STATE OF THAI AVIATION INDUSTRY 2020

Provided by
Aviation Economics Division
Aviation Industry Promotion Department
The Civil Aviation Authority of Thailand

Executive Summary

Business Operation in Aviation Industry of Thailand in 2020

39 Airports

6 Air Navigation Facility providing services

47 Air Operator Licenses (AOL)

25 Air Operators Certificates (AOC)

13,195 Registered Drones

67 Ultralight Aircraft

638 Aircraft

269 Maintenance Repair and Overhaul

22 Approved Training organization (ATO) and Language Proficiency Testing Center (LPTC)

8 Hospitals or infirmaries appointed by the Civil Aviation Authority of Thailand

42 Medical Examiners and Senior Medical Examiners

33 Aircraft Original Equipment Manufacturers

Personnel Licenses

297 Student Pilot Licenses

27 Private Pilot Licenses

259 Commercial Pilot Licenses

178 Air Transport Pilot Licenses

126 Aircraft Maintenance Engineer Licenses

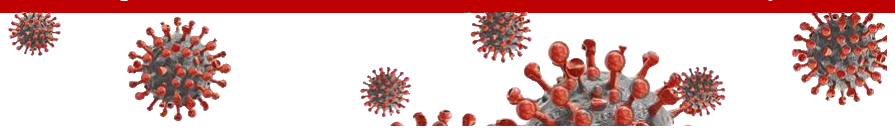
39 Flight Operations Officer Licenses

57 Student Air Traffic Controller Licenses

13 Air Traffic Controller Licenses

Data on 31st December 2020

The Impacts of the COVID-19 Pandemic on Aviation Industry



At the beginning of 2020, Thai economy has been facing severe public health crisis effect of the global COVID-19 which impacts on people's daily lives causing economic activities to slow down. The production supply and consumers' revenues have been deducted and some businesses have also suspended their operations. The commercial international air transport, this time, has been affected more than any other period of crises. The impacts on the Aviation Industry are listed as follows:

Table showing the decreasing rates of the number of passenger seats globally in 2020 compared to 2019

Number of Passenger Seats	World	Asia Pacific
Total	-50%	-45%
International	-55% - 64%	-71.9% – 77.5%
Domestic	-18% - 23%	-12.9% - 16.2%

Source: Economic Impacts of COVID-19 on Civil Aviation, ICAO, April 2021

In 2020, the total number of the world's passenger seats diminished 50 percent which can be divided into the 55 – 64 percent decrease of international passenger seats and the 18 – 23 percent decrease of domestic passenger seats. The total number of passenger seats in Asia Pacific decreased by 45 percent consisting of 71.9 – 77.5 percent decrease of international passenger seats (decreased the most compared to all other regions) and the 12.9 – 16.2 percent decrease of domestic passenger seats (decreased less than all other regions).

Table showing the statistics of Thailand's air transport in 2020

Air Transport	Passenger		Flight		Freight	
	Million People	%	Number	%	Ton	%
Total	58.25	-64.7%	500,435	-53.1%	954,377	-36.0%
International	16.25	-81.7%	133,940	-73.9%	922,163	-34.7%
Domestic	81.70	-44.9%	366,495	-33.8%	32,214	-58.6%

Note: % means the change rates compared to 2019

Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Thailand's air transports were severely affected the most in the last 10 years. In 2020, the number of passengers was 64.7 percent lower than the previous year in which the international passengers lessened by 81.7 percent and the domestic passengers decreased by 44.9 percent. The total number of flights decreased by 53.1 percent consisting of the international flights reducing by 73.9 percent and the domestic flights diminishing by 33.8 percent. These reductions are due to the international and domestic travel restriction measures. With reference to air freight, in spite of the fact that there was not any transport restriction, it was also affected because Thailand's air freight is a type of transport operated with passenger flights. In other words, the total amount of air freight declined by 36.0 percent when compared to last year in which the international air freight lessened by 34.7 percent and the domestic air freight decreased by 58.6 percent. The statistics of these air transports show that air freight could improve faster than the passenger transport owing to the fact that air freight was still in demand and consisted of fewer limitations in aviation than the passenger transport.

Measures towards Aviation Industry Assistance and Recovery

In 2020, the government agencies under the Ministry of Transportation had initiated a package of measures to mitigate the impacts from the COVID-19 pandemic stage 1 and 2 faced by airlines. The measures, with the objective to alleviate the impacts on airline operators, which became effective from 1st April to 31st December of 2020, are listed as follows:

 **Reducing airline operation costs**	 **Facilitating to increase the ability to earn revenues**	 **Building confidence in air travelling**	 **Creating continuity in business operations**	 **Financial measures**
• Aircraft's landing Charge • Aircraft's Parking Charge • Office rental fees • Air Navigation Service charge • Regulatory fee	• Relaxation of slots allocation rules Coordinating with regulated agent in other countries • Improving the process of air route allocation • Negotiating traffic rights in potential routes	• Promoting public health measures • Issuing/Publishing guidelines for air travelling	• Extending the effective duration of personnel licenses • Providing submitting evidence used for renewal of personal licenses • Streamline the processes of temporary aviation pauses	• Extending credit-term period • Reducing excise tax rates for jet fuel oils

However, due to the fact that the pandemic had continuously been producing impacts, airline operators decided to request the government to consider setting measures for continually assisting the airway business sectors of Thailand in 2021. Currently, the Civil Aviation Board (CAB) has approved the package of measures to alleviate the impacts in stage 3 for 2021 at the Civil Aviation Board meeting 1/2564 (2021) on 21st January 2021 consisting of the measure to decline costs and the financial measure for continually assisting airways. Situations would be evaluated quarterly and the measures would still be effective in case the outbreak continues.

Predictions on Air Travel Recovery

Several institutions, with regard to the air travel recovery, agreeably predicted that air transports would improve as shown below:

- International Civil Aviation Organization (ICAO) made a prediction that the global air transports in 2021 would develop in succession with the overall passenger seats decreasing by 34 – 40 percent compared to the normalcy in 2020.
- International Air Transport Association (IATA) reported that the global demand for air transports had diminished to the minimum in June 2020 by 86.5 percent and predicted that the international air transports' volumes, in 2024, will return to the quantity similar to of 2019's. Short-term air travel or domestic travelling will recover faster than long-term air travel.
- Airports Council International (ACI) reported that airline operators from around the world would lose their revenues for approximately 125,000 million US dollars in 2020 due to the fact that the 'Fixed Cost' from airport management was extremely high. Besides, employment in the aviation industry and other related industries would be 52.2 percent lower.
- The National Aviation Demand Forecasting Work Group has launched a prediction report towards the recovery from the COVID-19 pandemic on air travel in which the hypothesis was comprised of 3 scenarios as follows:
    - Best case scenario – In 2023, the number of passengers would return to be equal to the normal growth scenario in 2020.
    - Moderate case scenario - In 2023, the number of passengers would return to be equal to of 2019's.
    - Worst case scenario - In 2024, the number of passengers would return to be equal to of 2019's.

Therefore, it is found out, when compared to the actual situation occurring, that the recovery of the number of domestic passengers was close to the ‘best case scenario’ owing to the excellent national pandemic control in 2020. However, considering the current situation, if the new wave of the COVID-19 pandemic has still been affecting for a long period of time, the number of passengers might decrease to be close to the ‘worst case scenario’. The number of international passengers was close to the ‘worst case scenario’ since there is still an international travel restriction measure and passengers will have to stay in quarantine before entering the country. Nonetheless, the government also planned to loosen the COVID-19 preventive measure in order to open the country and to boost its tourism industry. If the plan goes on smoothly, they will possibly be able to boost the international air travel which will recovers quicker than the previous prediction. Thus, Controlling the COVID-19 pandemic is the major factor affecting the growth of air travel.

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Situations Regarding Business Operation in the Aviation Industry of Thailand

1.1 Airport Operator

Table 1 Statistics Regarding Aerodrome Establishment Licenses and Public Airport Operation Certificates Permitted and Granted, in Process of Permitting and Granting and in Permitted and Granted Plans Accumulated Until 2020

Types of Licenses and Certificates	Total
Public Aerodrome Establishment License	6
Private Aerodrome Establishment License	108
Public Aerodrome Operation Certificate	39
Public Aerodrome Manager Certificate	51

Sources: Airport Standard Department, The Civil Aviation Authority of Thailand – Data collected until 31 December 2020

In 2020, the total of 204 airport operators received the licenses and the certificates, were in the process of being permitted and granted, and were in the permitting and granting plans as shown below:

1.1.1 Public Aerodrome Establishment License: 6 Licenses (3 airports consisting of Trat Airport, Sukhothai Airport and Samui Airport). Airports in the charge of Department of Airports and Airports of Thailand Public Company (Limited) has been permitted to establish according to the Provision 55 of Air Navigation Act B.E. 2497 (1954).

1.1.2 Private Aerodrome Establishment License: 108 Licenses

- 3 airport operators received licenses.
  - Surface-level for Aircraft – 1 license
  - Helideck – 2 licenses
- 32 airport operators were in the process of being permitted.
  - Surface-level Heliport – 2 licenses
  - Helideck – 15 licenses
  - Shipboard Heliport – 15 licenses
- 73 airport operators were in the permitting plans.
  - Surface-level for Aircraft – 30 licenses

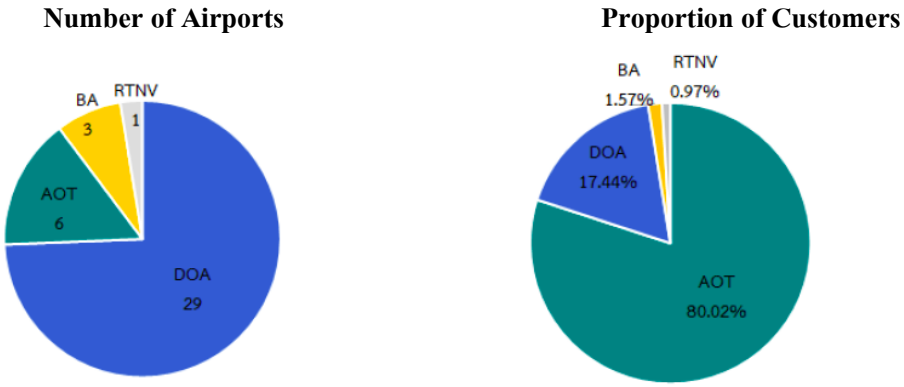
- Surface-level Heliport – 23 licenses
- Elevated Heliport – 23 licenses

1.1.3 Public Aerodrome Operation Certificate: 39 Certificates

- 6 airport operators received certificates.
- 7 airport operators were in the process of being granted.
- 26 airport operators were in the granting plans.

1.1.4 Public Aerodrome Manager Certificate: 51 Certificates

Figure 1 Number of Public Airports and Proportion of Customers Separated by Public Airport Operators



Sources: Department of Airports, Airports of Thailand Public Company (Limited), U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division and The Civil Aviation Authority of Thailand

There were the cumulative number of 39 airports in Thailand receiving the Public Aerodrome Operation Certificate in 2020 which can be divided as airports under:

- Department of Airports (DOA): 29 airports
- Airports of Thailand Public Company Limited (AOT): 6 airports
- Bangkok Airways Public Company Limited (BA): 3 airports
- Royal Thai Navy (RTNV): 1 airport

Among these 39 public airports, there were only 32 airports providing commercial flight services. However, there was only 1 airport considered and announced by the Minister of Transport as the permitted airport which was 'Betong Airport'. When considering the proportional number of passengers in each airport,

it was discovered that airports under the Airports of Thailand Public Company Limited had the most proportion of passengers (80.2 percent). Airports under Department of Airports had the secondary most proportion of passengers (17.44 percent) with airports under Bangkok Airways Public Company Limited coming third (1.57 percent) and airports under Royal Thai Navy appearing fourth (0.97 percent).

1.2 Air Navigation Facility providing services

Table 2 Thailand's air navigation facility providing services Granted with Certificates by The Civil Aviation Authority of Thailand

Air Navigation Facility providing services	Type of Navigation Service Certificate
Aeronautical Radio of Thailand Company (Limited)	Air navigation services certificate in the area of air traffic management's air traffic services
	Air navigation services certificate in the area of air traffic management's air traffic flow management
	Air navigation services certificate in the area of communications, navigation, and surveillance services
	Air navigation services certificate in the area of instrument flight procedures design service
Airspace Management Cell (AMC) Aeronautical Radio of Thailand Company (Limited)	Air navigation services certificate in the area of air traffic management's airspace management
Royal Thai Navy (RTNV)	Air navigation services certificate in the area of air traffic management's air traffic services
	Air navigation services certificate in the area of communications, navigation, and surveillance services
	Air navigation services certificate in the area aeronautical meteorological services
Thai Meteorological Department	Air navigation services certificate in the area aeronautical meteorological services

Air Navigation Facility providing services	Type of Navigation Service Certificate
Office of the Permanent Secretary for Transport	Air navigation services certificate in the area aeronautical search and rescue services
Civil Aviation Authority of Thailand	Air navigation services certificate in the area aeronautical information service

Sources: Airport Standard Department, The Civil Aviation Authority of Thailand – Data collected until 31 December 2020

There are 6 air navigation facility providing services in Thailand. Each's service capabilities are listed as follows:

1.2.1 Aeronautical Radio of Thailand Company (Limited): The main responsibility of this air navigation service provider is to provide services with reference to air traffic management, air traffic flow management, aeronautical communication, navigation and surveillance systems and instrument flight procedure design.

1.2.2 Airspace Management Cell (AMC), Aeronautical Radio of Thailand Company (Limited): The main responsibility of this air navigation service provider is to manage airspace in order to make the operations most effective and suitable for types of airspace users.

1.2.3 Royal Thai Navy (RTNV): The main responsibility of this air navigation service provider is to provide services with reference to air traffic services at U-Tapao Airport Authority, aeronautical communication, navigation and surveillance systems and aeronautical meteorological information.

