

Statistical Bulletin of Civil Aviation Industry Development in 2021

2021 is a year of special significance in the development of civil aviation. Under the guidance of Xi Jinping Thought on Socialism with Chinese Characteristics for a New Era, the entire industry made every effort to implement the guiding principles of the Party's 19th National Congress and all the previous Plenary Sessions of the 19th Central Committee. as well as the Central Economic Work Conference. Under the strong leadership of the CPC Central Committee and the State Council. and guided by the new development philosophy and the underlying principle of pursing progress while maintaining stability, the industry conscientiously followed the general principles of "implementing one perception, ensuring simultaneous development of transport aviation and general aviation, guarding the three bottom lines, and making up for the four weak links" governing civil aviation activities in the 14th Five-Year Plan period, in an effort to overcome a combination of overlapping difficulties due to pandemic prevention and control, operating losses, and safety pressure and achieve solid progress in high-quality growth of civil aviation.

Remarkable achievements were made thanks to the efforts of the whole industry.

I. Transport Aviation

In 2021, the COVID-19 brought deeper and more persistent impact on civil aviation industry than expected.

1. Transport Turnover

In 2021, the whole industry recorded a total transport turnover of 85.675 billion ton·km, up by 7.3% over the previous year. Domestic routes registered a total transport turnover of 64.114 billion ton·km, up by 9.1% over the previous year, including 301 million ton·km on Hong Kong, Macao and Taiwan routes, down by 5.5% over the previous year. The international routes saw a total transport turnover of 21.561 billion ton·km, up by 2.3% over the previous year.



Figure 1 Total Transport Turnover of Civil Aviation Industry 2017–2021



The entire industry registered a passenger turnover of 652.968 billion passenger km, up by 3.5% over the previous year. The passenger turnover on domestic routes reached 643.912 billion passenger km, up by 9.7% over the previous year, including 819 million passenger km attributable to Hong Kong, Macao and Taiwan routes, down by 36.1% over the previous year. The passenger turnover on international routes was 9.056 billion passenger km, down by 79.5% over the previous year.

The whole industry registered a cargo and mail turnover of 27.816 billion ton·km, up by 15.8% over the previous year. The domestic routes recorded a cargo and mail turnover of 7.059 billion ton·km, up by 4.0% over the previous year, including 229 million ton·km on Hong Kong, Macao and Taiwan routes, up by 10.8% over the previous year. The cargo and mail turnover of international routes hit 20.757 billion ton·km, up by 20.5% over the previous year.

2. Passenger Traffic

In 2021, the whole industry transported 440.557 million passengers, up by 5.5% over the previous year. Domestic routes carried 439.080 million passengers, up by 7.6% over the previous year, including 592 500 passengers on Hong Kong, Macao and Taiwan routes, down by 38.4% over the previous year. International routes transported 1.477 million passengers, down by 84.6% over the previous year.











Figure 4 Passenger Traffic of Civil Aviation Industry 2017–2021

3. Cargo and Mail Traffic

In 2021, the whole industry transported 7.318 million tons of cargo and mail, up by 8.2% over the previous year. 4.651



million tons of cargo and mail were transported on domestic routes, up by 2.6% over the previous year, including 189 900 tons on Hong Kong, Macao and Taiwan routes, up by 8.0% over the previous year. The international routes transported 2.667 million tons, up by 19.6% over the previous year.

4. Flight Hours and Take-offs

In 2021, transport airlines in the whole industry recorded 9.322 million flight hours, up by 6.4% over the previous year. 8.596 million flight hours were flown on domestic routes, up by 9.0% over the previous year, including 26 400 hours on Hong Kong, Macao and Taiwan routes, down by 25.7% over the previous year. International routes recorded 726 100 flight hours, down by 17.5% over the previous year.

In 2021, transport airlines in the whole industry performed a total of 3.952 million take-offs, up by 6.5% over the previous year. 3.855 million take-offs were for domestic routes, up by 7.9% over the previous year, including 12 500 take-offs for Hong Kong, Macao and Taiwan routes, down by 24.2% over the previous year. Take-offs for international routes were 96 700, down by 29.9% over the previous year.

In 2021, transport airlines in the whole industry registered 57 800 noncommercial flight hours, including 13 200 flight hours for training, and performed 64 900 non-commercial take-offs.



