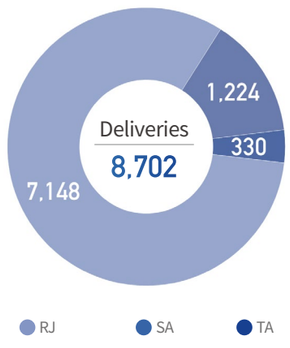
Single-aisle jets remained the main force for fleet growth, with 7,148 delivered, accounting for 22.0% of the global single-aisle jets delivery; 330 turbofan regional jet deliveries, accounting for 8.5% of the global regional jet deliveries; 1,224 twin-aisle jets were delivered, accounting for 16.4% of the world total.

Europe Fleet Growth



Source：COMAC，Cirium

Europe Fleet Delivery by Category 2024-2043

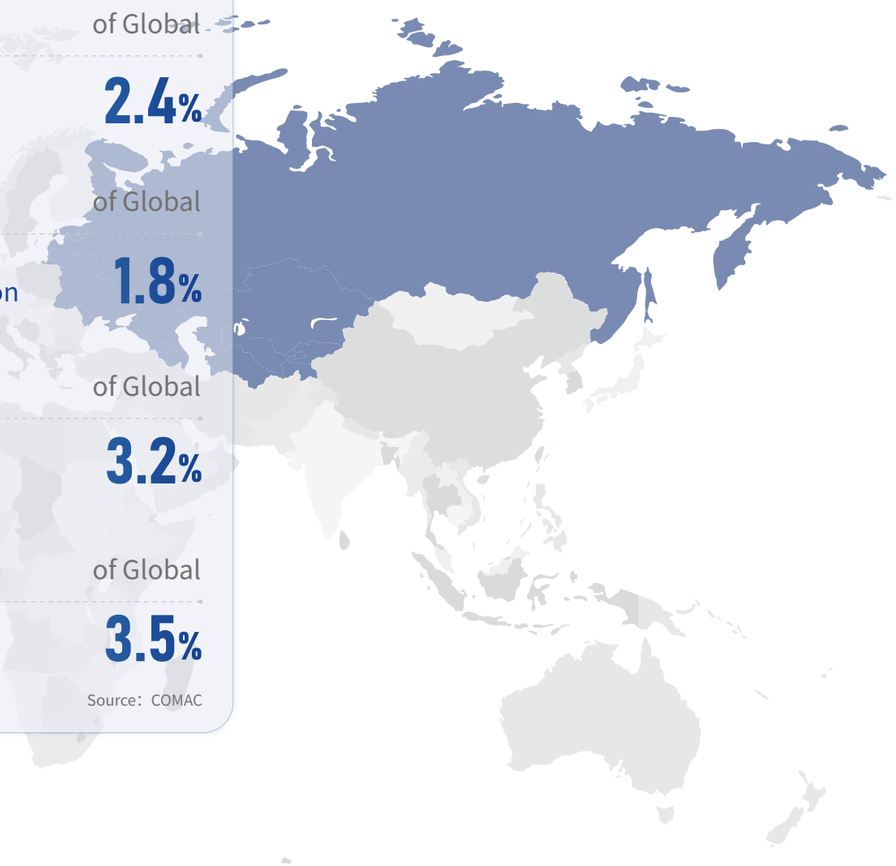


Source：COMAC

6.8 Russia and CIS

Deliveries	of Global
1,047	2.4%
Value	**of Global**
$121.8 Billion	1.8%
Fleet	**of Global**
1,555	3.2%
RPKs	**of Global**
0.74 Trillion	3.5%

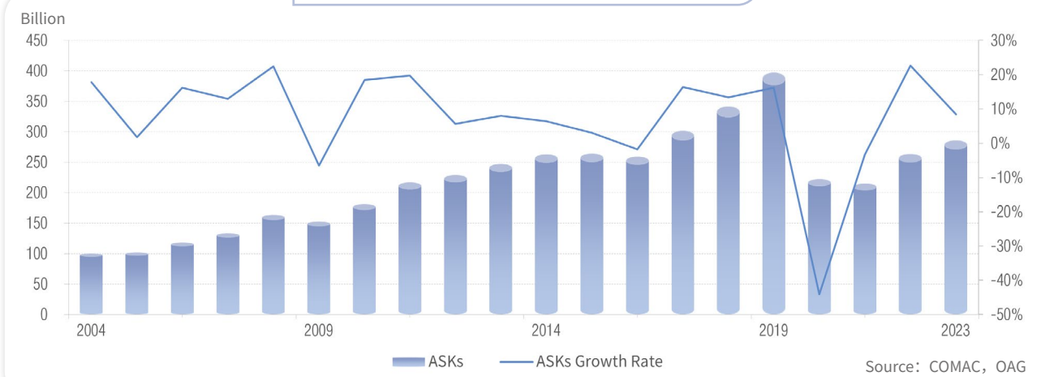
Source：COMAC



6.8.1 Market

Despite the ongoing impact of the Ukrainian crisis and Western sanctions against Russia, the Russian economy showed an overall recovery momentum in 2023, with economic growth exceeding the Russian government's expectations. According to the latest estimates of the Russian Federal State Statistics Service, Russia's gross domestic product (GDP) growth rate in 2023 is 3.6%. And Russia's total GDP reached 172.148 trillion rubles (about 1.88 trillion US dollars) at current prices, an increase of 7% over the same period last year. Despite the complex international situation and the shrinking trend of Russia's net exports, domestic final demand achieved an increase of 8.9%, making an important contribution to the positive growth of GDP. Since the second quarter of 2023, the Russian economy has gradually improved, and this trend is closely related to the significant increase in household consumption demand. In 2023, the annual ASKs of Russian and CIS airlines increased by 8% year-on-year compared with 2022, an increase of 22.11 billion seat kilometers, and the aviation market continued to recover. This series of data shows the steady growth momentum of the Russian economy and the ability of various industries to continue to develop in a complex international environment.

Russia and CIS ASKs Historical Trends(2004-2023)



Source：COMAC，OAG

6.8.2 Network

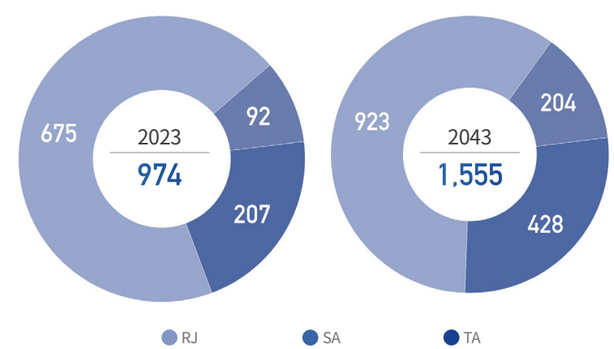
Compared with 2022, the ASKs of Russian and CIS carriers increased by 8.4% in 2023, of which the intra-regional route market decreased by 0.63%. In the cross-regional market, compared with 2022, the largest market Russian and CIS-European ASKs increased by 9.1%; the Russian and CIS-Asia-Pacific market was positively affected by the relaxation of international travel controls by countries in the Asia-Pacific region, especially China, and jumped to become the second largest market, with ASKs increasing by more than 200%; the Russian and CIS-Middle East market was the third largest market, with ASKs increasing by 25.2%; the fourth largest market, the Russian and CIS-African market, saw an increase of 31.5% in ASKs.