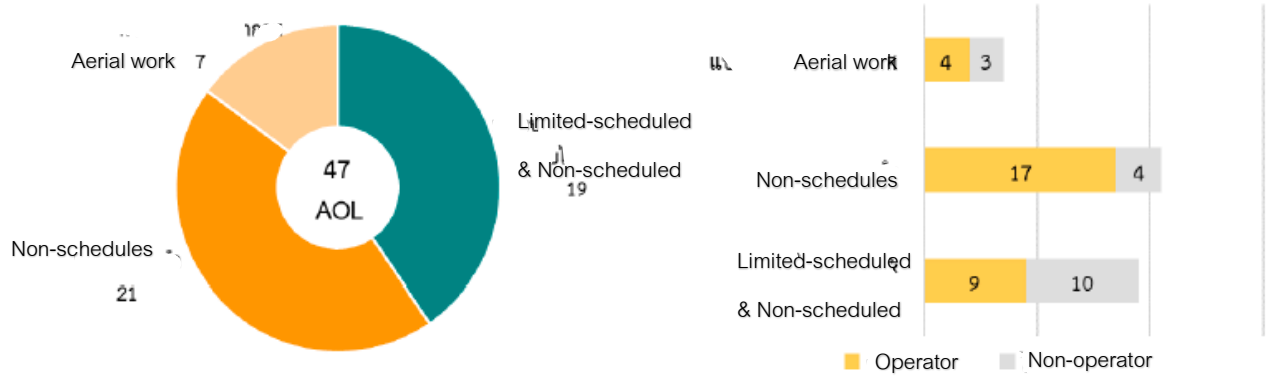
1.2.4 Meteorological Department: The main responsibility of this air navigation service provider is to provide services with reference to aeronautical meteorology such as, weather forecast as well as meteorological and earthquake information.

1.2.5 Office of the Permanent Secretary for Transport: This air navigation service provider is a central authority that provide search and rescue services. Their main responsibilities are to perform as a call center for aircraft and ship accident notifications along with managing and providing search and rescue operational coordination services as well as designing national search and rescue plans.

1.2.6 Civil Aviation Authority of Thailand: This air navigation service provider is an authority that manages and controls aviation in Thailand. Currently, the Civil Aviation Authority of Thailand also take charge of providing services regarding Thailand's aeronautical information.

1.3 Operator Granted with Air Operator Licenses (AOL)

Figure 2 Number of Operators Granted with Air Operator Licenses Separated by Types of Licenses



Sources: Economic Supervision Department, The Civil Aviation Authority of Thailand – Data collected until 31 December 2020

In 2020, there was a total of 47 air operator licenses holders, increasing by 5 more than in 2019. However, it was found out that there were only 30 operators (still operating) and 17 non-operators in 2020 from which the license holders can be divided into 3 types as follows:

1.3.1 Limited-Scheduled and Non-Scheduled Commercial Air Transport: consisting of 19 license holders which can be classified into 9 operators and 10 non-operators. There were 2 non-operators in 2020 - NewGen Airways Company Limited (in process of license revocation submission) and Nokscoot Airlines Company Limited (went into absolute receivership by court order).

1.3.2 Non-Scheduled Commercial Air Transport: consisting of 21 license holders which can be divided into 17 operators and 4 non-operators. There were 2 non-operators in 2020 – TSSP Platform Company Limited and Winsor Flying Company Limited (Both were the new license holders).

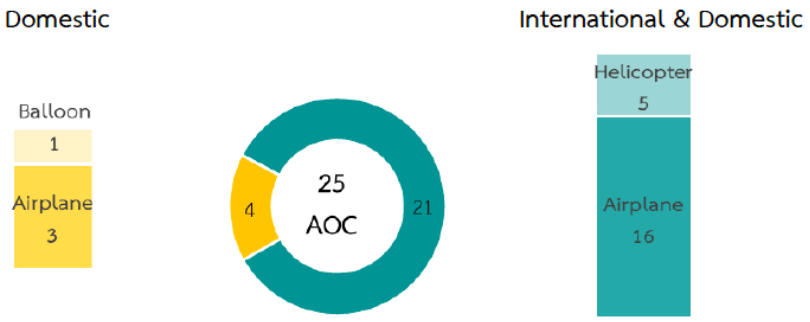
1.3.3 Aerial Work: consisting of 7 license holders which can be classified into 4 operators and 3 non-operators. Drop zone (Thailand) Company Limited and Asia Aviation and Technology Company Limited were both the new license holders and Avanti Air Charter Company Limited had been a license holder but was on the process of improving business plans to be consistent with the current situation.

Therefore, it is obvious that despite the increasing number of air operator licenses holders in 2020, many license holders' business operations, affected by the COVID-19 pandemic, could not carry on. Meanwhile, there were also other license holders facing the impact, but still able to keep their 'still operating'

statuses consisting of Thai Airways International Public Company Limited and Nok Airlines Public Company Limited (in process of requesting business rehabilitation from the Central Bankruptcy Court).

1.4 Operator Granted with Air Operators Certificates (AOC)

Figure 3 Number of Operators Granted with Air Operator Certificates



Sources: Operational Aviation Standard Department, The Civil Aviation Authority of Thailand – Data on 31 December 2020

In 2020, there was a total of 25 operators receiving the Air Operator Certificate (AOC) which can be divided into:

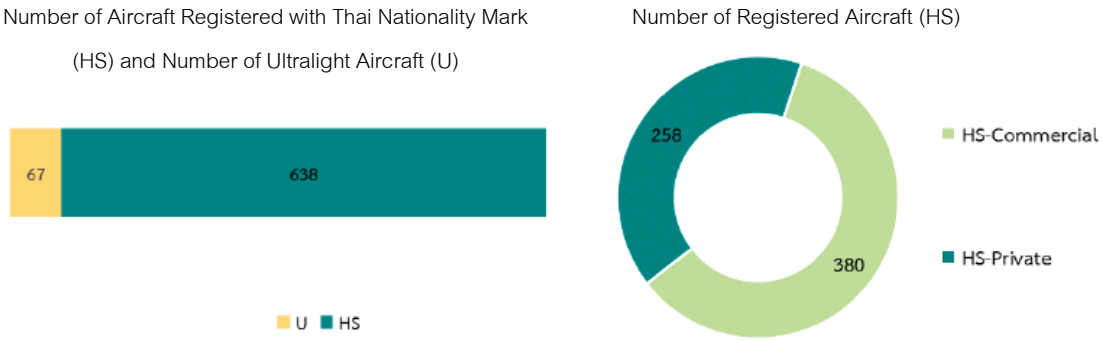
1.4.1 Operators Granted with Air Operator Certificates to Provide Services in International and Domestic Air Routes: consisting of 27 operators which can be classified into services of 16 surface-level airplanes and 5 helicopters.

1.4.2 Operators Granted with Air Operator Certificates to Provide Services Only in Domestic Air Routes: consisting of 27 operators which can be classified into services of 3 surface-level airplanes and 1 balloon.

During 2020, the only one new operator receiving the Air Operator Certificate was Thai Summer Airways Company Limited, providing surface-level airplane services on international air routes.

1.5 Registered Aircraft in Thailand

Figure 4 Number of Aircraft Registered with Thai Nationality Mark (HS) and Number of Ultralight Aircraft (U)

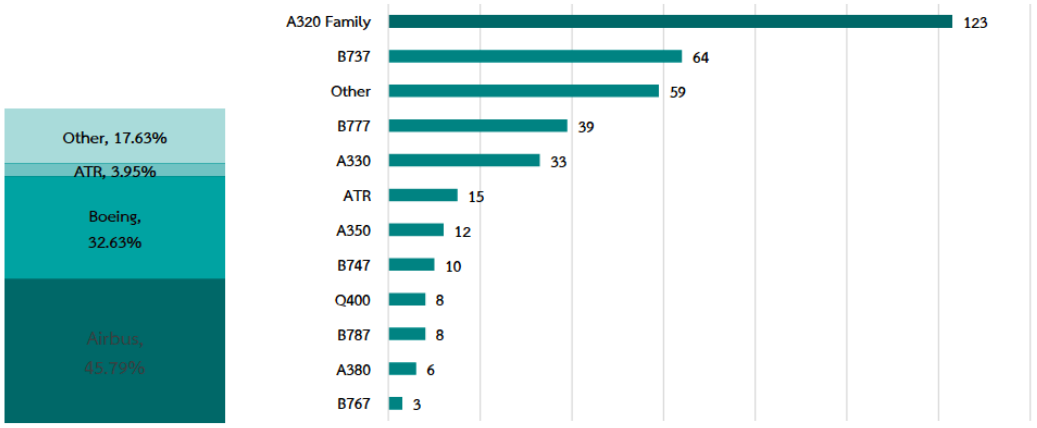


Sources: Airworthiness and Aircraft Engineering Department, The Civil Aviation Authority of Thailand - Data on 31 December 2020

Registered aircraft receiving Airworthiness Certificate in 2020 can be divided into Ultralight Aircraft (U) composed of 67 airplanes and Aircraft Registered with Thai Nationality Mark (HS) consisting of 638 airplanes.

Most of these airplanes registered with Thai Nationality Mark (HS) consisted of 380 commercial airplanes, equaling to 59.56 percent of all of this type of aircraft, and the rest was 258 private airplanes, equaling to 40.44 percent.

Figure 5 Number and Proportion of Commercial Aircraft Registered with Thai Nationality Mark (HS)

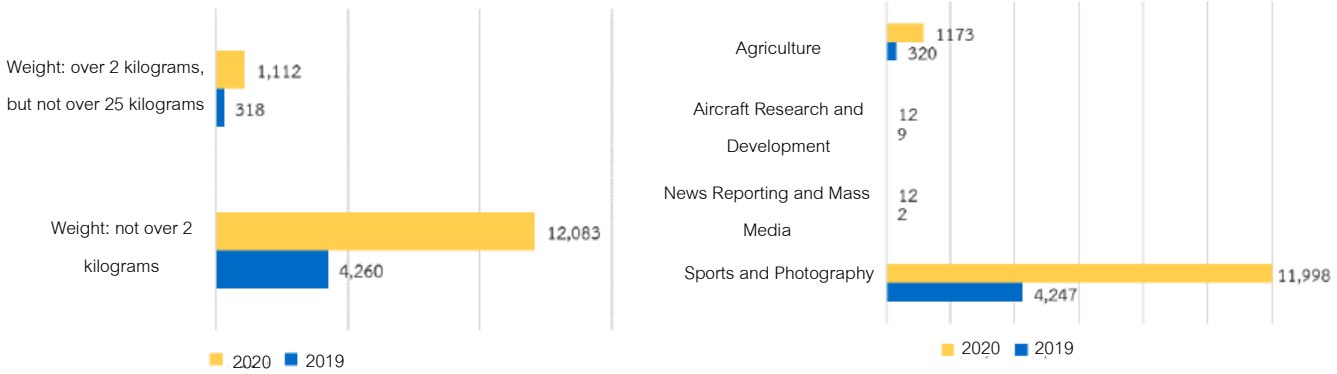


Sources: Airworthiness and Aircraft Engineering Department, The Civil Aviation Authority of Thailand - Data on 31 December 2020

78.42 percent of commercial aircraft registered with Thai Nationality Mark (HS) and receiving Airworthiness Certificate in 2020 was aircraft manufactured by Airbus Company Limited and Boeing Company Limited. The proportion of aircraft manufactured by Airbus Company Limited was 45.79 percent and by Boeing Company Limited was 32.63 percent.

When considering the types of aircraft, it was found out that airlines provided services by using A320 aircraft manufactured by Airbus Company Limited the most, equaling to 123 airplanes or 32.37 percent, with B737 aircraft manufactured by Boeing Company Limited coming the second, equaling to 64 airplanes or 16.84 percent.

Figure 6 Number of Registrations for Unmanned Aerial Vehicle (Drone) Controllers or Launchers Separated by Weights and Objectives



Sources: Flight Formalities Department, The Civil Aviation Authority of Thailand - Data on 31 December 2020

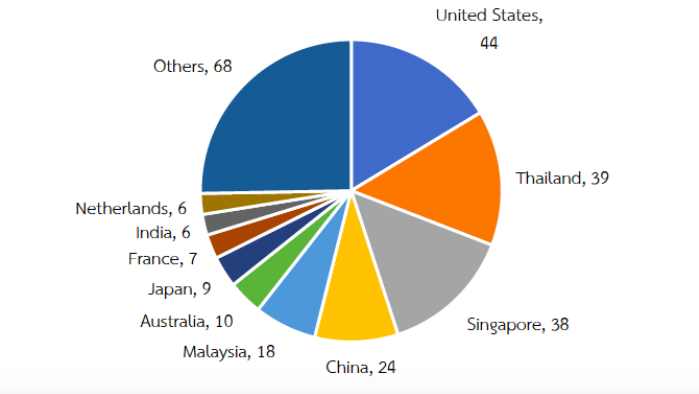
In 2020, aircraft heads requested to register for a total of 13,195 airplanes. When separating based on weight. it was discovered that the referred number of aircraft consisted of airplanes with not more than 2 kilograms for 91.57 percent and the rest was airplanes with more than 2 kilograms, but not more than 25 kilograms. The objectives to use aircraft for sports and photography were 90.93 percent and for agriculture 8.89 percent.

1.6 Maintenance Repair and Overhaul – MRO

MRO unit operators who could perform maintenance repair and overhaul operations on Thai registered aircraft shall obtain MRO Certificate[1] issued by CAAT.

[1] Section 41/94 of the Air Navigation Act B.E. 2497 (1954) states that no person shall operate a repair station business unless a Repair Station Certificate has been obtained from the Director General. The application for the certificate and the issuance of the certificate under paragraph one shall be in accordance with the rules and procedures prescribed in the Ministerial Regulations. The Director General shall also specify the type of aircraft, major components of aircraft, equipment or aircraft parts that the repair station is entitled to maintain in the repair station certificate.

Figure 7 Number of Operators in airport maintenance repair and overhaul Certified by The Civil Aviation Authority of Thailand Separated by Country



Sources: Airworthiness and Aircraft Engineering Department, The Civil Aviation Authority of Thailand - Data on 31 December 2020

In 2020, there was a total of number of 269 MRO unit operators certified by CAAT from across the world, increasing by 15 compared to the previous year. These MRO unit operators were stationed in 43 countries in which most of them (44 operators) performed their duties in America, equaling to 16.36 percent, with 39 Thai operators coming the second and 38 Singaporean operators coming the third, equivalent to 14.50 percent and 14.13 percent respectively.

1.7 Original Equipment Manufacturer – OEM

Most original equipment manufacturers in Thailand operate their production in Tier 2 and Tier 3[2] which rely on advanced production technologies.

Table 3 Operators in Aircraft Original Equipment Manufacturer Industry Permitted to Operate Business According to Factory Act, B.E. 2535 (1992) During 1992-2020

Type	Number of Factory	Investment Fund
Construction, assembly, modification, reparation or transformation of aircraft or hovercraft	13	12,842
Manufacturing of special parts or equipment for aircraft or hovercraft	20	3,068
Total	33	15,910

Sources: Accumulated statistics on number of factories that are licensed under the Factory Act B.E. 2535 (1992), classified by types at the end of 2020, Department of Industrial Works

During 1992- 2020, there was a total of 33 original equipment manufacturers licensed to operate business under the Factory Act B.E. 2535 (1992), equaling to the number of the previous year. The total amount of investment fund until 2020 was 15,910 million Baht which can be divided into 2 types consisting of 13 operators in the business related to construction, assembly, modification, reparation or transformation of aircraft or hovercraft with the investment fund of 12,842 million Baht and 20 operators in the business related to manufacturing of special parts or equipment for aircraft or hovercraft with the investment fund of 3,068 million Baht.