Figure 5 Cargo and Mail Transported by Civil Aviation Industry 2017–2021

5. Number of Transport Airlines

By the end of 2021, there were 65 transport airlines in China, a net increase of 1 from that by the end of the previous year, including 39 state-controlled airlines and 26 privately-controlled airlines if categorized based on the type of ownership. Among all the transport airlines, there were 12 all-cargo airlines, 9 joint venture airlines and 8 publicly listed airlines.

6. Transport Aircraft Fleet

By the end of 2021, the civil aviation industry had 4 054 registered transport aircraft, 151 more than that by the end of the previous year.

Table 1 Number of Transport Aircraft in 2021

Aircraft Categories	Number of Aircraft	Increase from 2020	Percentage of Transport Fleet (%)
Total	4 054	151	100.0
Passenger Aircraft	3 856	139	95.1
Including: Wide-body Aircraft	465	7	11.5
Narrow-body Aircraft	3 178	120	78.4
Regional Aircraft	213	12	5.3
Freighters	198	12	4.9
Large Freighters	43	0	1.1
Small and Medium Freighters	155	12	3.8

7. Route Network

In 2021, there were 4 864 scheduled routes in China, including 4 585 domestic routes (including 25 routes connecting the mainland with Hong Kong, Macao and Taiwan) and 279 international routes. The total route distance was 10.496 million km if the overlapped distance was counted in, or 6.898 million km if the overlapped distance was deducted.

By the end of 2021, scheduled flights were operated in 244 domestic cities (excluding Hong Kong, Macao and Taiwan). Chinese airlines operated scheduled international flights to 60 cities in 41 countries. Airlines from the mainland operated scheduled flights to Hong Kong from 8 mainland cities, to Macao from 8 mainland cities and to Taiwan from 8 mainland cities.

8. Operations of Transport Airlines (groups)

In 2021, China National Aviation Holding Group recorded 1.967 million flight hours, up by 2.4% over the previous year. It registered a total transport turnover of 19.368 billion ton km, up by 2.4% over the previous year, and carried 87.002 million passengers, up by 0.8% over the previous year, and 1.764 million tons of cargo and mail, up by 1.1% over the previous year.

In 2021, China Eastern Air Holding Group recorded 1.801 million flight hours, up by 13.4% over the previous year. It registered a total transport turnover of 16.216 billion ton km, up by 14.1% over the previous year; and carried 79.100 million passengers, up

Table 2 Number of Scheduled Routes and Mileage in China in 2021

Indicator	Value
Number of Air Routes	4 864
Domestic Air Routes	4 585
Including: Hong Kong, Macao and Taiwan Air Routes	25
International Air Routes	279
Air Route Mileage Including Overlapped Distance (10 000 km)	1 049.63
Domestic Air Routes	903.27
Including: Hong Kong, Macao and Taiwan Air Routes	2.94
International Air Routes	146.36
Air Route Mileage Excluding Overlapped Distance (10 000 km)	689.78
Domestic Air Routes	557.81
Including: Hong Kong, Macao and Taiwan Air Routes	2.94
International Air Routes	131.96



Figure 6 Share of Each Airlines (Groups)' Total Transport Turnover in 2021

by 6.0% over the previous year; and carried 1.455 million tons of cargo and mail, up by 23.6% over the previous year.

In 2021, China Southern Airlines Group recorded 2.11 million flight hours, up by 1.6% over the previous year. It registered a total transport turnover of 21.211 billion ton km, up by 2.0% over the previous year, and carried 98.498 million passengers, up by 1.7%



over the previous year, and 1.442 million tons of cargo and mail, down by 1.3% from the previous year.

In 2021, other airlines recorded a total of 3.444 million flight hours, up by 8.4% over the previous year. They registered a total transport turnover of 28.880 billion ton·km, up by 11.4% over the previous year and carried 175.958 million passengers, up by 10.0% over the previous year; and 2.658 million tons of cargo and mail, up by 11.5% over the previous year.