6.8.3 Fleet

In 2023, there are 974 passenger aircrafts in service in Russia and the CIS, of which single-aisle aircraft accounts for 69.3% and turbofan regional jet accounts for 30.7%. By 2043, the fleet size in the region will reach 1,555, accounting for 3.2% of the global fleet. The Russian aviation market has gradually recovered after the pandemic, but it still faces huge obstacles such as new aircraft purchases and route restrictions due to Western sanctions.

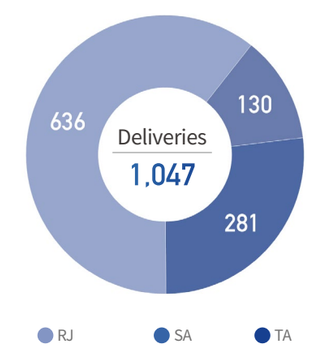
In the next two decades, 1,047 new aircrafts will be delivered to the region, with the value of approximately US$121.8 billion. Single-aisle aircraft remain the main factor affecting fleet growth, with deliveries reaching 636, accounting for 60.7%; turbofan regional jet deliveries will be 281; and twin-aisle aircraft deliveries will be 130.

Russia & CIS Fleet Growth



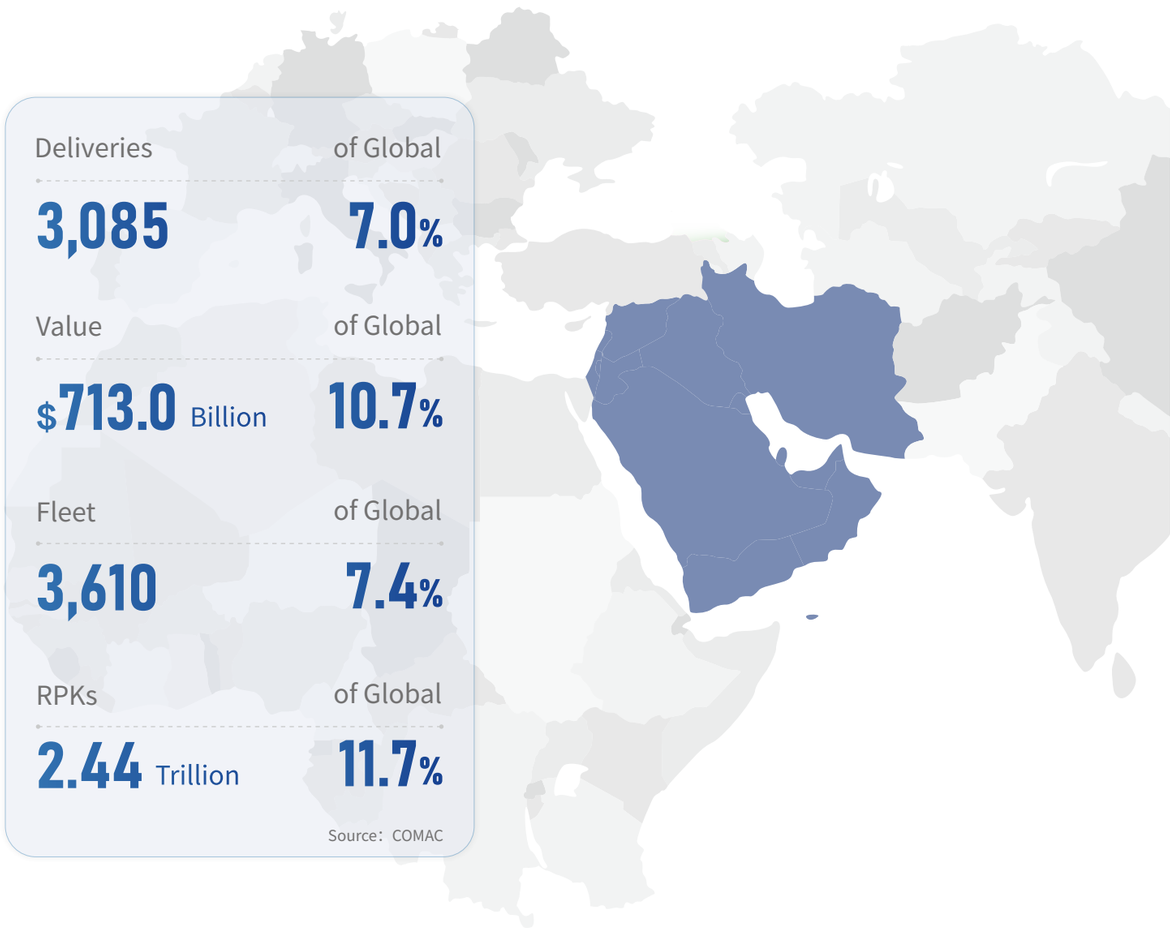
Source：COMAC，Cirium

Russia & CIS Delivery by Category 2024-2043



Source：COMAC

6.9 Middle East



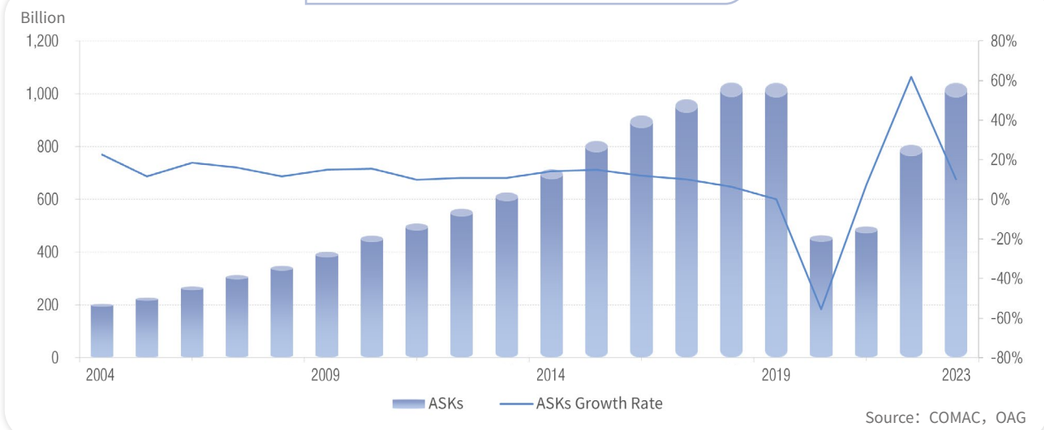
Deliveries	of Global
3,085	7.0%
Value	of Global
$713.0 Billion	10.7%
Fleet	of Global
3,610	7.4%
RPKs	of Global
2.44 Trillion	11.7%

Source: COMAC

6.9.1 Market

In 2023, the aviation industry in the Middle East showed signs of recovery. According to data from the International Air Transport Association (IATA), the region's international passenger traffic increased by 41.6% compared to 2022, reaching 88.6% of 2019 levels. Domestic passenger traffic grew by 30.4% year-on-year, surpassing the 2019 annual level by 3.9%. Qatar Airways' total revenue for the fiscal year reached 76.3 billion Qatari riyals (approximately 20.9 billion USD), a 45% increase compared to the previous year, setting a new historical record. During the Qatar World Cup, the airline transported over 1.4 million fans. From 2023 to 2033, the fleet size of Middle Eastern airlines is expected to grow at an annual rate of 5.1%, making it one of the fastest-growing aviation markets globally.