[2] Aircraft production is divided into 4 tiers: Tier 1: Assembly and Testing, Tier 2: Design and Build, Tier 3: Build to Print and Tier 4: Material Manufacturing and Support Processes

1.8 Flying Training School Certification and Aviation Language Proficiency Testing Center (LPC)

The Civil Aviation Authority of Thailand (CAAT) issued certificates for training institutions and language proficiency testing centers for personnel as follows:

Table 4 Number of Certificates from Flight Schools and Language Proficiency Testing Centers of Personnel During 2019-2020

Type of Certificate	Number (Certificate) in 2019	Number (Certificate) in 2020
Aviation Training Institution	14	16
Air Traffic Control Training Institution	2	1
Aviation Training Institution (Aircraft Maintenance Engineer)	1	1
Language Proficiency Testing Centers of Personnel	4	4

Sources: Personnel Standard Department, The Civil Aviation Authority of Thailand – Data on 31 December 2020

In 2020, there was a total of 22 training institutions and language proficiency testing centers for personnel granted with the certificates.

1.8.1 Aviation Training Institution Certificate: 16 certificates - 2 new institutions granted with the type of certificate in 2020 were composed of Bangkok Aviation Training Center Company Limited and Defence Technology Institute.

1.8.2 Air Traffic Control Training Institution Certificate: 1 certificate - Civil Aviation Training Center

1.8.3 Aircraft Maintenance Engineer Institution Certificate: 1 certificate - Civil Aviation Training Center

1.8.4 Language Proficiency Testing Centers of Personnel Certificate: 4 certificates: Civil Aviation Training Center was the only institution that received all 4 types of the referred certificates.

1.9 Aeromedical Hospitals and Infirmaries

In 2020, there was a total of 8 hospitals and infirmaries appointed by the Civil Aviation Authority of Thailand to verify mental and physical readiness of each person who applies for types of personnel licenses which will be shown in the table below:

Table 5 Number of Hospitals or Infirmaries Appointed by The Civil Aviation Authority of Thailand

Type	Hospital
Civil Aeromedical Center (AMC)	Institute of Aviation Medicine, Royal Thai Air Force
	Bangkok Civil Aviation Medicine Center, Bangkok Hospital
	Samitivej Srinakarin Hospital
Civil Aeromedical Office (AMO)	Bumrungrad Hospital
	Vejthani Hospital
	Abhakornkiatiwong Hospital
	Bangkok Hospital at Chiang Mai (NEW)
	Phayathai 2 Hospital (NEW)

Sources: Personnel Standard Department, The Civil Aviation Authority of Thailand – Data on 31 December 2020

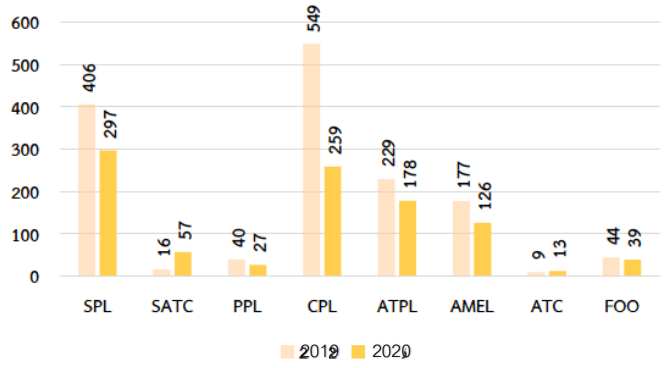
Civil Aeromedical Center (AMC) is a hospital or infirmary appointed by the Civil Aviation Authority of Thailand to provide examination services for issuance or renewal of class 1-4 medical certificates. In 2020, there are 3 hospitals or infirmaries that have been appointed as the civil aeromedical centers which are (1) Institute of Aviation Medicine, Royal Thai Air Force, (2) Bangkok Civil Aviation Medicine Center, Bangkok Hospital and (3) Samitivej Srinakarin Hospital.

Civil Aeromedical Office (AMO) is a hospital or infirmary appointed by the Civil Aviation Authority of Thailand to provide the medical examination services for issuance or renewal of class 1-4 medical certificates but able to provide the medical examination services for issuance only for class 2 and 4 medical certificates. There are 5 hospitals or infirmaries that have been appointed as the civil aeromedical office which are (1) Bumrungrad Hospital, (2) Vejthani Hospital, (3) Abhakornkiatiwong Hospital, (4) Bangkok Hospital at Chiang Mai and (5) Phayathai 2 Hospital ((4) and (5) were the new hospitals appointed in 2020).

There is a total of 42 medical examiners and senior medical examiners appointed by the Civil Aviation Authority of Thailand, consisting of 23 medical examiners and 19 senior medical examiners.

1.10 Personnel Licenses

Figure 8 Personnel Licensing in 2019-2020



Sources: Personnel Standard Department, The Civil Aviation Authority of Thailand – Data on 31 December 2020

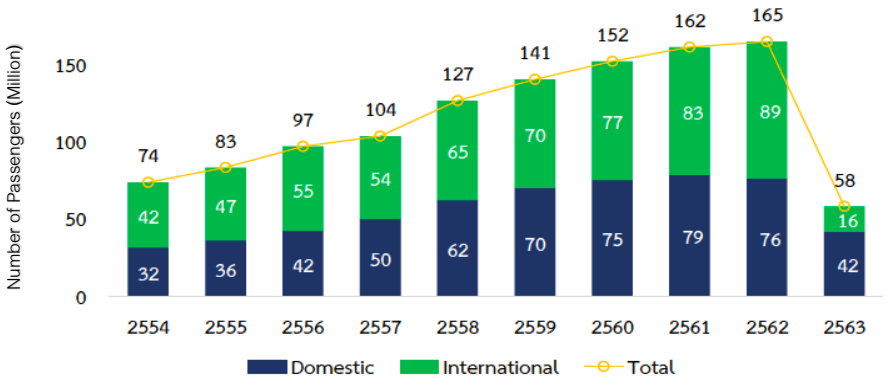
In 2020, the Civil Aviation Authority of Thailand issued 996 personnel licenses, decreasing from the previous year by 474 certificates. The types of certificates which diminished in number were Student Pilot License (SPL), Private Pilot License (PPL), Commercial Pilot License (CPL), Air Transport Pilot License (ATPL), Aircraft Maintenance Engineer License (AML) and Flight Operation Officer License (FOO). On the other hands, the types of certificates which augmented in number were comprised of Student Air Traffic Control License (SATC) and Air Traffic Control License (ATC).


Air Transport of
Thailand

Air Transport of Thailand

2.1 Statistics Regarding Air Transport

Figure 9 Statistics Regarding Number of Overall Passengers in 10 Years (2011-2020)

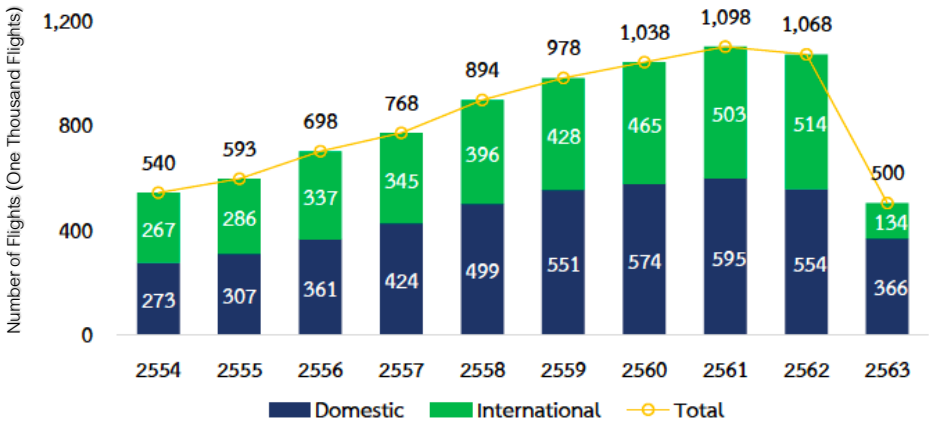


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

According to the above statistical figure concerning number of overall passengers in 10 years (2011-2020), it was discovered that the number of overall passengers in normal situations on 2011-2020 had been growing overall passengers in which its compound annual growth rate (CAGR) was 10.58 percent per year divided into the number of international passengers increasing on average of 9.74 percent per year and the number of domestic passengers increasing on average of 11.63 percent per year. Subsequently, the COVID-19 pandemic emerged in 2020, producing serious impacts on the aviation industry in both Thailand and the World. Due to a halt in air transport, the number of overall passengers all over the country decreased the most in ten years of Thailand's aviation industry. There were only 58.25 million passengers lessening from the previous year by 64.7 percent consisting of 16.25 million international passengers decreasing by 81.7 percent and 41.99 million domestic passengers decreasing by 44.9 percent compared to the previous year. When considering the proportional number of domestic passengers and international passengers, it is obvious that the proportion of domestic passengers increased to 72.1 percent while the international passengers decreased to only 27.9 percent.

Figure 10 Statistics Regarding Number of Overall Flights in 10 Years (2011-2020)

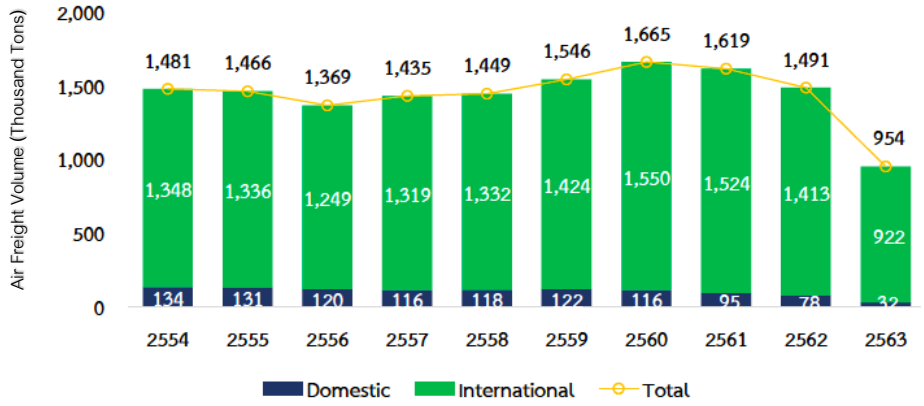


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

According to the growth statistics of Thailand's overall flights in the past 10 years (2011-2020), the compound annual growth rate (CAGR) of flights during 2011-2019 was 9.24 percent per year consisting of the growths of the international flights for 8.53 percent per year and of the domestic flights for 8.89 percent per year which were concordant with the number of passenger growth. However, owing to the COVID-19 pandemic in 2020, related state agencies laid down the measures to restrict international and domestic travels. This caused the number of flights in 2020 to diminish to only 500,435 flights decreasing from the previous year by 53.1 percent consisting of 133,940 international flights decreasing 73.9 percent and 366,495 domestic flights diminishing 33.8 percent. The domestic flights had a tendency to recover faster than the international flights since the government, in the middle of the year, had loosened the restriction measures for travelling in the country.

Figure 11 Statistics Regarding Volume of Overall Air Freight in 10 Years (2011-2020)

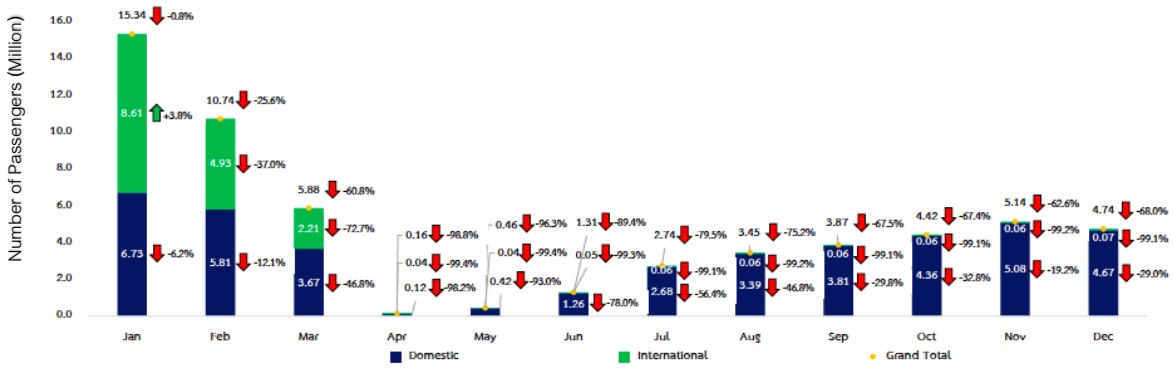


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

According to the above figure showing the air freight volume in the past 10 years (2011-2020), there were fluctuations in air freight of Thailand in which its compound annual growth rate (CAGR) in normal situations during 2011-2020 was deducted 6.54 percent per year. However, there were 954,377 tons of air freight volume in 2020 decreasing from the previous year by 36.0 percent. Most of the decrease referred occurred in international air freight at the Suvarnabhumi Airport. There were 922,163 tons of international air freight decreasing by 34.7 percent and 32,214 tons of domestic air freight decreasing by 58.6 percent compared to the previous year. The reduction of domestic air freight was due to the decrease in serviced flights, causing the air freight charges to be higher compared to other types of transports while the COVID-19 pandemic had directly impacted the volume of international air freight which significantly decreased. Air freight could recover faster than passenger transport because of fewer flying limitations in air freight and some airlines adjusted their operations by adopting more passenger aircraft for transporting goods.