9. Transport Airports

By the end of 2021, there were 248 certified transport airports in China (excluding those in Hong Kong, Macao and Taiwan), a net increase of 7 from that by the end of the previous year. Newly built airports in 2021 were Jingzhou Shashi Airport, Jiujiang Lushan Airport, Heze Mudan Airport, Wuhu Xuanzhou Airport, Chengdu Tianfu Airport, Chenzhou Beihu Airport, and Shaoguan Danxia Airport. In 2021, Qingdao Liuting Airport was relocated to Qingdao Jiaodong Airport, and Lianyungang Baitabu Airport was relocated to Lianyungang Huaguoshan Airport.

If classified based on aerodrome reference code, 15 of the certified airports were 4F, 37 were 4E, 37 were 4D, 154 were 4C, 4 were 3C, and 1 airport was below 3C.

By the end of 2021, transport airports in China had 275 runways, 7 133 parking stands, and 17.879 million

Region	Number of Certified Transport Airports	Percentage of the Total (%)
Nationwide	248	100.0
Including: Northeast Region	56	22.6
East Region	40	16.1
West Region	125	50.4
Central Region	27	10.9



Figure 7 Passenger Throughput at Civil Transport Airports 2017–2021



Figure 8 Passenger Throughput of Civil Transport Airports by Region in 2021





Figure 9 Cargo and Mail Throughput of Civil Transport Airports 2017–2021



Figure 10 Cargo and Mail Throughput of Civil Transport Airports by Region in 2021



Figure 11 Aircraft Movements at Civil Transport Airports 2017–2021

square meters of terminal floorage.

10. Traffic Handled by Airports

In 2021, the civil transport airports in China recorded a passenger throughput of 907 million, up by 5.9% over the previous year.

Specifically, airports in the eastern region recorded a passenger throughput of 443 million, up by 3.6% over the previous year; those in the central region 113 million, up by 11.3%; those in the western region 297 million, up by 6.5%; and those in the northeastern region 55 million, up by 10.8%.

In 2021, civil transport airports across China recorded a cargo and mail throughput of 17.828 million tons, up by 10.9% over the previous year.

Specifically, airports in the eastern region recorded a cargo and mail throughput of 12.988 million tons, up by 11.2% over the previous year; those in the central region 1.590 million tons, up by 15.9%; those in the western region 2.727 million tons, up by 8.2%; those in the northeastern region 523 200 tons, up by 4.8%.

In 2021, civil transport airports in China recorded 9.777 million movements, up by 8.0% over the previous year, including 7.986 million movements for commercial flights, up by 7.1% over the previous year.

In 2021, China had 96 transport airports, each with an annual passenger throughput of more than



Table 4 Number of Airports with Passenger Throughput Exceeding 1 Million in 2021

Annual Passenger Traffic	Number of Airports	Increase from 2019	Percentage of Total (%)
More Than 10 Million Passengers	29	2	70.8
1~10 Million Passengers	67	9	24.0

Table 5 Number of Airports with Cargo and Mail Throughput Exceeding 10 000 tons in 2021

Annual Cargo and	Number of	Increase	Percentage
Mail Traffic	Airports	from 2019	of Total (%)
More than 10 000 tons	61	2	98.7

1 million. Passenger throughput handled by airports in Beijing, Shanghai and Guangzhou accounted for 18.0% of the total handled by all domestic airports, down by 0.2% over the previous year.

In 2021, there were 61 civil transport airports, each with an annual cargo and mail throughput exceeding 10 000 tons. Cargo and mail throughput of the airports in the three major cities of Beijing, Shanghai and Guangzhou accounted for 44.9% of the total of all domestic airports, up by 0.9% over the previous year.

II. General Aviation

1. Number of General Aviation Enterprises

By the end of 2021, there were 599 certificated general aviation enterprises, including 121 in North China, 49 in Northeast China, 157 in East China, 140 in Central and South China, 78 in Southwest China, 33 in Northwest China and 21 in Xinjiang.

By the end of 2021, there were 12 663 certificated UAV general aviation enterprises, including 1 888 in North China, 1 004 in Northeast China, 4 363 in East China, 2 459 in Central and South China, 1 489 in Southwest China, 969 in Northwest China and 491 in Xinjiang.

2. Aircraft Fleet Size

By the end of 2021, the total number of general aviation aircraft registered reached 3 018, including 1 077 for training.

3. General Aviation Airports

In 2021, 31 general aviation airports were newly certified, adding the number of certified general aviation airports to 370.