Middle East Historical ASKs Trends (2004-2023)



Source: COMAC, OAG

6.9.2 Network

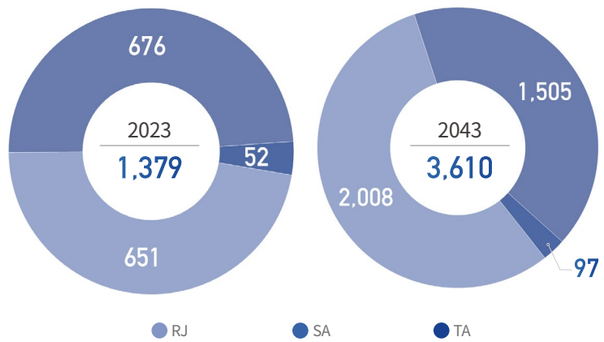
In 2023, the overall capacity in the Middle East (ASKs) recovered to 99.9% of 2019 levels. Middle Eastern carriers continued to focus their capacity on international routes, which accounted for 97.1% of total capacity, an increase of 1.9% from the previous year. International routes comprised 90% of the total number of routes. In terms of route numbers, the total number of routes in the Middle East remained the same as the previous year, with 451 domestic routes and 4,072 international routes.

6.9.3 Fleet

In 2023, the Middle East had 1,379 active passenger aircraft, with 47.2% being single-aisle jets and 3.8% being turboprop regional aircraft. By 2043, the region's fleet is projected to grow to 3,610 aircraft, accounting for 7.4% of the global fleet.

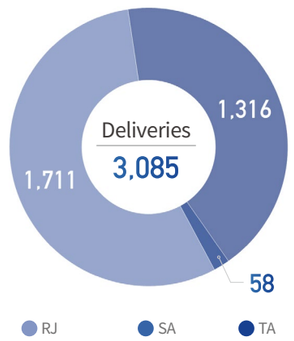
Over the next twenty years, the region will receive 3,085 new aircraft, valued at approximately $713 billion. Single-aisle jets will be the main driver of fleet growth, with 1,711 deliveries, representing 5.3% of global single-aisle jet deliveries. Twin-aisle jets will see 1,316 deliveries, accounting for 17.6% of global twin-aisle jet deliveries. Turboprop regional aircraft deliveries will total 58, representing 1.5% of global turboprop regional aircraft deliveries.

Middle East Fleet Growth



Source: COMAC, Cirium

Middle East Delivery by Category 2024-2043

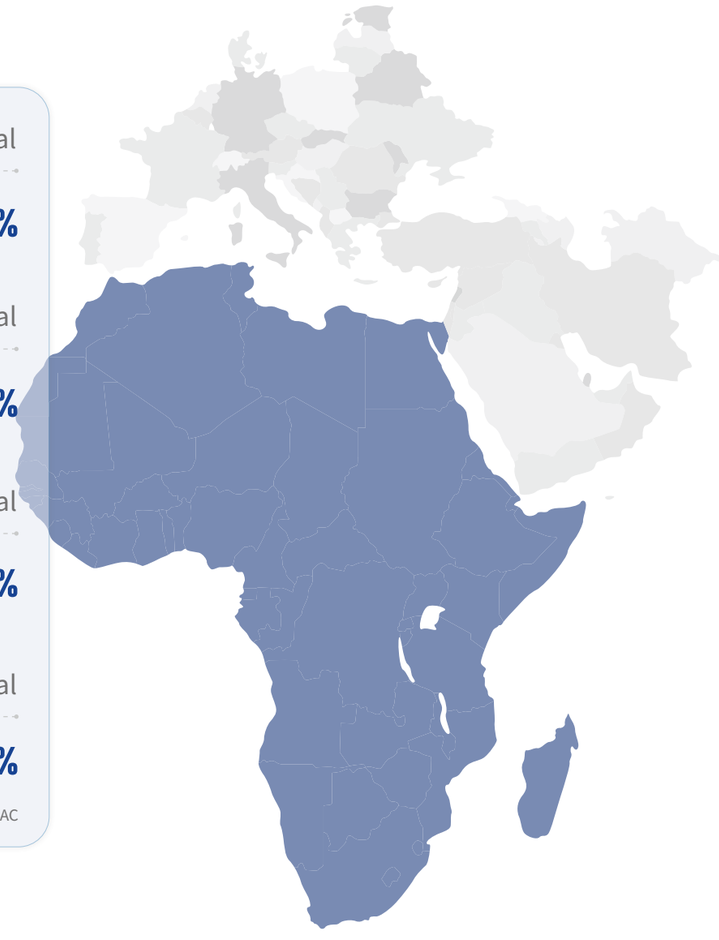


Source: COMAC

6.10 Africa

Deliveries	of Global
1,397	3.2%
Value	**of Global**
$202.1 Billion	3.0%
Fleet	**of Global**
1,957	4.0%
RPKs	**of Global**
0.53 Trillion	2.5%

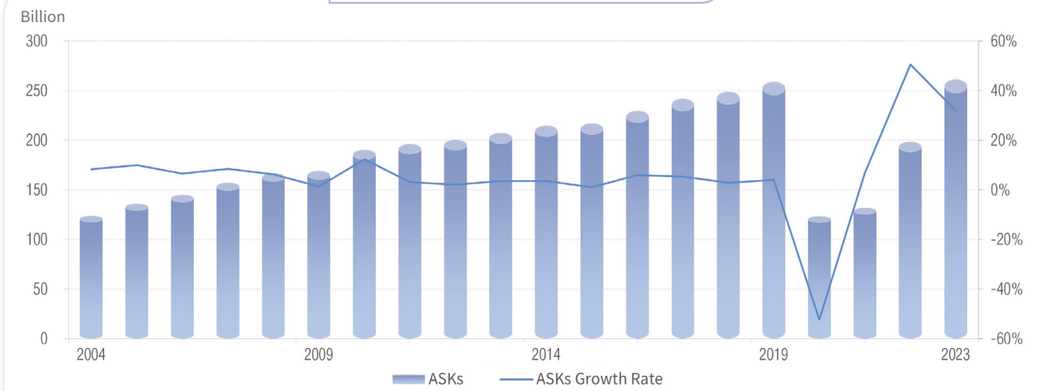
Source: COMAC



6.10.1 Market

The African aviation industry showed positive development in 2023. Despite regional differences, overall passenger volumes increased significantly, especially in North Africa and Central/West Africa, where passenger traffic reached 120% and 117% of 2019 levels, respectively. Nigeria was the main driver of growth in Central/West Africa, accounting for 41% of the region's total passenger volume, with traffic increasing to 136% of 2019 levels. However, Southern Africa, particularly South Africa, still saw passenger numbers below 2019 levels.

Africa Historical ASKs Trends (2004-2023)



Source: COMAC, OAG

6.10.2 Network

In 2023, the overall capacity in Africa (ASKs) recovered to 97.2% of 2019 levels. The focus of capacity deployment in Africa remained on international routes, which accounted for 96% of the total capacity and 76% of the total number of routes.

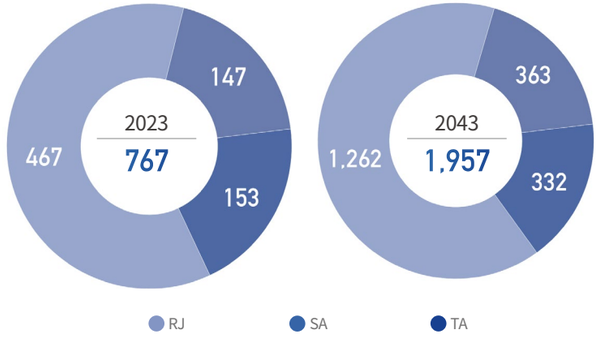
In terms of route changes, the number of routes in Africa increased by 283 compared to the previous year. International routes grew by 5.8%, while domestic routes saw a 4% increase.