Figure 12 Statistics Regarding Number of Monthly Passengers in 2020

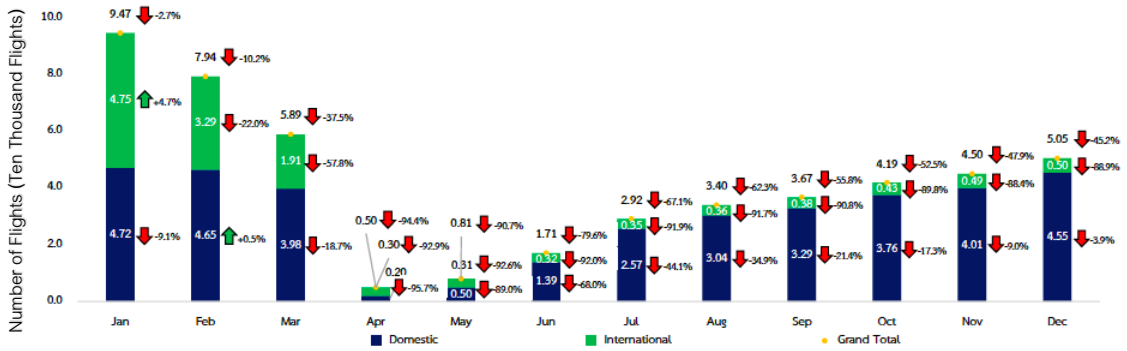


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

In January of 2020, it was reported by the Ministry of Public Health that the first COVID-19 infected person (foreigner) had been found and the number of infected people continuously increased; therefore, the overall number of passengers in Thailand had begun to diminish since February and the number reached its minimum in April 2020. Subsequently, the government declared the Emergency Decree on Public Administration in Emergency Situations which restricts cross-provincial travels for domestic passengers and the Civil Aviation Authority of Thailand also declared a temporary measure restricting flying into Thailand causing most of Thai airlines announced flight suspension. Then, the enforcement of the Emergency Decree on Public Administration in Emergency Situations was extended from May to June. When the situation of COVID-19 pandemic had begun to ease up, the government decided to loosen the travel restriction measure of passengers and promoted domestic tourism through policies. This caused all airlines providing domestic flight services to open their services in June and the number of domestic passengers also increased continuously from July to November which are high season. It can be inferred that it took 6-7 months of recovery (May – November 2020) until passengers had confidence and return to travel by air again. However, the new wave of COVID-19 pandemic occurred at the end of December making the number of domestic passengers lower than in November. The number of international passengers was still extremely small due to the effective measure restricting flying into Thailand. Most flights were repatriation flights and they began to allow semi-commercial flights from October. Nonetheless, because of the permission processes for country arrivals and travel document preparation, there were not many passengers in international air routes.

Figure 13 Statistics Regarding Number of Monthly Flights in 2020



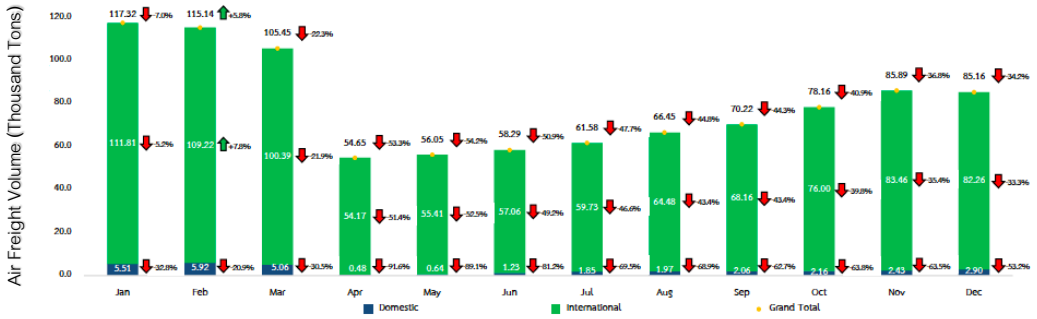
Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

The number of flights in 2020 was concordant with the number of passengers. In February of 2020, the number of flights began to diminish because of the prevalence of COVID- 19 pandemic, especially in international flights. In March of 2020, international flights were seriously affected by travel restriction measures from countries in Southeast Asia as airline operators started to decrease domestic flight services. The number of flights reached its minimum in April of 2020 owing to the temporary measure restricting aircraft flying into Thailand and there were only repatriation flights allowed. With reference to domestic flights, most airline operators cancelled aviation services this month as a result of the cross- provincial travel restriction measure for controlling the pandemic. When the measure had been loosened in May of 2020, airline operators returned to provide domestic flight services. However, throughout the duration from April to June 2020, there were only 2 airlines consisting of Nok Airlines and Thai Vietjet Air that was still providing air transport services. Then, in the last 3 months of this year, the number of flights slightly augmented due to the permission of semi-commercial flights apart from special repatriation flights. In terms of domestic flights, most airline operators increased their flying frequency and returned to provide services in normal air routes they had suspended. Besides, the airline operators raised their new air routes to satisfy the needs of passengers. For example, Thai AirAsia expanded their aviation base in Suvarnabhumi Airport to provide services to Chiang Mai, Phuket, Krabi, Surat Thani, Nakhon Si Thammarat, Hat Yai and Nan and Thai Smile Airways provided their services from in Suvarnabhumi Airport to Nakhon Si Thammarat, Nan, Nakhon Phanom, Loei and Chiang Mai - Nakhon Si Thammarat and Udon Thani - Nakhon Si Thammarat air routes. Moreover, Nok Airlines provided their services in Hat Yai - Ubon Ratchathani air route and Thai Vietjet Air provided their services from Suvarnabhumi

Airport to Hat Yai, Khon Kaen, Nakhon Si Thammarat, Ubon Ratchathani, Surat Thani and Chiang Rai - Hat Yai air route.

Figure 14 Statistics Regarding Volume of Monthly Air Freight in in 2020

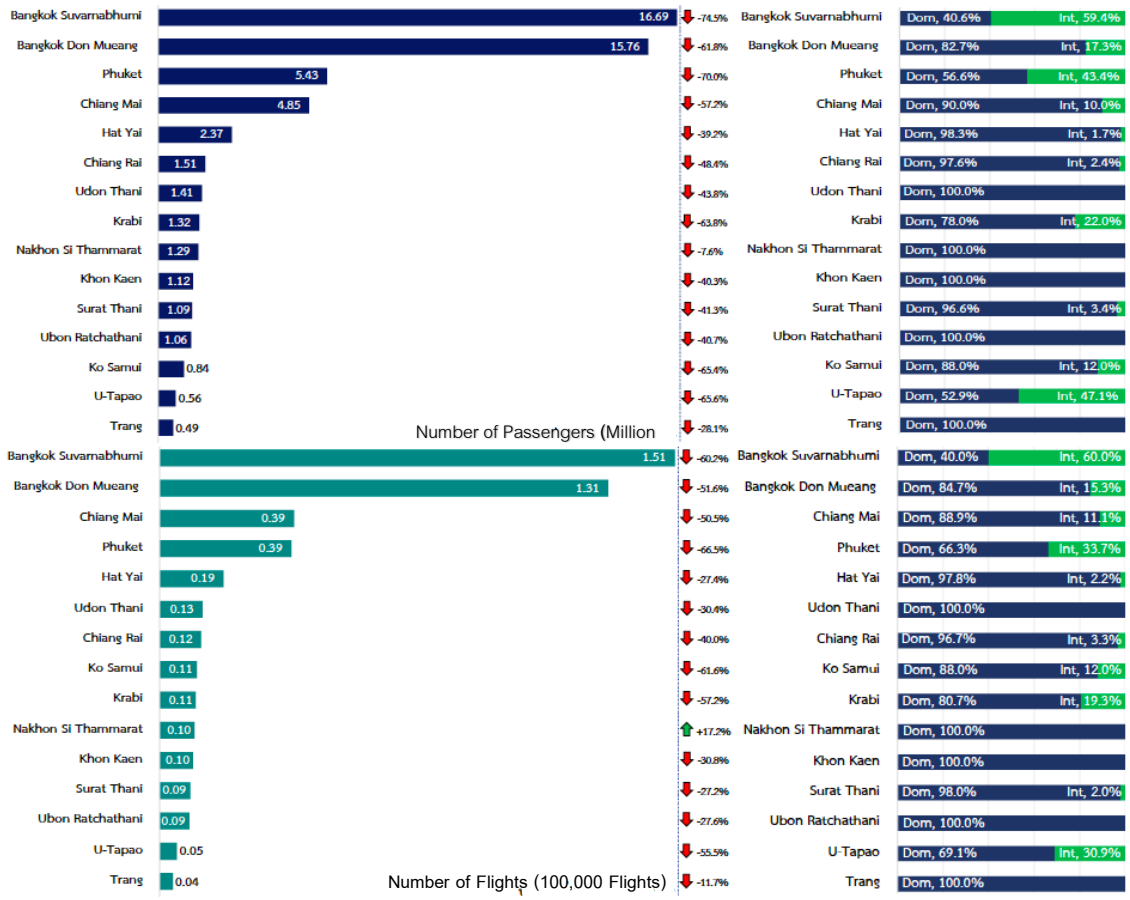


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

It was discovered that the COVID-19 pandemic had not impacted much towards air freight in the first 2 months, but it began to have the effects in March of 2020. The trend of air freight volume began to drop in the 2nd quarter. The overall volume of air freight decreased since most of air transports in Thailand are conveyed under passenger aircraft; thus, restricting passenger aircraft to fly into Thailand since April produced a decrease in freight as well. However, airlines were allowed to provide air freight services as per the announcement of the Civil Aviation Authority of Thailand (CAAT) regarding "Exemption on Measures and Guidelines for Cargo Transport in the Passenger Compartment of Air Operators During COVID-19 Pandemic" in order to increase capabilities in air freight and to help airlines adapt their operations using more passenger aircraft to provide freight services.

Figure 15 Overview of Airports with Top 15 Highest Number of Passengers and Flights and Proportion of Service



Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

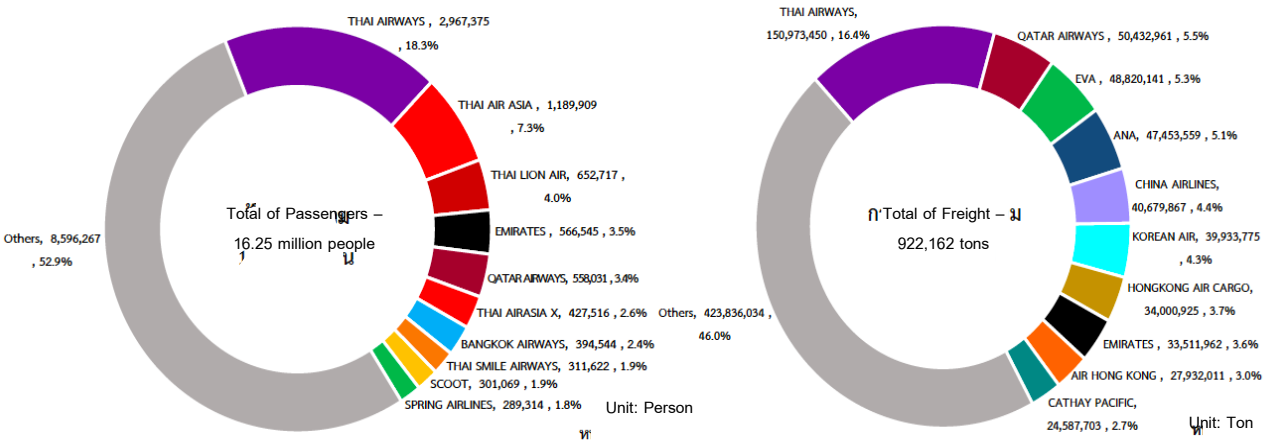
When considering top 10 airports with the highest number of passengers and flights, it was found that, in 2020, Suvarnabhumi Airport had the highest total number of passengers and flights divided into 16.69 million passengers decreasing by 74.5 percent from the previous year and 150,894 flights shrinking by 60.2 percent from the previous year. Don Mueang Airport had the second highest number of passengers and flights. The statistics show that airports with high proportions of international air travel, such as Suvarnabhumi Airport, Don Mueang Airport, Phuket Airport, Chiang Mai Airport, Krabi Airport, Samui Airport and U-Tapao Airport, were affected by the COVID-19 pandemic more than airports with high proportions of domestic air travel, such as Hatyai International Airport, Mae Fah Luang – Chiang Rai International Airport, Udon Thani International Airport, Nakhon Si Thammarat Airport and Khon Kaen Airport. Due to the fact that the government supported

domestic travel by promoting tourism in the country, the number of passengers recovered faster than the airports mainly providing international passenger services.

2.2 Market Shares of Airlines

2.2.1 Statistics Regarding Air Transport

Figure 16 Market Share of Airlines Providing Passenger Transport and Air Freight Service on International Air Routes

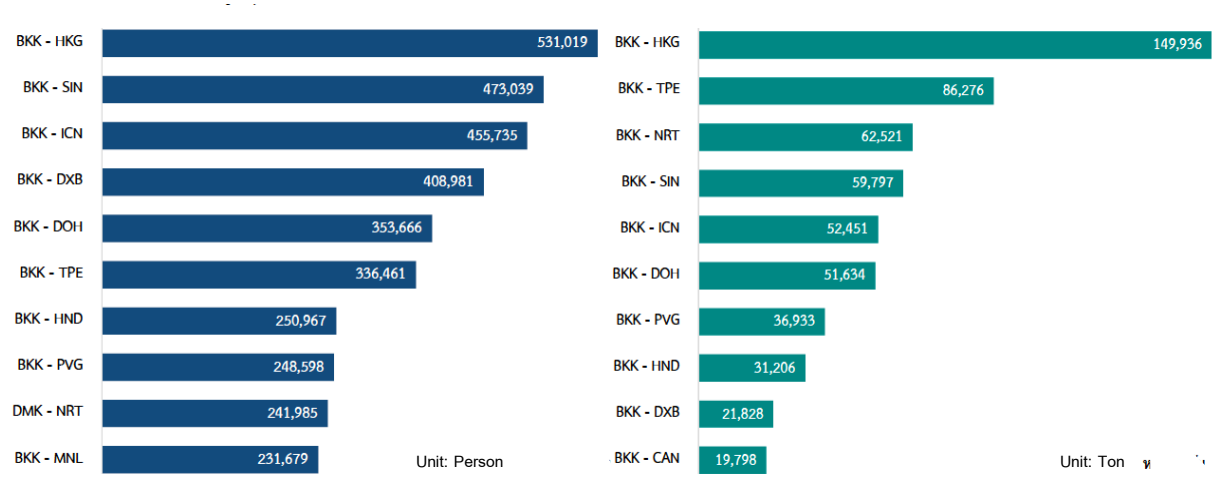


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

The COVID- 19 pandemic had impacts on international air transports causing the number of international passengers to diminish significantly as a result of the travel restriction measure. Airlines were allowed to provide their aviation services only regarding repatriation flights and cargo aircraft. Semi-commercial flights were subsequently allowed in October of 2020 so as to add more channels for transporting into Thailand by air. Airlines with the highest number of international passengers were Thai Airways (2.97 million people or 18.3 percent) with Thai AirAsia (1.19 million people or 7.3 percent) coming the second place and Thai Lion Air (652,717 million people or 4.0 percent) coming the third place. Considering the volume of international air freight, it was discovered that Thai Airways had the highest volume of air freight (150,973 tons or 16.4 percent) with Qatar Airways (50,433 tons or 5.5 percent) coming the second and EVA Air (48,820 tons or 5.3 percent) coming the third.