4. Flight Hours

In 2021, the whole general aviation industry posted 1.178 million flight hours, up by 19.8% over the previous year, including 20 000 hours of passenger-carrying operations, down by 19.1% over the previous year; 107 000 hours of people-carrying operation, up by 17.0% over the previous year; 591 000 hours of other GA operations, up by 27.0% over the previous year; and 460 000 hours of non-commercial operations, up by 14.4% over the previous year.

5. Unmanned Aircraft

By the end of 2021, there were 781 000 registered unmanned aircraft users, including 718 000 individual users and 63 000 enterprises, public institutions, and government entities, with the number of registered unmanned aircraft totaling 832 000.

By the end of 2021, there were 120 800 valid UA pilot licenses in China.

In 2021, unmanned aircraft that used the CAAC Unmanned Aircraft Cloud System flew a total of 1.436 million hours.



III. Transport Efficiency and Financial Performance

1. Transportation Efficiency

In 2021, the industry-wide average daily use rate of registered transport aircraft was 6.62 hours, up by 0.13 hours over the previous year. Specifically, the average daily use rate of large and medium-sized aircraft was 6.77 hours, up by 0.16 hours over the previous year; that of small aircraft was 3.78 hours, a decrease of 0.36 hours over the previous year.

In 2021, the passenger load factor for scheduled flights averaged 72.4%, down by 0.5 percentage points from the previous year.

In 2021, the load factor for scheduled flights averaged 66.9%, up by 0.4 percentage points over the previous year.

Indicator	Value (%)	Increase from 2019 (Percentage Points)
Passenger Load Factor of Scheduled Flights	72.4	-0.5
Domestic Air Routes	72.9	-0.8
Including: Hong Kong, Macao and Taiwan Air Routes	43.2	-6.4
International Air Routes	48.3	-15.8
Freight Load Factor of Scheduled Flights	66.9	0.4
Domestic Air Routes	65.3	-0.9
Including: Hong Kong, Macao and Taiwan Air Routes	57.2	4.7
International Air Routes	75.1	7.5

 Table 6 Passenger Load Factor and Weight Load Factor for Scheduled Flights in 2021

2. Financial Performance

According to preliminary statistics, in 2021, the whole civil aviation industry made 752.92 billion yuan in business revenue, up by 21.5% over the previous year, and registered a loss of 84.25 billion yuan, 18.71 billion yuan less than the previous year. Specifically, airlines made 424.51 billion yuan in business revenue, up by 13.3% over the previous year, and recorded a loss

of 67.09 billion yuan, 14.92 billion yuan less than the previous year. Airport made 94.41 billion yuan in business revenue, up by 7.9% over the previous year, and saw a loss of 24.62 billion yuan, 1.41 billion yuan less than the previous year. Support businesses made 234.0 billion yuan in business revenue, up by 48.4% over the previous year; and made a total profit of 7.46 billion yuan, up by 2.38 billion yuan over the previous year.

According to preliminary statistics, in 2021, the revenue of the whole industry was 4.55 yuan per ton·km, up by 0.27 yuan per ton·km over the previous year. Passenger revenue per ton·km was 5.28 yuan, while cargo and mail revenue per ton·km was 3.05 yuan, both up by 0.33 yuan over the previous year.

According to preliminary statistics, in 2021, the taxes payable by the whole civil aviation industry were 23.69 billion yuan, down by 1.53 billion yuan from 2020.

IV. Aviation Safety and Service Quality

1. Aviation Safety

In 2021, the civil aviation industry of China operated in a safe and stable manner, with the 10-year rolling value of the major transport accident rate per million movements at 0. There were 16 general aviation accidents, resulting in 18 deaths.

From August 25, 2010 to the end of



2021, transport aviation had been operating safely for 136 consecutive months, with an accumulated 98.76 million hours of safe operation.

2021 saw 559 transport aviation incidents, including 6 serious incidents and 15 incidents attributable to human factors. The rate of incidents attributable to human factors per 10 000 flight hours was 0.016, down by 29.6% over the previous year. And all safety indicators fell within the target range set for the year.

In 2021, a total of 51 transport airlines were free of incidents attributable to human factors.

2. Aviation Security

By the end of 2021, there were 74 338 security inspectors in the industry, up by 3 563 over the previous year.