6.10.3 Fleet

In 2023, Africa had 767 active passenger aircraft, with 60.9% single-aisle jets, 19.9% turbofan regional jets, and 19.2% twin-aisle jets. By 2043, the region's fleet is expected to grow to 1,957 aircraft, accounting for 4.0% of the global fleet.

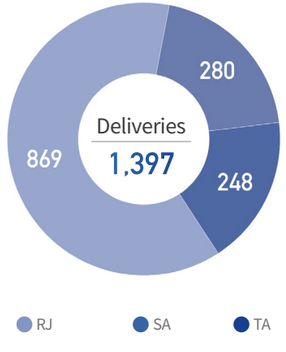
Over the next twenty years, the region will receive 1,397 new aircraft, valued at approximately $202.1 billion. Single-aisle jets will be the main driver of fleet growth, with 869 deliveries, representing 2.7% of global single-aisle jet deliveries. Turbofan regional jets will deliver 248 aircrafts, accounting for 6.4% of global turbofan regional jet deliveries. Twin-aisle jets will have 280 deliveries, representing 3.8% of global twin-aisle jet deliveries.

Africa Fleet Growth



Source: COMAC, Cirium

Africa Delivery by Category 2024-2043



Source: COMAC

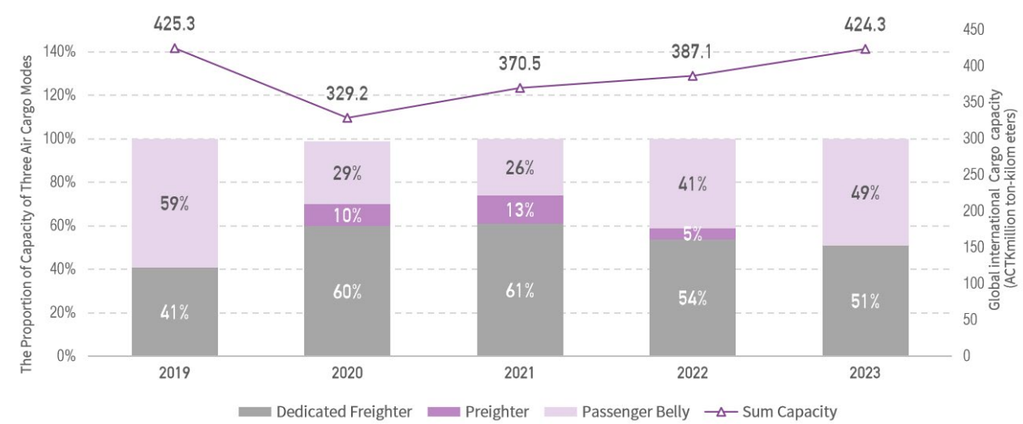
7 Cargo Aircraft Market Forecast

7.1 Global Air Cargo Market

7.1.1 Changes of International Air Cargo Capacity

In 2020, COVID-19 broke out globally, which directly led to the reduction of the total international air cargo transport capacity (ACTK) from 425.3 million ton-kilometers in 2019 to 329.2 million ton-kilometers, with a decline rate of 22.6%. With the growth of air cargo demand, the international air capacity increased to 370.5 million ton-kilometers in 2021, and continued to grow to 387.1 million ton-kilometers in 2022, which recovered to 91.0% of 2019's. In 2023, global international cargo capacity continued to grow to 424.3 million ton-kilometers, a year-on-year increase of 9.6%, almost recovering to the level of 2019's.

Changes in global international cargo capacity and the proportion of capacity of three air cargo modes from 2019 to 2023



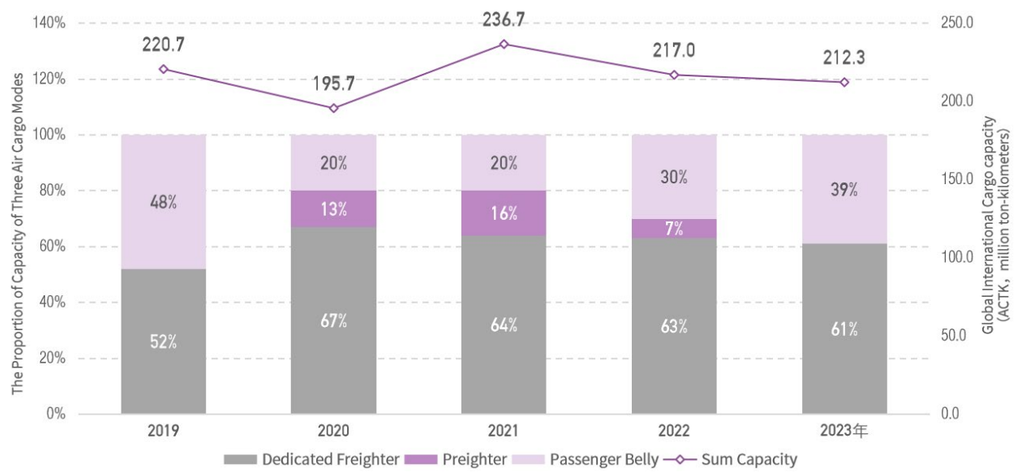
Source: COMAC, IATA

The outbreak of the COVID-19 led to a sharp reduction of global air passenger transport activities, which meant that the belly compartment transport capacity provided by passenger aircraft declined sharply. In response to this crisis, airlines not only increased their dedicated freighter capacity, but also temporarily converted some passenger aircrafts into freigthers (preighter) for cargo transportation. In 2020, the proportion of passenger aircraft belly cabin capacity in global international air cargo decreased from 59% in 2019 to 29%, while the proportion of dedicated freighter increased from 41% to 60%, and the proportion of preighter was 10%. In 2021, the proportion of passenger aircraft belly cabin capacity in global international air cargo continued to decline to 26%, while the proportion of dedicated freighter and preighter increased slightly to 61% and 13%, respectively. In 2022, with most countries announced the end of the pandemic, international passenger transport activities increased, which led to an increase in the proportion of passenger aircraft belly cabin capacity in global international air cargo to 41%, while the proportion of dedicated freighter and preighter decreased to 54% and 5%, respectively. In 2023, with the further recovery of global international passenger transportation, the proportion of belly cabin capacity in global international air cargo risen to 49%, while the proportion of dedicated freighter decreased to 51%, and preighter has withdrawn from global cargo transportation.

7.1.2 Changes of International Air Cargo Volume

In 2020, the total international cargo volume (CTK) decreased from 220.7 million ton-kilometers in 2019 to 195.7 million ton-kilometers, with a decrease rate of 11.3%. With the growth of global trade, the air cargo volume increased to 236.7 million ton-kilometers in 2021, higher than 2019's. In 2022, due to the contraction of various factors, the total international air cargo volume decreased by 8.3 percentage points to 217.0 million ton-kilometer, slightly lower than the level before the pandemic. In 2023, the total international air cargo volume slightly decreased by 1.9% to 212.3 million ton-kilometers.