Figure 17 Overview and Top 10 Ranking of International Air Routes Concerning Number of Passengers and Volume of Air Freight



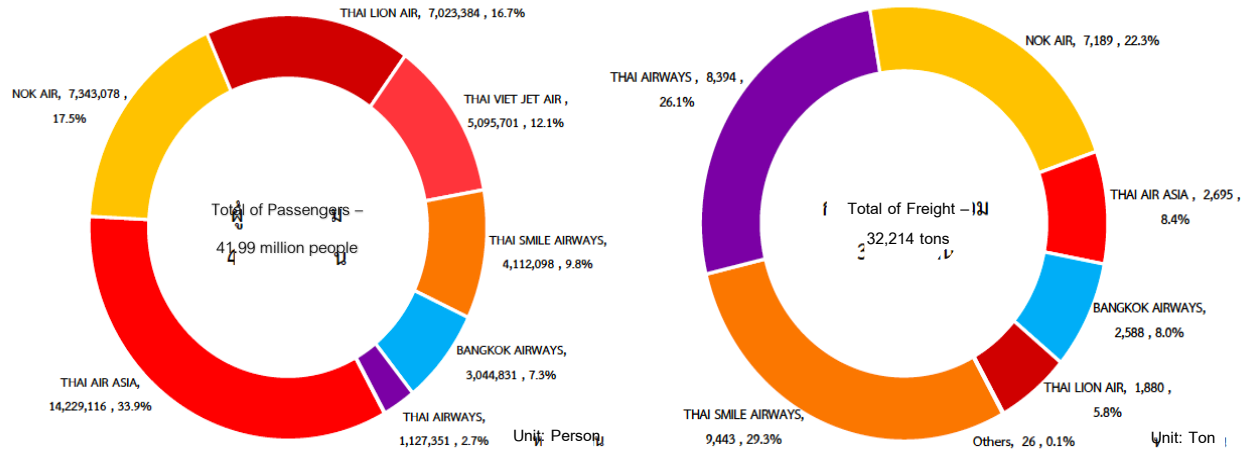
Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

According to the statistics regarding the top 10 international air routes with the highest number of passengers in 2020, it was found that Bangkok (Suvarnabhumi Airport) – Hong Kong route had the highest number of passengers (531,019 people) with Bangkok (Suvarnabhumi Airport) – Singapore route (473,039 people) ranking the second and Bangkok (Suvarnabhumi Airport) – Incheon route (455,735 people) ranking the third. For the top 10 international air routes with the highest volume of air freight in 2020, it was found that Bangkok (Suvarnabhumi Airport) – Hong Kong route had the highest volume of air freight (149,936 tons) with Bangkok (Suvarnabhumi Airport) – Taipei route (86,276 tons) ranking the second and Bangkok (Suvarnabhumi Airport) – Narita route (62,521 tons) ranking the third.

2.2.2 Domestic Air Routes

Figure 18 Market Share of Airlines Providing Passenger Transport and Air Freight Service on Domestic Air Routes

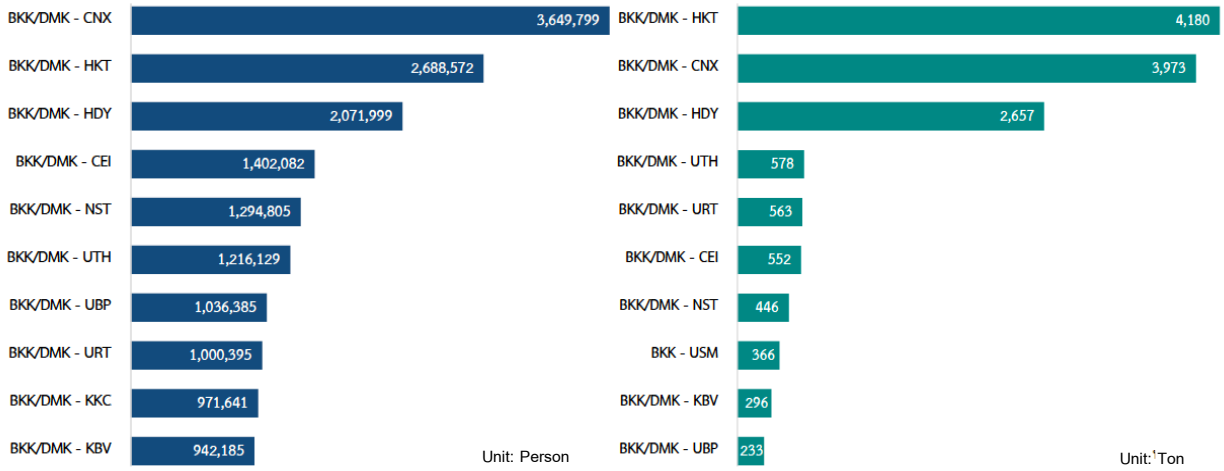


Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

Thai airlines that had the highest number of transported passengers in domestic air routes were Thai AirAsia (14.23 million people or equal to 33.9 percent) with Nok Airlines (7.34 million people or equal to 17.5 percent) ranking the second and Thai Lion Air (7.02 million people or equal to 16.7 percent) ranking the third. Considering the volume of air freight in domestic air routes, It was found that Thai Smile Airways had the highest volume of air freight (9,443 tons or equal to 29.3 percent) with Thai Airways (8,394 tons or equal to 26.1 percent) ranking the second and Nok Airlines (7,189 tons or equal to 22.3 percent) ranking the third.

Figure 19 Overview and Top 10 Ranking of Domestic Air Routes Concerning Number of Passengers and Volume of Air Freight



Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division

According to the statistics regarding the top 10 domestic air routes with the highest number of passengers in 2020, it was found that Bangkok (Suvarnabhumi Airport and Don Mueang Airport) – Chiang Mai route had the highest number of passengers (3.65 million passengers) with Bangkok (Suvarnabhumi Airport and Don Mueang Airport) – Phuket route (2.69 million passengers) ranking the second and Bangkok (Suvarnabhumi Airport and Don Mueang Airport) – Hat Yai route (2.07 million passengers) ranking the third. For the top 10 domestic air routes with the highest volume of air freight in 2020, it was discovered that Bangkok (Suvarnabhumi Airport and Don Mueang Airport) – Phuket route had the highest volume of air freight (4,180 tons) with Bangkok (Suvarnabhumi Airport and Don Mueang Airport) – Chiang Mai route (3,973 tons) ranking the second and Bangkok (Suvarnabhumi Airport and Don Mueang Airport) – Hat Yai route (2,657 tons) ranking the third.

2.3 Competition Among Domestic Air Routes

Analyses on the level of competition in the domestic airline market by air routes using the market concentration indicator (Herfindahl-Hirschman index: HHI) calculated from the number of passengers in every route of each airline. The criteria for determining the HHI[3] index and the results are listed as follows:

Table 6 Data Regarding Number of Domestic Air Routes Based on Competitive Nature of Market

Competitive Nature	HHI	Number of Route
Perfectly Competitive Market	0%	0
Monopolistic Competition Market	1%-50%	14
Oligopoly Market	51%-80%	11
Oligopoly Market and Monopoly Market	81%-100%	33
Total		**58**

Sources: Airports of Thailand Public Company (Limited), Department of Airports, U-Tapao Airport Authority and Bangkok Airways Public Company (Limited)

Analyzed by Aviation Economics Division and The Civil Aviation Authority of Thailand

In 2020, Thailand had a total of 58 scheduled domestic direct flights. The HHI index calculation results on airlines providing services on each domestic air route are shown in the Appendix. Air routes can be classified according to the competitive nature of the market using HHI index as follows:

2.3.1 Perfectly Competitive Market: No perfectly competitive air route was found.

2.3.2 Monopolistic Competition Market: There was a total of 14 air routes in the monopolistic competition market. These were air routes provided services by many airline operators and consisting of many passengers; thus, each airline operator had low market shares such as Bangkok – Phuket and Bangkok – Chiang Mai routes. Most air routes in this group were in the main routes (More than 1 million passengers a year).

2.3.3 Oligopoly Market: There was a total of 11 air routes in the oligopoly market. These were air routes provided services by more than 1 airline, but not over 3 airlines such as Bangkok – Loei, Bangkok – Sakon Nakhon and Bangkok – Nan. Most air routes in this group were in the minor routes

[3] Airport council international (ACI)

(More than 100,000 passengers but not more than 1 million customers a year)[4] and were limited by the competence of increasing flights of Thailand's airports, especially in main airports, causing airlines to not be able to increase frequency and capacity of that route because when airlines were allocated their aviation durations, they always used the allocated durations for the most travel demanded air routes.

2.3.4 Oligopoly Market and Monopoly Market: There was a total of 33 air routes in the oligopoly market and the monopoly market such as Bangkok – Mae Sot, Bangkok – Samui and cross-regional air routes such as Chiang Mai – Hua Hin. The factor producing the oligopoly market and the monopoly market was due to the minor routes (More than 100,000 passengers a year and limit the number of airlines that could fly for not more than 3 airlines). Airlines are required to operate in accordance with the Notification of the Civil Aviation Authority of Thailand on the Criteria for Allocating Routes to Licensees for Air Operation Business B.E. 2560 (2017) stipulating that the airlines requesting the allocation of domestic routes on the major and minor routes must also fly on the sub-routes. This makes an airline choose a new route that has not yet been served by any airline to avoid competition in that route, or the routes with restrictions on operations such as routes to and from Ko Samui. This is due to the limitation of the runway of Samui Airport, thus limiting the size of aircraft to take off and land on such runway. The largest aircraft that can land on Samui Airport at present is Airbus A319. However, this type of aircraft has not been popular. Only Bangkok Airways has been used this aircraft model in its fleet. Thus, at present, there is only one airline can fly on this route despite the huge travel demand.

2.4 Situations Regarding Domestic Air Route Fares in 2020

The aviation industry across the world in 2020 had been suffering from the crisis due to COVID-19 pandemic. Domestic air routes in Thailand began to suspend its services in March of 2020 in order to act according to the governmental measures on containing the COVID-19 pandemic. The government declared the Emergency Situation Decree on 25 March of 2020[5] causing airlines from foreign countries to begin suspending international air routes since March and to start laying down a measure restricting foreign aircraft from flying into Thailand from 3 April of 2020[6]. Furthermore, the COVID-19 pandemic situations in other countries were more intense and the travel restriction measure (Lockdown) was enforced, causing the domestic travel demand

[4] Notification of CAAT on the Criteria for Allocating Routes to Licensees for Air Operation Business B.E. 2560 (2017)

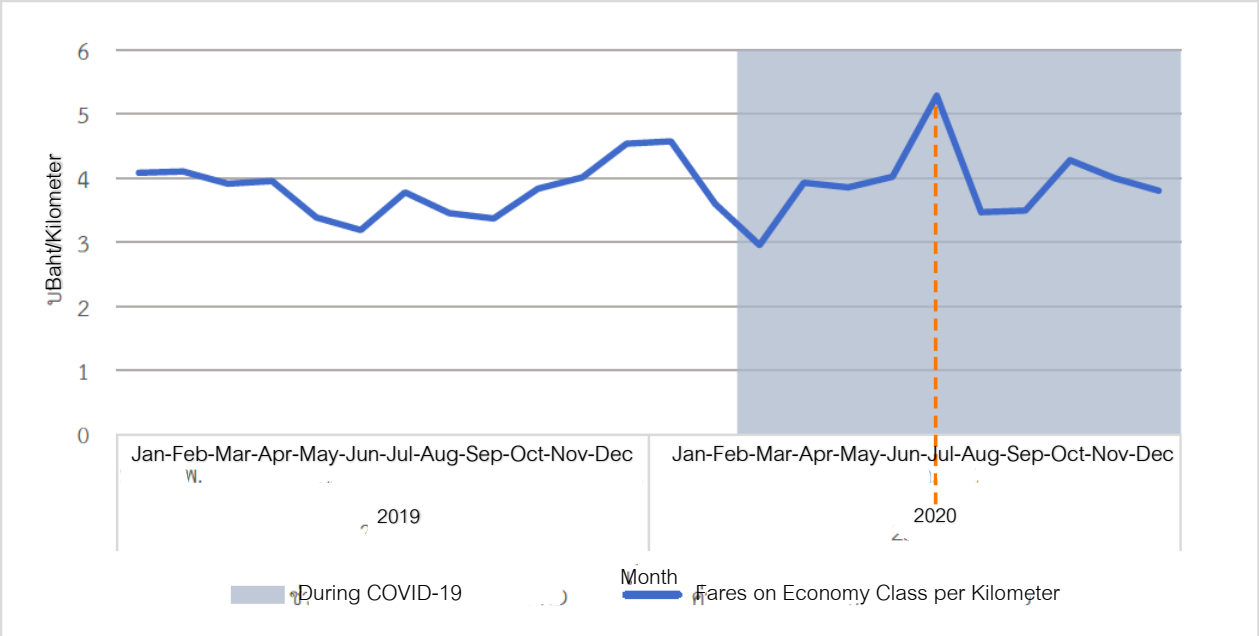
[5] Declaration of anEmergency Situationin all areas of the Kingdomof Thailand, Government Gazette Edition Issue 137, Special part 69 Ngor., Page 1 on 25 April of 2020

[6] The announcement of the Civil Aviation Authority of Thailand (CAAT) regarding Title: Temporary Aircraft Restrictions on Aviation and flying into Thailand on 3 April of 2020. It has been renewed until present.

of foreign passengers to diminish as well. Apart from that, the citizens still had no confidence in pandemic safety and many provinces laid down the measure to restrict cross- provincial travels; thus, passengers demanding to travel to a province located near a destination airport cannot travel to their destinations. The demand to use services from airlines significantly decreased, so it was necessary for many airlines to make a decision on declining their flights or stopping their services since the 2nd quarter of 2020. Airlines still providing services shall act according to the 'Social Distancing' measure spacing out passengers' seats on flights; therefore, available seats in each flight decreased by 30 percent. Subsequently, the total revenues of airlines diminished and the costs per passenger increased, so they needed to augment their minimum fares.