In 2021, the civil aviation security inspection units screened 445 million passengers, 185 million pieces of checked baggage, 575 million pieces of air cargo (excluding mail and express deliveries), and 235 million pieces of mail and express deliveries, handled 32 cases of illegal interference involving fake terrorist threat information, and addressed 12 047 cases of security related incidents. As a result, aviation industry operated with zero security accident for 236 consecutive months.

3. Flight Regularity

In 2021, passenger airlines in China operated 3.786 million flights in total, among which 3.331 million were punctual, resulting in an average flight regularity rate of 88.00%.

Table 7 Causes for Flight Irregularities in 2021

Item	% of the Total	Increase from 2020 (%)
Causes of Flight Irregularity for All Airlines	100.00	0.00
Including: Weather	59.56	2.25
Airlines	15.28	-1.19
ATC	0.63	-0.13
Others	24.53	-0.93
Causes of Flight Irregularity for Major Airlines	100.00	0.00
Including: Weather	60.24	1.49
Airlines	14.95	0.30
ATC	0.75	-0.23
Others	24.06	-1.56

2021, major airlines operated 2.930 million flights in total, among which 2.581 million were punctual, resulting in an average flight regularity rate of 88.08%.

In 2021, the average delay of passenger flights in China was 10 minutes, 1 minute longer than the previous year.

4. Service Quality

By the end of 2021, there were 29 airports across China that allowed passengers to check in using an ID card, 66 airports that applied face recognition technology, and 234 airports that implemented paperless convenient travel process. 40 large-scale airports, each with an annual passenger traffic of over 10 million passengers, launched E-screening service for passengers, with 77 000 passengers having registered for the service. Through Flight Service Management Platform was used on a trial basis by 9 airlines, 53 airports and 99 routes. 29 airlines offered customized catering services. The civil aviation service quality supervision platform was put into operation, and the response rate to the complaints against domestic airlines reached 100%.

In 2021, CAAC, its regional administrations, CAAC Consumers Affairs Center and the China Air Transport Association accepted a total of 138 600 pieces of passenger complaints.

In 2021, 76.95% of the stands close to the terminals at airports with an annual passenger throughput exceeding 10 million used boarding bridges.

V. Education and Technological Innovation

1. Education

In 2021, universities and colleges directly under CAAC enrolled a total of 22 484 students, including 1 531 postgraduates, 20 673 undergraduate and junior college students, and 280 students of adult education program. 2 856 were pilot students.

In 2021, there were 79 464 registered students in colleges and universities directly under CAAC, including 4 037 graduate students, 73 203 undergraduate and junior college students, and 2 224 students of adult education program.

In 2021, a total of 18 091 students graduated from the colleges and universities directly under CAAC, including 954 graduate students, 16 121 undergraduates and junior college students and 1 016 students of adult education program.

2. Technological Innovation

In 2021, 2 major national R&D projects of civil aviation and 18 key programs of NSFC Joint Funds were approved.

In 2021, 16 scientific and technological achievements in civil aviation were approved, and 35 projects were awarded the CATA Technological Innovation Award.

3. New Navigation Technologies

By the end of 2021, 34 airlines in the industry were capable of HUD operation, 1 299 aircraft were equipped with HUDs, 108 airports were capable of special category I HUD operation, 20 airports were capable of special category II HUD operation, and 17 airports were capable of taking off using HUD under visibility of 150 meters.

242 transport airports were capable of operating PBN flight procedures, 27 airports with complex terrain and airspace were capable of operating RNP AR procedures, 97.8% of transport aircraft were equipped with ADS-B system, and 49 airlines utilized electronic flight bags (EFB).

Table 8 Statistics of Civil Aviation Pilot Licenses of China in 2021

Type of License	Number	Year-on-year Increase
Sport Pilot License (SPL)	1 515	402
Private Pilot License (PPL)	4 822	807
Commercial Pilot License (CPL)	42 445	4 564
Multi-crew Pilot License (MPL)	187	-5
Airline Transport Pilot License (ATPL)	27 267	1 026
Total	76 236	6 794



VI. Professionals

1. Number of Pilots

By the end of 2021, there were a total of 76 236 valid pilot licenses in China's civil aviation industry, a net increase of 6 794 over the end of the previous year. Among them, 1 515 were Sports Pilot Licenses (SPLs), 4 822 were Private Pilot Licenses (PPLs), 42 445 were Commercial Pilot Licenses (CPLs), 187 were Multi-crew Pilot Licenses (MPLs), and 27 267 were Airline Transport Pilot License (ATPLs).