Changes in global international cargo volume and the proportion of volume of three air cargo modes from 2019 to 2023



Source：COMAC，IATA

In 2020, the proportion of passenger aircraft belly cargo volume in global international air cargo decreased from 48% in 2019 to 20%, while the proportion of dedicated freighter increased from 52% to 67%, and the proportion of preighter was 13%. In 2021, the proportion of passenger aircraft belly cargo volume in global international air cargo remained unchanged, with the proportion of dedicated freighter decreasing to 64% and the proportion of preighter increasing to 16%. In 2022, due to a certain degree of recovery in international passenger transportation, the proportion of passenger aircraft belly cargo volume in global international air cargo increased to 30%, while the proportion of dedicated freighter remained almost unchanged, while the proportion of preighter decreased to 7%. In 2023, with the further recovery of global international passenger transportation activities, the proportion of belly cargo volume in global international air cargo has risen to 39%, while the proportion of dedicated freighter has decreased to 61%.

7.2 Current Situation of the Global Air Cargo Market

In 2023, international air passenger transportation business continued to recover, and the belly cabin capacity of passenger aircraft was also restored accordingly.

In 2023, the entire industry available cargo ton kilometer (ACTK) increased by 11.3% year-on-year, a increase of 2.5% compared to 2019. In 2023, the cargo ton kilometer (CTK) of the entire industry decreased by 1.9% year-on-year, a decrease of 3.6% compared to 2019. The industry wide load factor (CLF) decreased by 5.9 percentage points year-on-year, a decrease of 2.7 percentage points compared to 2019.

In 2023, the Africa-Asia market showed the most significant growth, with a double-digit year-on-year growth. With China's reopening, the market saw a significant growth of 37% in February and achieved positive year-on-year growth for most months of this year.

In the second half of 2023, due to regional conflicts, especially the Red Sea conflict, traditional shipping routes were disrupted, and manufacturers and shippers increasingly chose air cargo as a substitute for traditional shipping. The trade routes between Europe-Asia, Europe-Middle East, and Middle East-Asia have seen significant growth, even surpassing other markets by the end of the year.

In December 2023, the international CTK involving North America, especially the North American Europe and North American Asia trade channels, showed positive growth for the second consecutive month.

In 2023, the international air cargo volume within Asia and Europe has decreased.

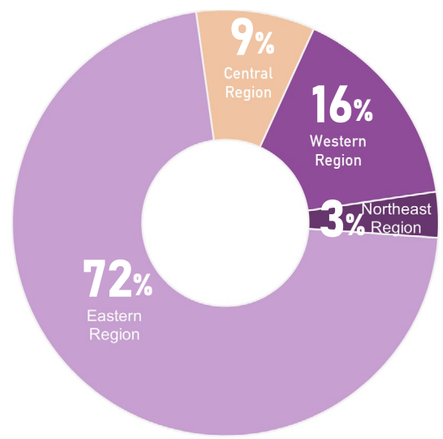
7.3 Current Situation of Chinese Air Cargo Market

In 2023, China completed a turnover of 28.36 billion ton-kilometers of cargo and mail, a increase of 11.6% year on year. The cargo and mail turnover of domestic routes was 0.7 million ton-kilometers, a increase of 34.7% year on year, of which the cargo and mail turnover of Hong Kong, Macao and Taiwan routes was 184 million ton-kilometers, an increase of 6.4% year on year. International routes completed 21.3 billion ton-kilometers of cargo and mail turnover, a increase of 5.6% year on year.

In 2023, China civil aviation industry completed 7.35 million tons of cargo and mail transportation, a increase of 21.0% year on year. The cargo and mail volume of domestic routes was 4.56 million tons, a increase of 32.8% year on year, of which the cargo and mail volume of Hong Kong, Macao and Taiwan routes was 0. 15 million tons, a increase of 2.5% year on year. International routes completed 2.79 million tons of cargo and mail volume, a increase of 5.8% year on year.

In 2023, eastern region completed a turnover of 12.07 million tons of cargo and mail, a increase of 12.8% year on year, accounting for 71.7% of the total transportation volume. Central region completed a turnover of 1.52 million tons of cargo and mail, a increase of 20.3% year on year, accounting for 9.0% of the total transportation volume. Western region completed a turnover of 2.67 million tons of cargo and mail, a increase of 24.0% year on year, accounting for 15.8% of the total transportation volume. Northeast region completed a turnover of 0.58 million tons of cargo and mail, a increase of 37.8% year on year, accounting for 3.5% of the total transportation volume.

Distribution of cargo and mail transportation volume in civil aviation transportation airports by region in 2023



Source：CAAC，COMAC

7.4 Historical Development of Global Freighter Fleet

In the past 20 years from 2004 to 2023, the global freighter fleet experienced a series of stages of slow increase, slow decrease, and then a rapid increase.

From 2004 to 2007, the global freighter fleet increased from 2,048 to 2,157, with a four-year compound annual growth rate of only 1.2%. From 2008 to 2015, the global freighter fleet decreased compared to the previous years, with a compound annual growth rate of -1.5% over the past eight years; Especially in 2010 and 2013, the growth rates reached to -3.9% and -3.6% respectively compared to the previous year. From 2016 to 2023, the global freighter fleet grew rapidly, with a compound annual growth rate of 4.5% over the past eight years; Especially in 2020 and 2021 after the outbreak of the COVID-19, the growth rates reached astonishing to 10.2% and 7.0%. The growth rate of freighter fleet decreased to 2.1% in 2022, and increased to 6.1% in 2023.

Trends of Global Freighter Fleet (2004-2023)

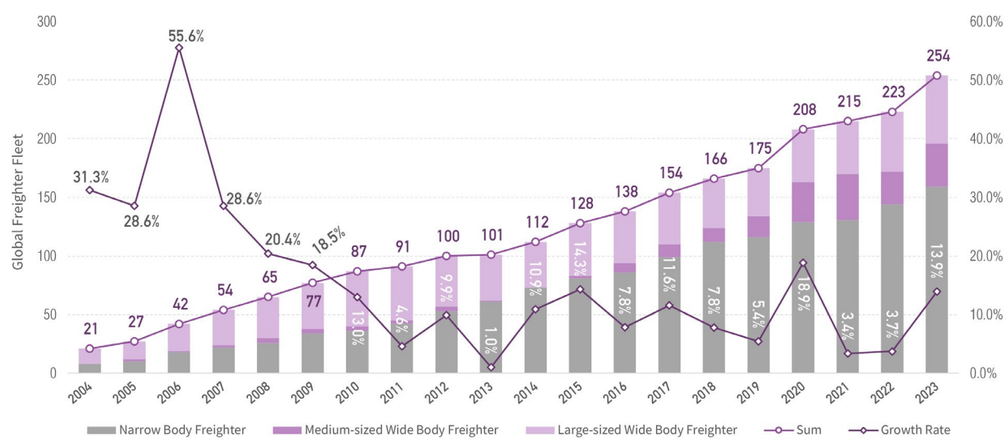
Source：COMAC，Cirium

By the end of 2023, there were 2,740 freighters worldwide (including in service and in storage), including 1,124 narrow body freighters, 874 medium-sized wide body freighters, and 742 large-sized wide body freighters.

7.5 Historical Development of Chinese Freighter Fleet

Since the re-organization of the three major domestic airlines (Air China, China Eastern Airlines and China Southern Airlines) in 2002, various airlines have launched the strategy of "Simultaneous development of passenger and cargo", and established specialized cargo companies and departments, and carried out air cargo and air express services. Chinese dedicated freighter fleet has continued to grow since then, with a compound annual growth rate of 14.8% from 2004 to 2023 over the past 20 years.