Concerning monitoring and inspection on fare per kilometer of domestic air routes in the highly demanded route group which covers routes linking with airports in Bangkok, data from airline websites from 2019-2020 for 27 routes are gathered and can be concluded as follows[7]:

Figure 20 Economy Class Fare Changes Per Kilometer on Average of Domestic Air Routes with High Demand in 2019-2020



Sources: Service Rate Division, Aviation Economics Division and The Civil Aviation Authority of Thailand

The figure 20 shows that fare per kilometer on average of domestic air routes with high demand in March of 2020 was substantially lower than in February. Since the number of passengers decreased due to the fact that passengers from foreign countries could not visit Thailand, the demand in this part was gone and

[7] In order to avoid the difference of flying distance to analyze the overview of fare change, so it was analyzed by using fare per kilometer on the average instead of average fare.

airlines' revenues dropped while the costs were still the same. Then, most airlines had to temporarily cease providing services in many routes during April and May because the COVID-19 pandemic situation in Thailand was unclear and the social distancing measure, requiring airlines to decrease its number of passenger seats, hugely diminished their supply, rising fares on average until June of 2020. July had been the first month that the government began to apply the tourism promotion policy by announcing substitution holidays for Songkran Days and declaring the aid measure called 'เราเที่ยวด้วยกัน' (Translation: We Travel Together) for costs of accommodations and fares while the increasing number of flights could not catch up the travel demand making the fares in July of 2020 significantly rise. Subsequently, the average fares dropped in August and September since airlines returned to provide services in almost every route as well as adding their flights; in this way, the supply became higher in order to support the hugely rising number of passengers' travels. The results of consideration towards the comparison of fares in 2019 and 2020 could be summarized as per the table 1.

Table 7 Comparative Results Related to Economy Class Fare Per Kilometer on Monthly Average of Domestic Air Routes with High Demand in 2019-2020

Quarter	2019	2020	Percentage of Change
1st	4.04	3.71	-7.99%
2nd	3.51	3.94	12.11%
3rd	3.54	4.09	15.53%
4th	4.13	4.03	-2.43%

Sources: Service Rate Division, Aviation Economics Division and The Civil Aviation Authority of Thailand

When considering and comparing changes of fares on average per kilometer in 2019 and 2020, it appears that fares in the 1st quarter of 2020 declined by 8 percent compared to 2019 due to the fact that the government began to limit travelling in international air routes in March of 2020 while airlines had not decreased their flights. Then, the fares on average per kilometer in the 2nd and the 3rd quarters of 2020 grew by 12-15 percent owing to the social distancing measure and the decrease in airlines' services, making the supply much lower. At the end of the 3rd quarter, the results of the tourism promotion policy caused the demand to increase faster than the supply making the average fares of the 3rd quarter of 2020 higher than of 2019 by 15 percent. However, the demand in the 4th quarter of 2020 became lower than in 2019 because foreigners could not fly to Thailand; thus, the average fares in the 4th quarter of 2020 was lower than of 2019 by 2 percent. The econometric approach on the 'Fixed Effect Regression' model can be utilized to study the effects of COVID-19 pandemic towards the overall changes of fares in order to be concordant with the nature of the available data consisting of

data from airlines providing services in domestic air routes. The data regarding fares is continuous in consecutive periods without any interval of time (Panel Data). The natures of each air route and each airline cannot be quantitatively measured as variables in which these natures could not alter by time. The model of equation used to calculate is:

$$fare_{ijt}=\alpha_0+\beta_1 covid_t+\beta_2 intercovid_t+\beta_3 rival_{jt}+\beta_4 flightsaday_{ijt}+\upsilon_{ij}+\epsilon_{ijt}$$

In which:

$fare_{ijt}$	Range of fares which is a kind of mean calculated from the sum of the lowest value and the highest value divided by 2 in order to use instead of the mean of fares of each airline on each route in the same date and time as data regarding highest and lowest fares
α_0	The 'Intercept' value of the equation which is equal to the mean of fare variables used to calculate each time
$covid_t$	The *Dummy* variable for explaining the results of COVID-19 affecting the number of passengers who used services of domestic air routes on the period t in which this variable is equal to 1 from April – June 2020 and is equal to 0 during other periods
$intercovid_t$	The *Dummy* variable for explaining the results of COVID-19 affecting the number of passengers from foreign countries who used services of domestic air routes on the period t in which this variable is equal to 1 from April – September 2020 and is equal to 0 during other periods
$rival_{jt}$	Number of airlines providing services in route j on the period t
$flightsaday_{ijt}$	Number of flights that airline i provides services in route j on the period t
υ_{ij}	The variable representing specific nature of airline i for providing services in route j in which this specific nature does not change by time and cannot be measured practically
ϵ_{ijt}	Error term variable of airline i' data in route j on the period t and t is day/month/year the fare data was collected

The basic statistical values of the variables used to calculate are shown in the table 8

Table 8 Summary towards Basic Statistics of Variables Used in Studies Covering Data in 2019 and 2020

Variable	Obs	Mean	Std. Dev.	Min	Max
fare	10,129	2,103	908.19	269	6,170
covid	10,129	0.04048	0.19709	0	1
intercovid	10,129	0.2169	0.41216	0	1
rivals	10,129	4.14217	2.01018	1	7
flightsaday	10,129	3.90206	3.02793	1	30

According to the database gathered from airline websites from 2019 to 2020, there was a total of 10,129 values of observations collected in which the highest average value of fare was 2,103 baht. The standard deviation equaled to 908.19 and the lowest average value of fare was 269 baht. The highest amount of fare was 6,170 baht. The highest number of airlines providing services in each air route was 7 airlines and the least was 1 airline. Moreover, the highest number of flights per day in each air route of each airline was 30 flights and the least was 1 flight. The calculation results can be summarized the table 9.

Table 9 Showing Calculation Results towards COVID-19 Pandemic Impacts on Average Fare of Domestic Air Routes

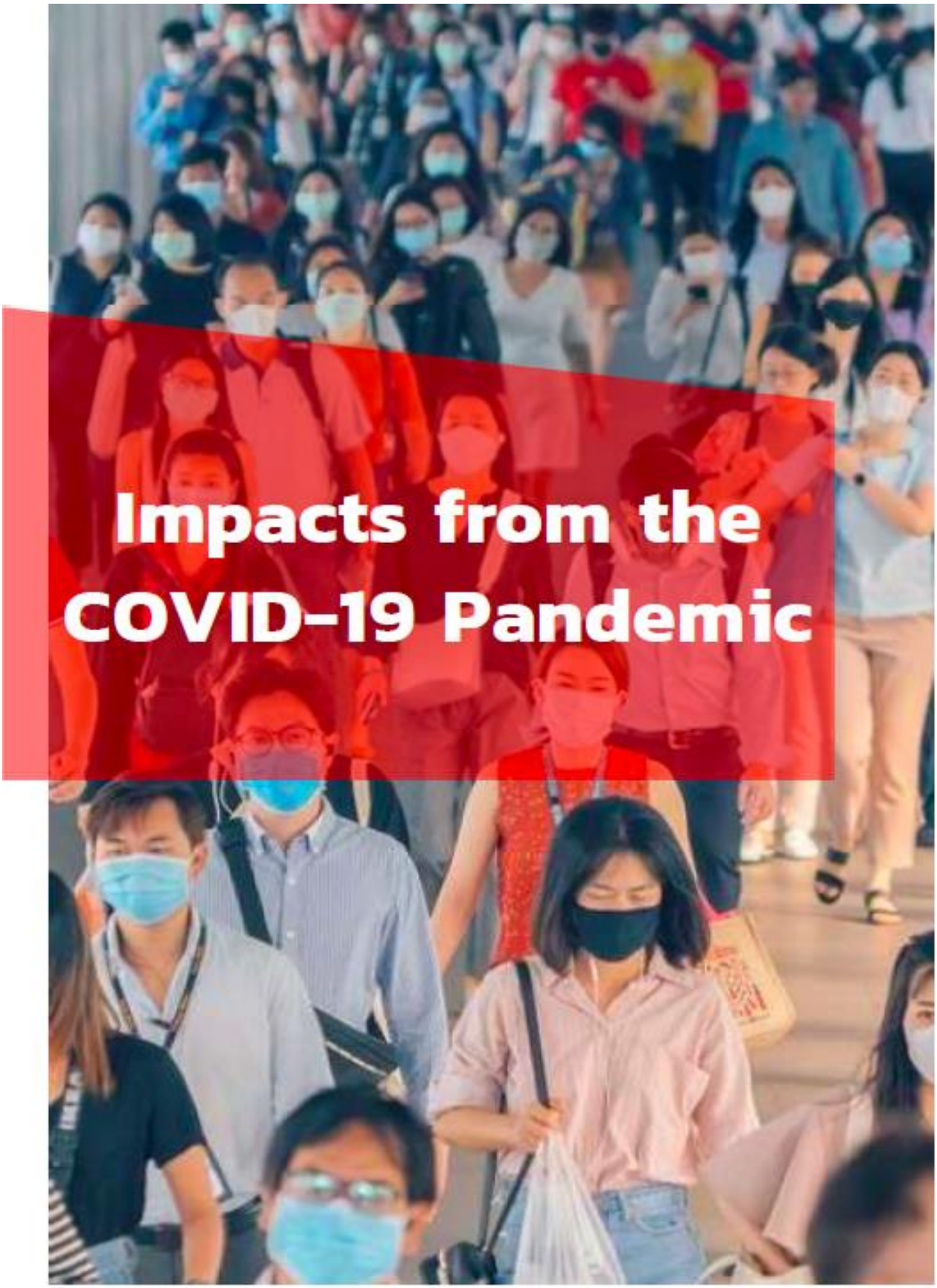
	fare
covid	-157.5***
	(0.000)
intercovid	216.7***
	(0.000)
rivals	-19.05
	(0.148)
flightsaday	-32.69***
	(0.000)
_cons	2268.9***
	(0.000)
N	10129
R-sq	0.026
adj.R-sq	0.006

Note: p-values in parentheses: * p<0.05, ** p<0.01, *** p<0.001

The calculation results from table 9 show that the COVID-19 pandemic, having impacts on the demands to travel of citizens in the country, caused a decrease in overall average fares of domestic air routes due to the fact that airlines needed to diminish the fares in order to be concordant with the purchasing power of Thai people. Besides, the COVID-19 pandemic, having impacts on the number of passengers from foreign countries, caused an increase in overall average fares of domestic air routes since airlines needed to decline the number of flights while the costs were stable and unchangeable according to the number of flights. Thus, it was necessary to expand fares and the number of competitors did not produce any change in average fares while the increase of the number of flights per day caused a decrease in average fares.

When combining both parts of the coefficient from COVID-19 variables, it shows that fares would multiply, so it can be concluded that the COVID-19 pandemic, in overall image, caused an increase in average fares which was due to the reduction on the number of foreign tourists who could not visit Thailand. This indicates that the aviation business in domestic air routes of Thailand mainly relied on much demand from foreign countries.

Therefore, if foreign tourists have still been unable to visit Thailand in 2021 owing to the COVID-19 pandemic, it is estimated that the overall fares of domestic air routes will not diminish. The governmental sector should consider a measure that promotes tourism and stimulates more demand for travel of citizens in the country as well as supporting airlines to increase the number of serviced flights in order to raise the supply to be in accordance with the tourism promotion.


Impacts from the
COVID-19 Pandemic

Impacts from the COVID-19 Pandemic

The COVID-19 pandemic had begun since the beginning of 2020 and became prevalent rapidly in Asia and across the world subsequently. It became the public health crisis affecting people's daily lives and causing economic activities to slow down. The production supplies as well as the revenues and the purchasing power of consumers reduced. Some businesses suspended their operations such as the commercial international air transport. Therefore, this public health crisis led to the economic crisis sending warnings to many countries including Thailand.

3.1 Economic Condition Due to COVID-19 Pandemic

Figure 21 Comparison of Growth Rates Between World Economy and Thai Economy in 2020

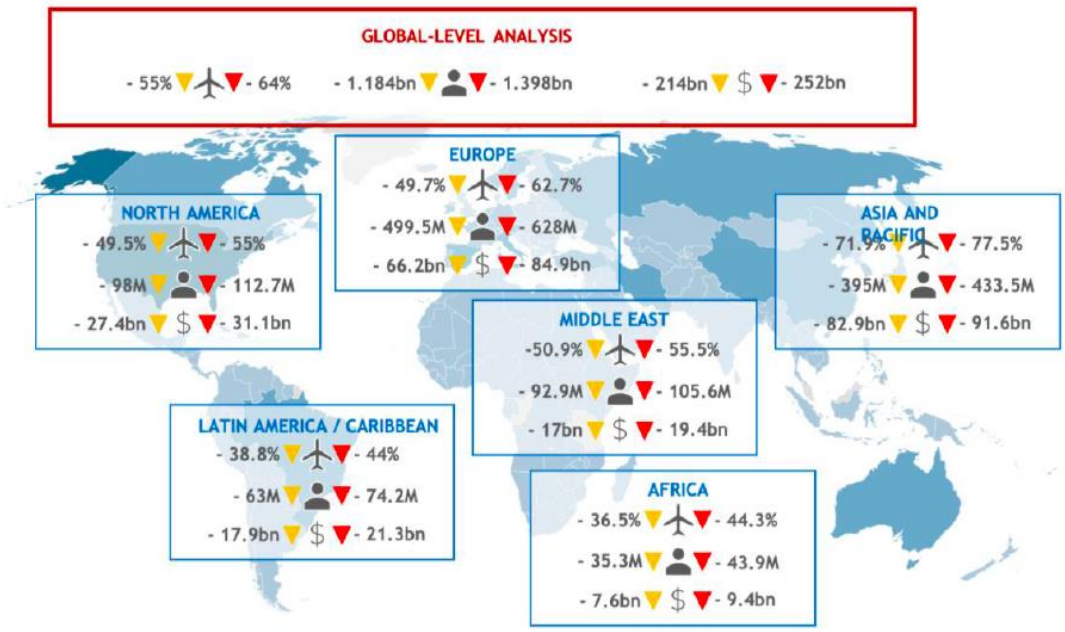
		World	Thailand
	World Bank	-4.3%	-6.5%
	International Monetary Fund (IMF)	-3.5%	-6.6%
	Fiscal Policy Office		-6.5%
	Bank of Thailand	-	-6.1%
	Office of the National Economic and Social Development Council	-	-6.1%

Source: Data collected by Aviation Economics Division

The COVID-19 pandemic had been continuously affecting and became the economic crisis in 2020. The World Bank reported that the Gross Domestic Product (GDP) in countries across the world would diminish by 4.3 percent. The International Monetary Fund (IMF) reported that the global GDP would also decline by 3.5 percent. Regarding the economic situations in Thailand, the international and national economic institutes such as World Bank, IMF, Fiscal Policy Office, and Office of the National Economic and Social Development Council reported that the GDP of Thailand would decrease in the similar level of 6.1-6.6 percent