2. Other Professionals

By the end of 2021, there were 63 480 licensed maintenance staff in the industry, up by 3 145 over the previous year; and 10 822 licensed dispatchers, up by 1 828 over the previous year.

By the end of 2021, there were a total of 35 263 ATM technicians in four categories, up by 2 161 over the previous year, including 16 236 air traffic controllers, up by 1 235 over the previous year.

VII. Foreign Relations

In 2021, CAAC held bilateral talks or written consultations with its counterparts in 16 countries or regions. By the end of 2021, China had signed a bilateral air services agreement with 128 countries or regions, which was the same as that by the end of the previous year, including 44 in Asia (including ASEAN), 27 in Africa, 38 in Europe (including the European Union), 12 in the Americas, and 7 in Oceania.

In 2021, CAAC signed technical arrangements or working arrangements related to airworthiness certification with the Civil Aviation Agency of Slovenia, the European Aviation Safety Agency, and the Civil Aviation Authority of United Kingdom. By the end of 2021, 40 countries or regions had established bilateral airworthiness relations with China, with a total of 191 bilateral airworthiness documents currently in force.

VIII. Airworthiness Certification

In 2021, an additional 630 aircraft went through the nationality registration process in the whole industry, including 177 newly registered commercial aircraft and 453 general aviation aircraft.

In 2021, CAAC airworthiness certification department issued a total of 163 design approvals, 87 production approvals, and 114 approvals for aviation fuel and aviation chemicals.



Figure 12 Number of Type Certification and Validation of Type Certification 2017–2021

IX. Investment in Fixed Assets

In 2021, the industry saw a total investment of 188.044 billion yuan in fixed assets, including 122.247 billion yuan for civil aviation infrastructure and technological



Figure 13 Investment in Civil Aviation Infrastructure Development and Technological Upgrading 2017–2021

transformation, up by 13.0% over the previous year.

X. Green Development

In 2021, the fuel consumption per ton km in the industry was 0.309 kg, down by 9.2% from 2005 (the baseline year for energy conservation and emissions reduction in the industry). The energy consumption per passenger at airports saw an approximate increase of 2.3%, compared with the average of the final three years of the 12th Five-Year Plan period (2013-2015).

In 2021, 591 000 flights used temporary routes, shortening the flight distance by 21.66 million km, saving about 117 000 tons of fuel and reducing carbon dioxide emissions by about 369 000 tons.

By the end of 2021, there were about 9 900 electric vehicles in airports, accounting for 21% of the total number of vehicles. Also, there were 3 600 charging facilities at airports. All the airports with an annual passenger throughput of more than 5 million passengers had installed and put into use alternative units to APUs.

Since the initiation of the Blue Sky Protection Campaign in 2018, the industry had invested about 3.75 billion yuan into 152 projects associated with the campaign. As a result, about 620 000 tons of aviation fuel was saved, which equaled to a reduction of about 1.953 million tons of carbon dioxide emissions and

of about 7 500 tons of various air pollutants emissions.

In 2021, the clean energy use at airports was at a high level, with electricity, natural gas, and thermal power accounting for 85.3%, and clean energy such as solar energy and geothermal energy accounting for about 1.0%.

XI. Legal and Credit System Development

In 2021, 5 regulations were drafted, revised or abolished.

In 2021, there were a total of 438 cases involving administrative punishments; 2 entities and 14 natural persons were included in the CAAC List of Individuals with Serious Dishonest Acts due to their engagement in the serious dishonest acts set out in the Measures on Civil Aviation Industry Credit Management.

XII. The Labor Union

2021, 6 civil aviation units received the National May Day Labor Certificate, 11 individuals were awarded the National May Day Labor Medal, and 18 working teams were awarded the title of Pioneer of National Workers.

In 2021, 694 300 employees from 33 700 working teams in 378 units participated in the competition of the Civil Aviation Safety and Health Cup.