Trends of Chinese Freighter Fleet (2004-2023)



Source：COMAC，Cirium

From 2008 to 2011, due to the impact of the global economic downturn, the growth rate of the freighter fleet significantly slowed down, but the scale maintained sustained growth. Encouraged by the development policies of the State Council, Civil Aviation Administration, and local governments for aviation logistics, the demand in Chinese aviation logistics market continued to grow, and the scale of freighter fleet also skyrocketed. From 2014 to 2019, there was another consecutive significant growth, with an annual compound growth rate of about 9.6%. From 2020 to 2021, in case of the downturn in the passenger market due to the continuous impact of COVID-19 and the further growth of freight demand, the number of freighter (including preighter) continued to grow, especially in 2020, when the COVID-19 had just occurred, with a growth rate of 18.9% for freighter. The growth of the total number of freigther slowed down in 2021 and 2022, with annual growth rates of 3.4% and 3.7% respectively, while the growth rate in 2023 was as high as 13.9%.

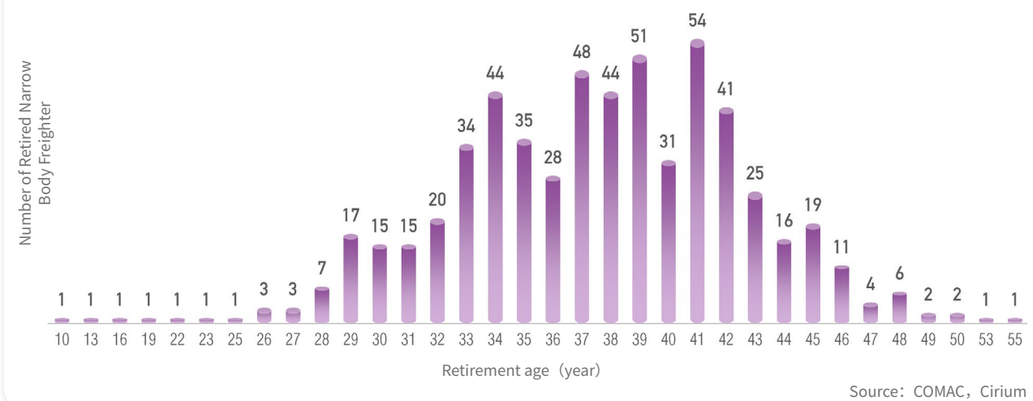
By the end of 2023, There ware 254 freighters in China, including 159 narrow body freighters, 37 medium-sized wide body freighters, and 58 large-sized wide body freighters.

7.6 The Retirement of Global Freighters

From 2004 to 2023, a total of 1,048 freighters were retired globally, including 584 narrow body freighters, 320 medium-sized wide body freighters, and 144 large-sized wide body freighters.

The average retired age of the 584 narrow body freighters is 37.5 years, of which 410 narrow body freighters retired between 33 and 42 years, accounting for 70.2% of the total. There were 87 narrow body freighters retired under 33 years old, accounting for 14.9% of the total. There were 87 narrow body freighters over 43 years old, accounting for 14.9% of the total.

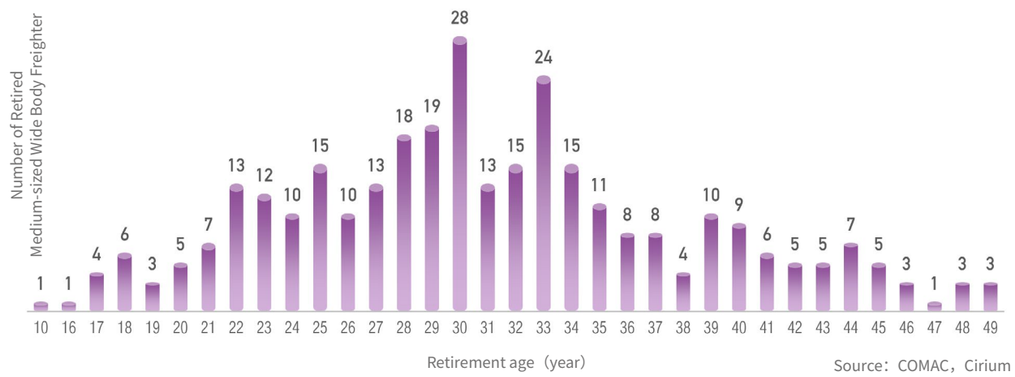
Retirement of Global Narrow Body Freighter (2004-2023)



Source：COMAC，Cirium

The average retirement age of the 320 medium-sized wide body freighters is 31.0 years, of which 216 medium-sized wide body freighters retired between 22 and 35 years, accounting for 67.5% of the total. There were 27 medium-sized wide body freighters retired under 22 years old, accounting for 8.4% of the total. There were 77 medium-sized wide body freighters retired over 35 years, accounting for 24.1% of the total.

The Retirement of Global Medium-Sized Wide Body Freighters (2004-2023)



Source：COMAC，Cirium

The average retirement age of the 144 large-sized wide body freighters is 29.4 years, and the retirement age of large-sized wide-body freighters is relatively scattered, with 63 retired from 20 to 29 years, accounting for approximately 43.8% of the total. 50 freighters retired between 31 and 36 years, accounting for approximately 34.7% of the total. There were 31 retired freighters of other age, accounting for approximately 21.5% of the total.

The Retirement of Global Large-Sized Wide Body Freighters (2004-2023)

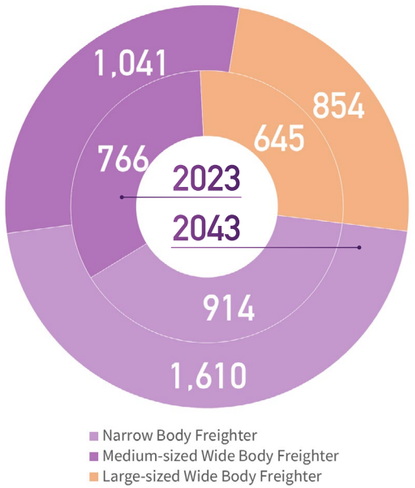
Source：COMAC，Cirium

In 2023, 9 freighters were permanently retired globally, including 5 narrow body freighter, 2 medium-sized wide body freighters and 2 large-sized wide body freighters.

7.7 Forecast of the Global Freighter Fleet

By 2043, the global scale of the freighter fleet will reach 3,505, including 1,610 narrow-body-freighters, 1,041 medium-sized wide -body freighters, and 854 large-sized wide body freighters.

Global Historical and Predicted Freighter Fleet Size

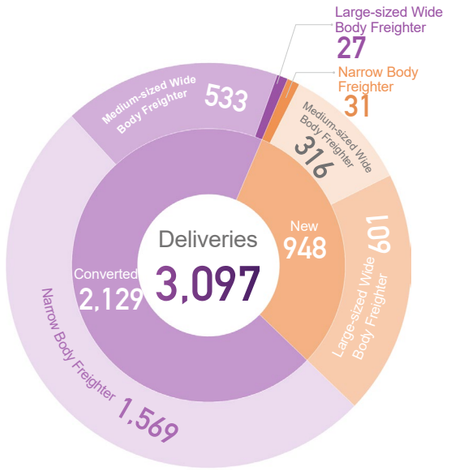


Note: the number of storage freighters is not included in the fleet in 2023.