3.2 Impacts on Aviation Industry

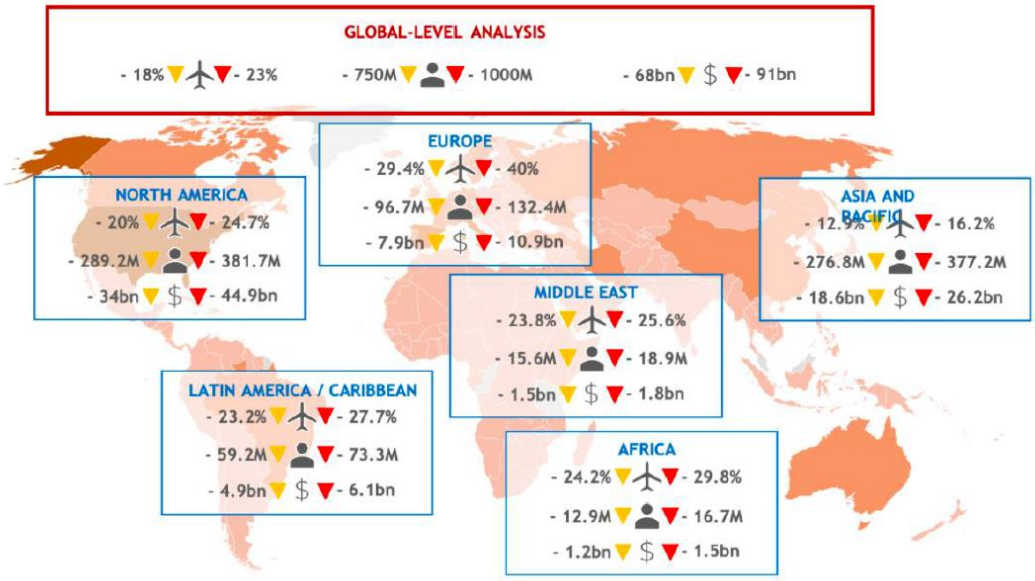
Figure 22 Impacts of COVID-19 pandemic on International Air Transports in 2020



Source: Global-level Analysis of Impacts on International Traffic, ICAO

The International Civil Aviation Organization (ICAO) reported towards the effects of the COVID-19 pandemic on international air transports that the average passenger seats of countries across the world in 2020 would decrease by 55-64 percent with the number of passengers diminishing by 1,184 – 1,398 million people. Airline operators lost their revenues around 214,000 – 252,000 million US dollars when compared to normal situations in 2019. Asia Pacific had the highest decreased number of passengers seats which was 71.9-77.5 percent while Africa had the lowest decreased number of passengers seats which was 36.5-44.3 percent.

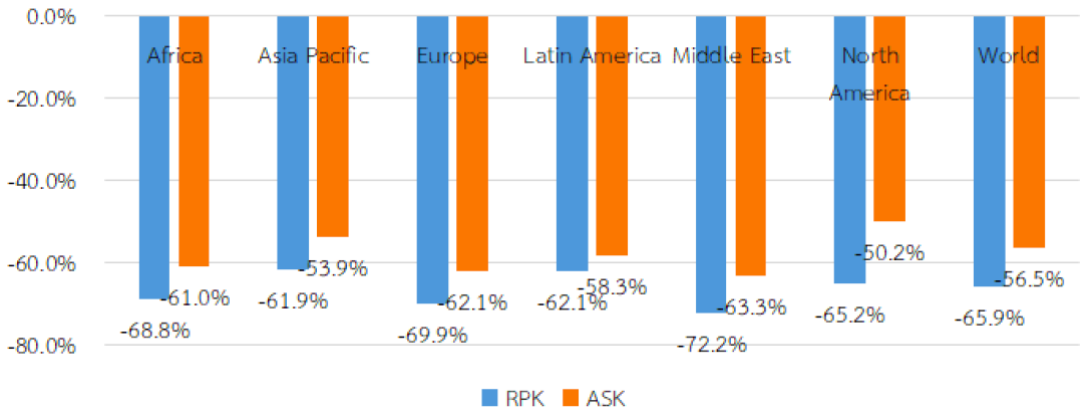
Figure 23 Impacts of COVID-19 pandemic on Domestic Air Transports in 2020



Source: Global-level Analysis of Impacts on Domestic Traffic, ICAO

Considering domestic air transports in 2020, the International Civil Aviation Organization (ICAO) reported that the COVID-19 pandemic caused domestic passenger seats of countries across the world to diminish by 18-23 percent with the number of passengers decreasing by 750 – 1,000 million people. Airline operators throughout the world lost their revenues around 68,000 – 91,000 million US dollars when compared to normal situations in 2019. This indicates that the domestic air travels were affected less than the international air travels. Europe had the highest decreased number of passengers seats which was 29.4 – 40 percent while Asia Pacific had the lowest decreased number of passengers seats which was 12.9 – 16.2 percent.

Figure 24 Impacts of COVID-19 pandemic on Revenue Passenger Kilometers (RPK) and Available Seat Kilometers (ASK)



Source: Air passenger market analysis, IATA, December 2020

Besides, the International Air Transport Association (IATA) reported towards the effects of the COVID-19 pandemic that the number of revenue passenger kilometers (RPK) and the number of available seat kilometers (ASK) throughout the world in 2020 decreased by 65.9 percent and 56.5 percent respectively. Middle East was affected the most with the reductions in revenue passenger kilometers (RPK) and available seat kilometers (ASK) by 72.2 percent and 63.3 percent in order while Asia Pacific was affected the least with the decreases in revenue passenger kilometers (RPK) and available seat kilometers (ASK) by 61.9 percent and 53.9 percent respectively.

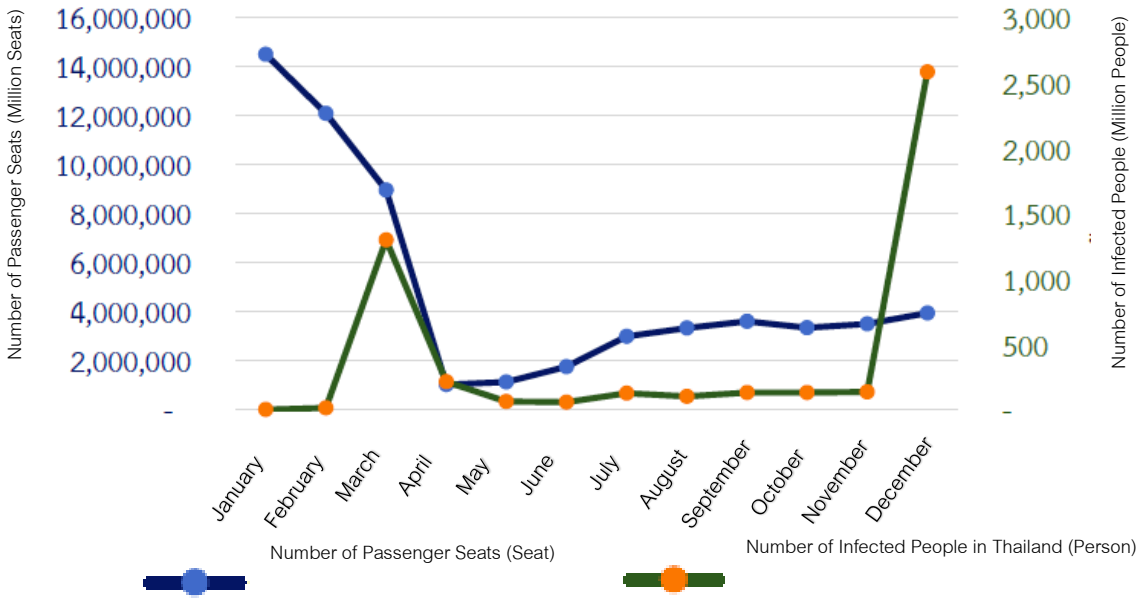
The Airport council international (ACI)[8] reported that the COVID-19 pandemic caused air transports across the world in the first 3 months of 2020 to decrease by 26.3 percent. It had continuously been reducing until reaching its minimum point in April (94.4 percent) and began to recover in May. It was estimated that airports would lose their revenues for approximately 125 billion US dollars due to the fact that the fixed cost of airport management was extremely high. Apart from that, job positions in the aviation industry and other related industries decreased by 52.2 percent due to the COVID-19 pandemic. The main factors diminishing the demand to travel by air are the reduction in household incomes, travel restriction measures of each country and passengers' confidence on travel safety.

[8] Webinar "COVID-19 Economic Impact Analysis and the Path to Recovery" _on 25 March 2021, ACI

3.2.1 Thailand's Aviation Industry

The COVID-19 pandemic had produced serious effects on the aviation industry of Thailand in a decade. There was a total of 58.25 million passengers in 2020 lessening from the previous year by 64.7 percent consisting of 16.25 million international passengers decreasing by 81.7 percent and 42 million domestic passengers dropping by 44.9 percent compared to the previous year. This indicates that Thailand had more severely been affected from the situations than the average effects of the world and Asia Pacific.

Figure 25 Number of Passenger Seats Compared to Number of Infected People in Thailand



Sources: Database of OAG and Worldometer systems

The figure 25 shows the relativity between the total number of infected people in Thailand and the total number of passenger seats of airlines. In 2020, Thailand had begun to have infected people in February and the pandemic became severe in March. Then, the government declared the Decree on Public Administration in Emergency Situations B.E. 2548 (2005) in order to control the COVID-19 pandemic situations in April, so airlines needed to decrease or suspend their aviation operations. According to the statistics by the Tourism Authority of Thailand on international tourist arrivals to Thailand. It was discovered that[9] ever since April, there had not been any international tourist arrivals to Thailand which was in accordance with the preventive measure on COVID-19 pandemic. In July, it was also found that Thailand began to be capable of controlling the number of infected people in the country and cancelled the lockdown measure; thus, the number of passenger seats, only

[9] The statistics on International tourist arrivals to Thailand in 2020, Ministry of Tourism and Sports

in domestic flights, slightly increased. The international flights were still extremely low even though semi-commercial flights were allowed to fly ever since October.

3.3 Package of Measures towards Aviation Industry Assistance and Recovery

The COVID-19 pandemic directly impacted on the aviation industry; therefore, the government agencies under Ministry of Transportation, Department of Airports, Airports of Thailand Public Company (Limited), Aeronautical Radio of Thailand Company (Limited) as well as the Civil Aviation Authority of Thailand needed to lay down measures in order to alleviate effects for airline operators to continue their businesses due to the fact that airlines are the upstream industry that brings major revenues to the aviation industry. In 2020, 2 stages of measures had been carried out which can be concluded as follows:

- Measures on Reducing Airline Operation Costs – In order to assist in and decrease costs of operations for airline operators, related institutes laid down measures to diminish service charges such as aircraft's landing charge, aircraft's parking charge, office rental fee, air navigation service charge and regulatory fee for entering or departing from the country which the measure would expire on 31 December of 2020.
- Measures on Facilitating to Increase the Ability to Earn Revenues – The Civil Aviation Authority of Thailand had initiated a package of measures to facilitate airline operators including (1) allocating aviation duration, which delays disqualification in receiving aviation records in the next season for airlines that cancelled flights due to the situation and this would not be used to calculate flying conditions of continuous allocated aviation duration, (2) coordinating with aviation regulars from foreign countries which airlines cancelled flights, such as China, Japan and Republic of Korea in order to remain rights of the original allocated aviation duration, (3) improving the consideration process for allocating faster air routes as well as (4) negotiating for the rights to fly in international routes that Thai airlines are competent in the future, such as Republic of India, Islamic Republic of Pakistan and Republic of Korea.
- Measures on Building Confidence in Air Travelling - The Civil Aviation Authority of Thailand, Ministry of Public Health, Tourism Authority of Thailand and operators in the industry tried to build confidence for passengers in order to raise air travel demands. Public health measures related to air travels were announced such as processes of patient screening and methods on how to clean and disinfect passenger compartments. Besides, they announced to certify rights of airlines to reject

passengers who are risky in being infected with COVID-19 in order to assign authority for airlines to refuse passengers who are risky due to the pandemic.

- Measures on Facilitating to Create Continuity in Business Operations of Airlines - The Civil Aviation Authority of Thailand had extended the effective duration of licenses and other certification documents related to personnel licenses, which would expire within 30 June of 2020, to be effective until 30 September of 2020. Afterwards, they provided exemption in submitting evidence documents showing experiences on performing duties used for personnel renewal to 31 December of 2020 as well as reducing the processes of temporary aviation pauses and allowed airlines to return to fly as soon as they were ready.
- Measures on Finance – In order to lessen the tension in business operations for operators in the aviation business, the state agencies under Ministry of Transportation laid down measures to extend the period of debt repayment (Credit terms), service charges, burden charges or compensations which airline operators were charged. Moreover, Excise Department had enacted the ministerial regulation for specifying the limit of excise (Issue 11) B.E. 2563 (2020) so as to decrease excise tax rates for jet fuel from 4.726 baht per liter to 0.20 baht per liter which had become effective until 30 September of 2020. The period of this measure was subsequently extended from 3 November 2020 to 30 April 2021.

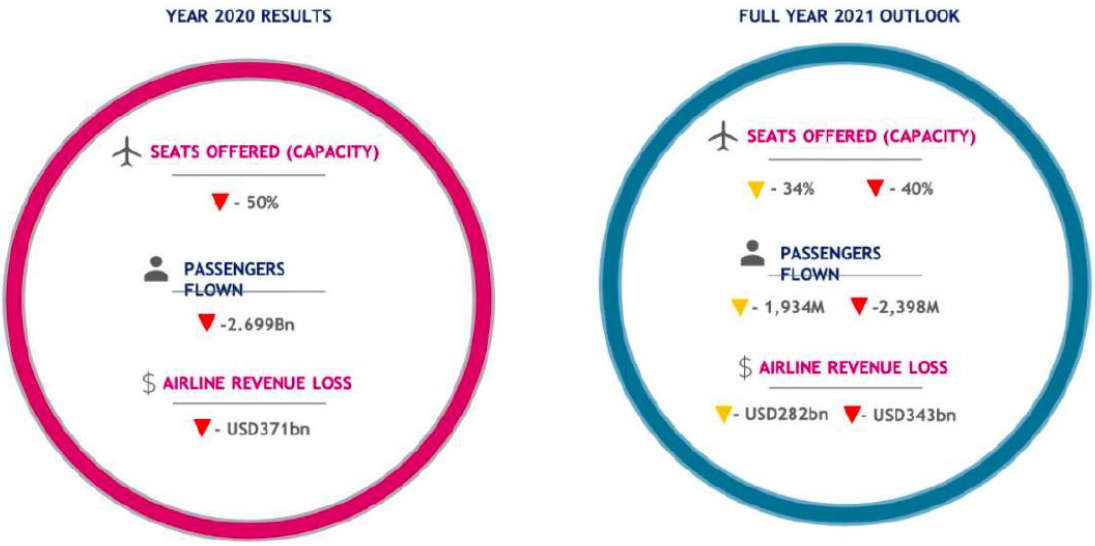
However, due to the fact that the pandemic had continuously been producing impacts, airline operators decided to request the government to consider setting measures for assisting the airway business sectors of Thailand due to the COVID-19 pandemic. Furthermore, the prolonged situation of COVID-19 pandemic also impacted continuously on institutes that provided help to airlines in 2020 including Department of Airports, Airports of Thailand Public Company (Limited) and Aeronautical Radio of Thailand Company (Limited). Currently, stage 3 of the measure towards alleviating effects from COVID-19 pandemic on airlines is in progress which has been executed at the beginning of 2021.