Source：COMAC，Cirium

Among the 948 delivered new-built freighters, there are 31 narrow body freighters, 316 medium-sized wide body freighters, and 601 large-sized wide body freighters. In addition, 2,129 passenger aircrafts will enter the freight market by passenger to freighter conversion, including 1,569 narrow body freighters, 533 medium-sized wide body freighters, and 27 large-sized wide body freighters.

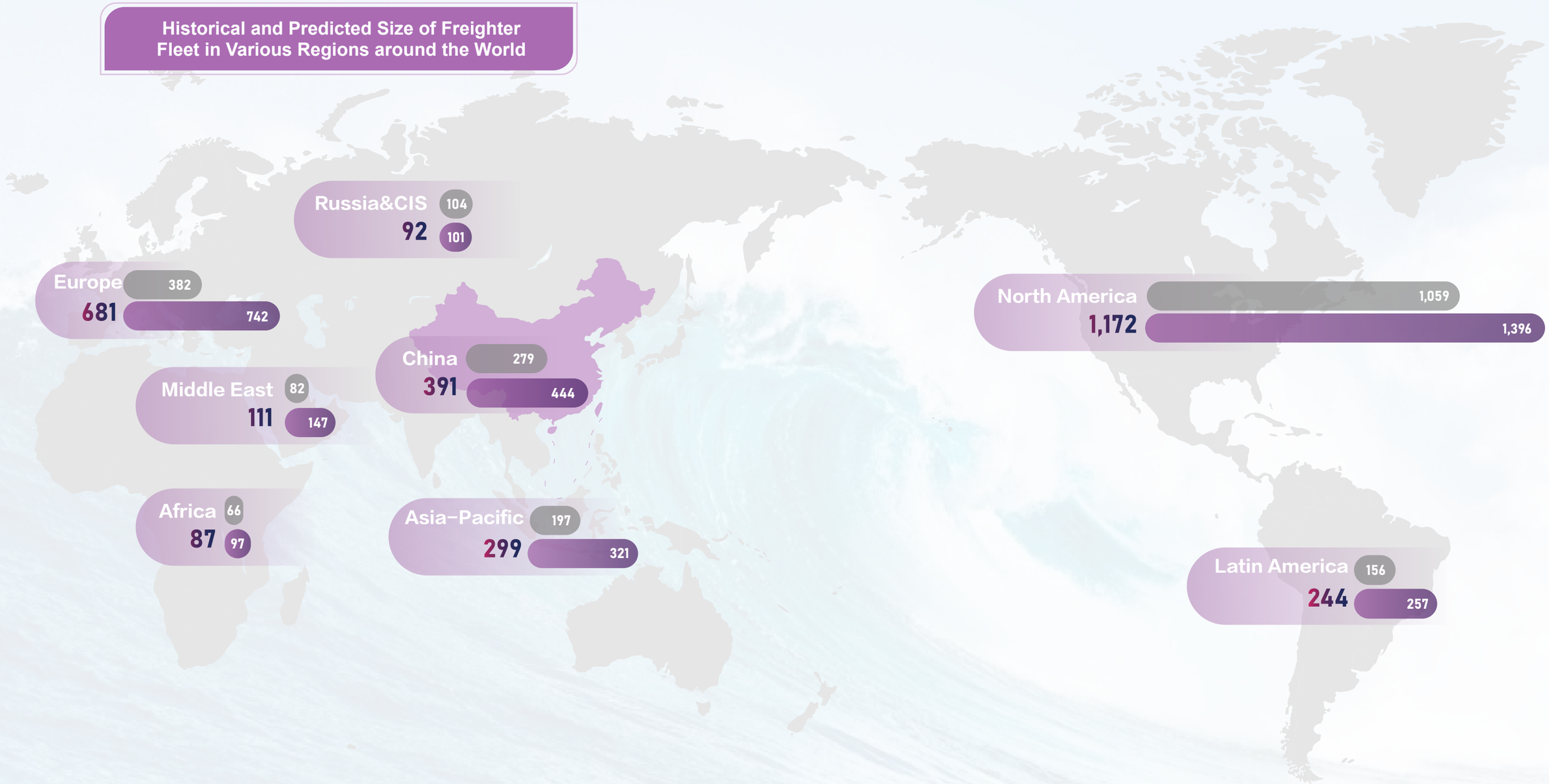
Forecast of Global Delivery Volume of Various Types of Freighters from 2024 to 2043



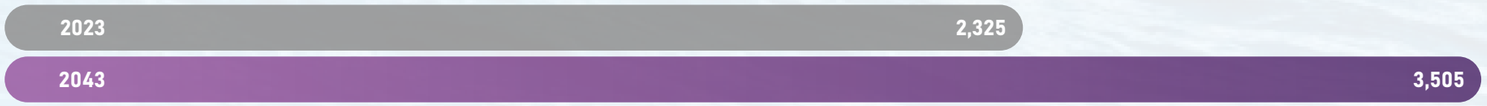
Source：COMAC

In global perspective, North America remains the region with the highest demand for freighters, with 1,172 freighters expected to be delivered over the next 20 years, and the number of freighter fleet will be 1,396. Meanwhile, the Asia Pacific region (excluding China) still maintains a good development trend. The Asia Pacific region (excluding China) will be delivered 299 freighters in the next 20 years, and the number of freighter fleet will be 321. China (including Hongkong, Macco and Taiwan) will have 391 freighters entering the market, and the number of freighter fleet will be 444. The development trend in European region is steadily increasing, and the number of freighter fleet will be 681. In economically underdeveloped regions such as Latin America, Middle East, and Africa, the freight market is relatively small and the fleet size has also increased to some extent. Russia and the Commonwealth of Independent States (CIS) region are the only regions in the world that have seen a decrease in freighter fleet. The existing freighters in this region are old and there are no new freighter to supplement. As old freighters gradually retired, the fleet will continue to decrease.

Historical and Predicted Size of Freighter Fleet in Various Regions around the World



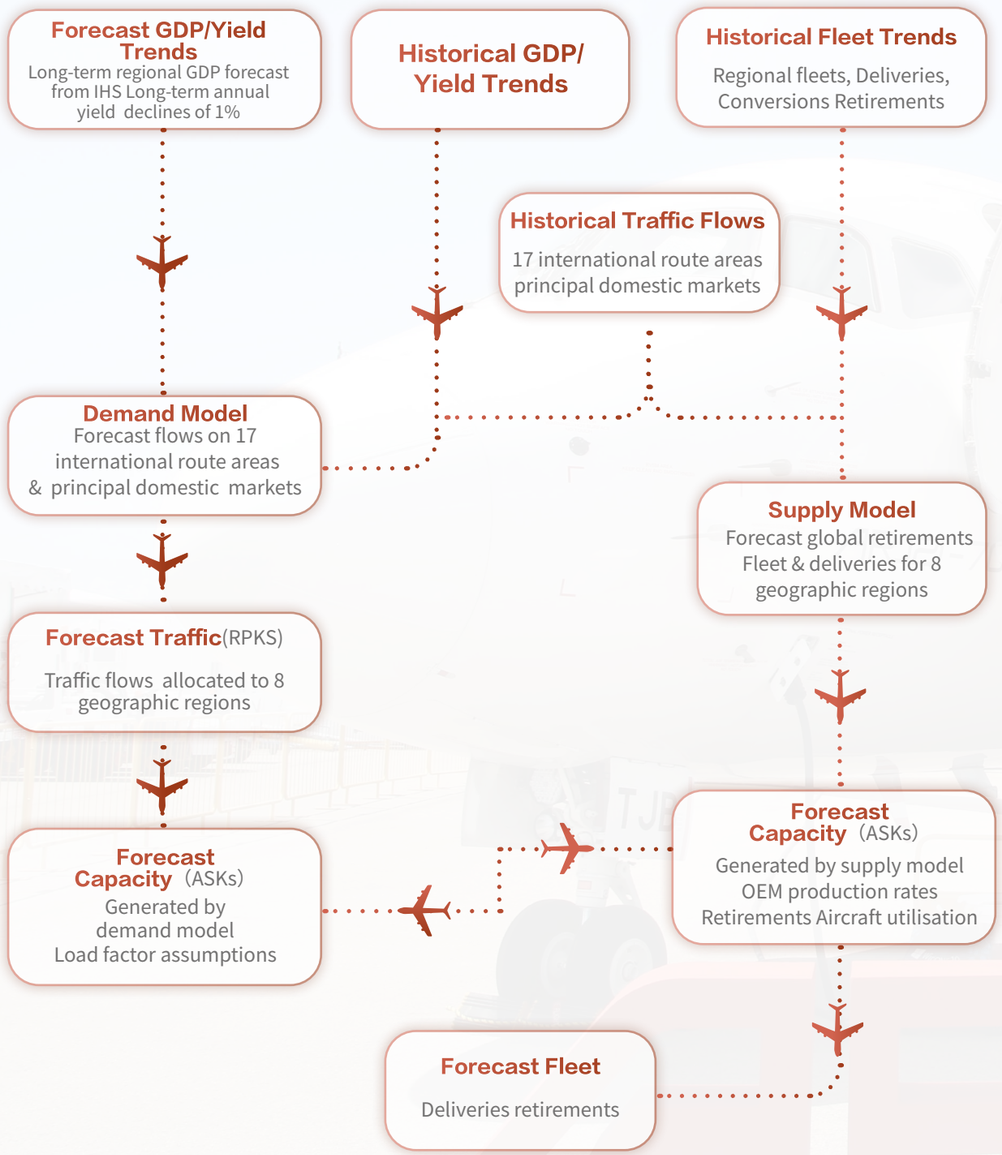
Global Freighter Fleet



Source: COMAC, Cirium
Note: the number of storage freighters is not included in the fleet in 2023. China includes Hong Kong, Macao and Taiwan regions.

APPENDICES & DATA TABLES

Methodology



Aircraft Size Category Definition

	Passenger Regional Jets	Passenger Single-Aisle Jets	Passenger Twin-Aisle Jets
Small Regional Jets	Embraer ERJ145 Bombardier CRJ100 / 200 Dornier 328Jet Embraer ERJ135/140 UAC Yak-40		
Medium Regional Jets	Bombardier CRJ700 **Embraer E170,E175** Antonov An-148 BAE System 146-100 Fokker 70		
Large Regional Jets	**COMAC C909** **UAC Superjet 100** BombardierCRJ900 / 1000 Antonov An-158 FokkerF28-1000 BAE System RJ85/RJ100 BAE System 146-200/300		
Small Single-Aisle Jets		**Embraer E190 / 195 / 190-E2 / 195-E2** **Airbus A319neo** **Airbus A220-100/300** **Boeing 737 MAX 7** Airbus A318 / A319 Boeing 737-600 / 700 Boeing 717 Boeing 737-200 / 300 / 500 McDonnell Douglas DC-9 Tupolev Tu-134 UAC Yak- 42	
Medium Single-Aisle Jets		**Airbus A320neo** **Boeing 737 MAX 8 / MAX 200** **COMAC C919** **UAC MC-21-300** Boeing 737-800 Airbus A320 Boeing 727-200 Boeing 737-400 McDonnell Douglas MD-80 / -90 Tupolev TU-154	
Large Single-Aisle Jets		**Airbus A321neo** **Boeing 737-900ER / MAX 9** **Boeing 737 MAX 10** Airbus A321 Tupolev TU-204 Boeing 737-900 Boeing 757-200 / 300 Ilyushin Il-62	
Small Twin-Aisle Jets			**AirbusA330-800neo/900neo** **Airbus A350XWB 900** **Boeing 787-8 / 9 / 10X** Boeing 777-200ER / LR Airbus A330-200 / 300 Boeing 767-300ER Airbus A300 Airbus A310 Airbus A340-200 / 300 / 500 Boeing 767-200 / 300 / 400 Boeing 777-200 Ilyushin IL-86 / 96 Lockheed L1011 McDonnell Douglas DC-10 / MD-11
Medium Twin-Aisle Jets			**Airbus A350XWB-1000** **Boeing 777-300ER** **Boeing 777-8** Airbus A340-600 Boeing 777-300
Large Twin-Aisle Jets			**Boeing 777-9** Boeing 747-8 Airbus A380-800 Boeing 747-400 Boeing 747 Classics

Note: Aircraft in Bold represents "In Production"

Freighter Size Category

Small Narrow-Body Freighter	Medium Wide-Body Freighter	Large Wide-Body Freighter
727		
737(JT8D)		
737 (CFMI)		
737 NG		
757		
A320		
A321	767	
An-72	A300	747
An-74	A310	777
C909	A330	An-124
BAE 146	A340	Il-96
CRJ100/200	DC-10	MD-11
DC-8	Il-76	
DC-9		
E195		
Il-62		
MD-80		
Tu-204		
Yak-40		

Global RPK Traffic Forecast Summary

ICAO Routes	2023	2028	2033	2038	2043	2019-2043 CAGR
International RPKs (billions)						
Between North America and Central America/Caribbean	109	137	164	195	233	3.4%
Between Central America and Caribbean	13	16	19	23	27	4.9%
Between Bermuda, Canada, Mexico and the United States	144	163	180	199	221	1.8%
Between North America/Central America/Caribbean and South America	143	202	242	290	347	3.7%
Local South America	17	30	42	57	78	3.5%
Local Europe	804	1,095	1,214	1,329	1,429	2.3%
Local Middle East	45	57	67	77	82	2.7%
Local Africa	46	64	78	107	157	5.3%
Between Europe and Middle East	281	405	480	561	646	3.2%
Between Europe/Middle East and Africa	292	445	577	774	962	5.2%
North Atlantic	756	940	1,042	1,151	1,265	1.9%
Mid-Atlantic	169	200	222	239	250	1.4%
South Atlantic	100	155	184	218	257	3.1%
Local Asia/Pacific	636	1,563	2,101	2,744	3,500	5.6%
Between Europe/Middle East/Africa and Asia/Pacific	874	1,558	2,038	2,601	3,307	5.4%
North/Mid-Pacific	264	568	668	786	925	3.2%
South Pacific	60	100	119	141	167	3.1%
Total International	4,755	7,699	9,435	11,492	13,855	4.0%
Domestic RPKs (billions)						
Europe	160	222	258	293	328	3.2%
Japan	78	83	87	91	94	0.8%
China	869	1,303	1,741	2,249	2,790	5.1%
US	1,244	1,402	1,502	1,609	1,725	1.9%
Other	737	1,071	1,374	1,744	2,193	3.4%
Total Domestic	3,087	4,081	4,961	5,986	7,129	3.5%
World Total	**7,842**	**11,781**	**14,397**	**17,478**	**20,984**	**3.8%**