Forecasts on Air
Travel Recovery

Forecasts on Air Travel Recovery

4.1 International Institutions' Forecasts

Figure 26 Forecasts Regarding Impacts of COVID-19 pandemic on Global Air Transports



Sources: Economic Impacts of COVID-19 on Civil Aviation, ICAO

ICAO has forecasted global civil aviation will be 34-40 percent reduction in the total number of seats in 2021, with approximately 1,934-2398 million passengers. Airliners around the world will lose about 282-343 billion US dollars in revenue, which has a tendency to strengthen over the year 2020. IATA reports that the demand for air traveling globally in June 2020 has reached its lowest level by 86.5 percent and will gradually increase until the year 2024, the short-haul flight or domestic routes will recover nearly to the amount of 2019 which rebound faster than long-haul flight.

4.2 Forecasts by Agencies in Thailand

CAAT (The Civil Aviation Authority of Thailand) has appointed a working group for forecasting the air demand of the country, consisting of representatives from CAAT, Chulalongkorn University Transportation Institute, Department of Airports, Airports of Thailand Public Company Limited, Aeronautical Radio of Thailand Company Limited, U-Tapao Airport Authority, and Bangkok Airways Public Company Limited, by prognosticating the recovery of air travel from the impact of the Covid-19 pandemic in which the assumptions are consisting of 3 case scenarios as follows:

1. Best-case scenario – It is estimated that in 2023, the number of passengers will recover to the pre-pandemic levels of the normal growth pattern in 2020

    • **With the assumption** that during November 2020, the government is starting to authorize long-stay foreign travelers, after that the border will open for foreigners entering Thailand except for the origin countries with a high volume of infected Covid-19 cases. Until the discovery of vaccination in early 2021 and the discovery of medication in December 2021, additionally, the number of passengers progressively increased.

2. Moderate-case scenario – It is estimated that in 2023, the number of passengers will recover to the pattern of 2019

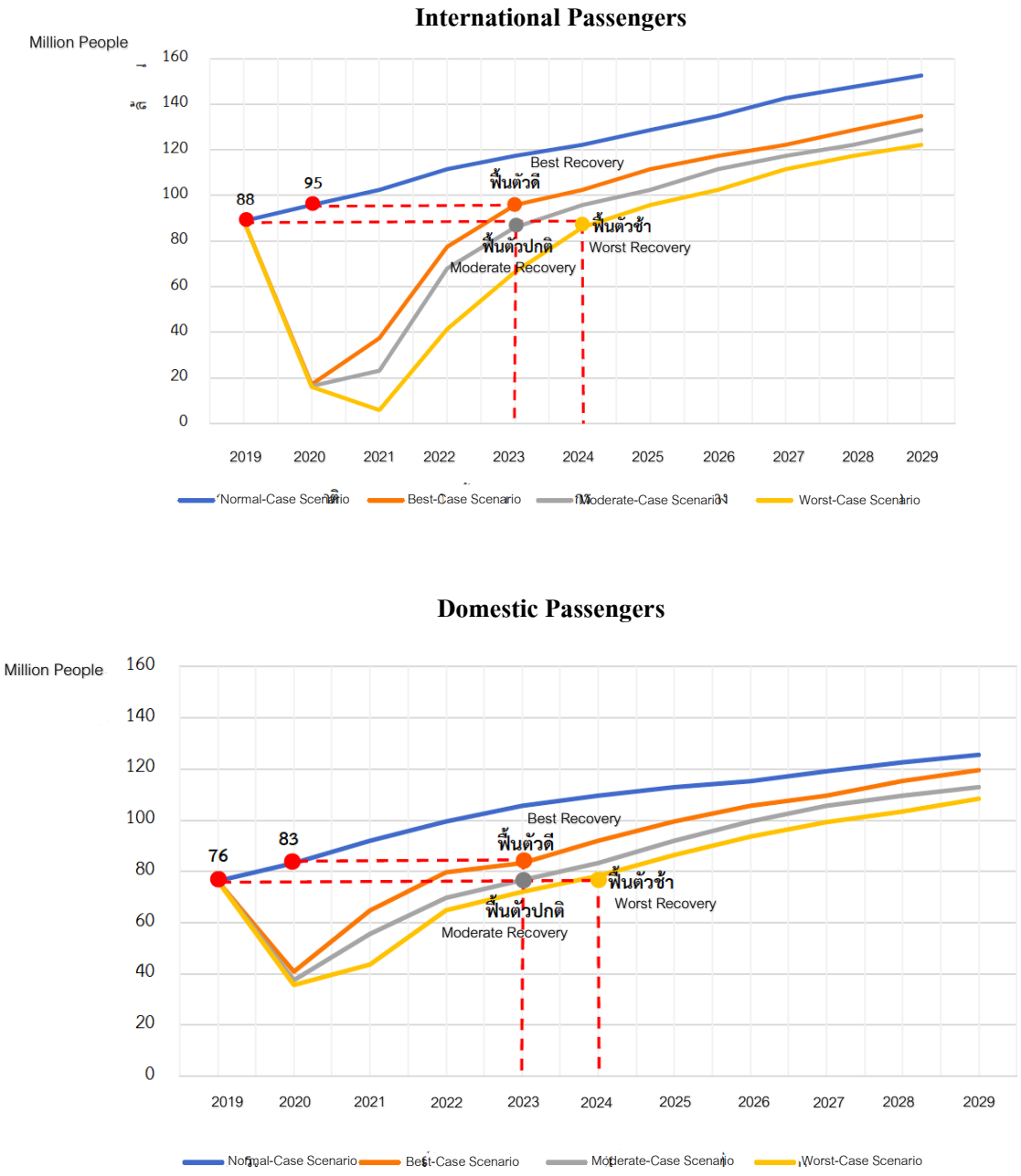
    • **With the assumption** that during November 2020, the government is starting to authorize long-stay foreign travelers and authorize influential countries such as East Asian countries and Southeast Asian countries, etc. to travel during January – May 2021. Subsequent to the discovery of vaccination in early 2021, traveling to Thailand is permitted but with a limited number of travelers. In December 2021, after the widespread distribution of vaccines to recipients, the government will allow travelers from any other country to enter Thailand. Additionally, the number of passengers progressively increased.

3. Worst-case scenario – It is estimated that in 2024, the number of international passengers will recover to the pattern of 2019

    • **With the assumption** that during November 2020, the government is starting to authorize travelers with a business purpose and authorize influential countries to travel during March – November 2021. Subsequently, the government will allow limited numbers of travelers from any other country to enter Thailand. Additionally, the number of passengers progressively increased.

The estimated volume of international passengers in all three case scenarios can be summarized as follows:

Figure 27 Forecast Results Regarding Air Travel During 2020-2029



Source: National Aviation Demand Forecasting Working Group

Figure 28 Forecast Results Regarding Air Travel During 2020-2029

Unit: Person

Year	International Passenger				Domestic Passenger			
	Normal Case Scenario	Best Case Scenario	Moderate Case Scenario	Worst Case Scenario	Normal Case Scenario	Best Case Scenario	Moderate Case Scenario	Worst Case Scenario
2019	88,822,412				76,253,599			
2020	95,806,978	17,164,079	16,414,244	16,096,708	83,245,901	40,817,168	37,485,832	35,607,942
2021	102,472,463	37,413,905	23,152,499	5,887,272	91,947,901	64,762,837	55,568,047	43,579,656
2022	111,530,962	77,501,851	67,927,640	41,357,596	99,543,936	79,666,804	69,712,410	64,792,636
2023	117,340,003	95,806,978	86,047,040	66,483,326	105,603,065	83,245,901	76,586,229	71,991,055
2024	122,186,160	102,472,463	95,806,978	86,047,040	109,533,211	91,947,901	83,245,901	78,251,147
2025	128,667,311	111,530,962	102,472,463	95,806,978	112,899,849	99,543,936	91,947,901	86,431,027
2026	134,832,643	117,340,003	111,530,962	102,472,463	115,202,680	105,603,065	99,543,936	93,571,300
2027	142,658,960	122,186,160	117,340,003	111,530,962	119,127,837	109,533,211	105,603,065	99,266,881
2028	147,657,753	128,667,311	122,186,160	117,340,003	122,614,298	115,347,552	109,533,211	103,331,470
2029	152,574,197	134,832,643	128,667,311	122,186,160	125,528,369	119,540,174	112,899,849	108,383,855

Source: National Aviation Demand Forecasting Working Group

The best-case scenario forecasting of the recovery from the Covid-19 for air passengers, the result showed that in 2021 there will be 102,176,742 passengers, comprising 64,762,832 for domestic passengers and 37,413,905 for international passengers, and will progressively increase, respectively in 2022 until 2023 will return to growth according to the normal-case scenario. For the moderate-case scenario, it presented that in 2021 there will be 78,720,546 passengers, comprising 55,568,047 for domestic passengers and 23,152,499 passengers for international passengers, and will return to growth to the normal-case scenario in the year 2024. For the worst-case scenario, in 2021, Thailand will have 49,579,656 passengers, comprising 43,579,656 for domestic passengers and 5,887,272 for international passengers, and will steadily increase until the year 2024 the number of passengers will be the equivalent volume as the year of 2019, and in the year of 2025 will reoccur to growth as the normal-case scenario. After returning to normal, the international passengers will have a growth average of 7 percent annually and domestic passengers will have a growth average of 7.7 percent annually.

Nevertheless, when comparing the forecast to the actual situation, the result revealed that the recovery of domestic passenger volume is proximate to the assumption of the best-case scenario, which is a consequence of the effective diffusion control on the spread of disease in the country and tourism stimulation measurement from the government.

Table 10 Study Results Referring Number of Daily and Newly Infected People

Circumstance	Prediction of Average Rate	Prediction of Minimum Rate	Prediction of Maximum Rate
Circumstance 1: No measurement in theory	9,140 (100.00%)	1,308	28,678
Circumstance 2: Closure of entertainment venues in risk provinces	2,996 (32.8%)	817	7,244
Circumstance 3: Closure of entertainment venues in risk provinces + Emphasis on personal behavior modification	934 (10.2%)	476	1,589
Circumstance 4: Closure of entertainment venues in risk provinces + Emphasis on personal behavior modification + Reduction in any gatherings that would pose a risk of transmission	593 (6.5%)	378	857
Circumstance 5: Closure of entertainment venues in risk provinces + Emphasis on personal behavior modification + Work from home option is encouraged	391 (4.3%)	303	483

Source: Department of Disease Control, April 2021

From the current situation, if the recent wave of the epidemic continues distant future, it may decrease the number of passengers, which is practical to the assumption of the worst-case scenario. For the analysis, the Department of Disease Control has formulated a mathematical model to originate predictions of the outbreak in Thailand. The model presented that if the government has assessment control measures including the closure of entertainment venues in risk provinces, emphasis on personal behavior modification, reduction in any gatherings that would pose a risk of transmission and work from home option is encouraged, it is expected to minimize the average number of infected cases remained at 391 per day within 1 month. Without efficacious control

measurements, it will consequence in the average number of the Covid-19 positive rate as excessive as 9,140 cases per day and will continuously increase an extensive crisis for numerous months.

The recovery in international passengers was similar to the assumption of the worst-case scenario. As international travel restrictions remained, the passengers must have the relevant documentation related to fit-to-fly health certificates. In addition, mandatory quarantine is required before entering the country. Consequently, in 2021, there will be an insignificant number of international passengers, then progressively increased after the widespread vaccination during 2023 – 2024. The Coronavirus Disease Epidemic Situation Administration Center 2019 (OCC) approved relaxation guidelines for Covid-19 restrictions on 30 March 2021 to revitalize tourism. The relaxation guideline is divided into 4 phases as follows:

Phase	Relaxation guidelines for Covid-19 restrictions
Phase 1 (1 April 2564 – 30 June 2564)	Fully vaccinated foreign travelers with a certificate of vaccination who travel to Phuket, Krabi, Phang-nga, and Chiangmai provinces and the area of Pattaya city will be eligible to undergo the reduced 7-day mandatory quarantine, which is shortened the quarantine length from 14 days.
Phase 2 (1 July 2564 – 30 September 2564)	Fully vaccinated foreign travelers with a certificate of vaccination who travel within only Phuket province are eligible to enter Thailand without quarantine. However, traveling to another zone, the mandatory quarantine of 7 days is still required.
Phase 3 (1 October 2564 onwards)	Fully vaccinated foreign travelers with a certificate of vaccination who travel within the area of Phuket, Krabi, Phang-nga, and Chiang Mai provinces are eligible to enter Thailand without quarantine. However, Traveling to another zone, the mandatory quarantine of 7 days is still required.
Phase 4 (1 January 2565 onwards)	Fully vaccinated foreign travelers with a certificate of vaccination are eligible to enter Thailand without quarantine.

According to the Relaxation guidelines for Covid-19 restrictions, it is anticipated to stimulate tourism and air transport. As per the prediction, if the opening of the country proceeds as planned, it will generate revenue from tourism in the amount of 54,967 million Baht[10]. If the operation advances satisfactorily without obstacles, there is a potentiality to stimulate international air travel to recover rapidly than anticipated.

[10] https://www.bangkokbiznews.com/news/detail/929633


Appendix

Appendix

The statistics of scheduled flight volume with determining flight routes for the respective airport in Thailand 2020

1. ท่าอากาศยานสุวรรณภูมิ – Suvarnabhumi Airport

Country	Airport	Frequency (Flight per year)
Thailand	Chiang Mai	12,103
	Chiang Rai	4,139
	Hat Yai	4,861
	Khon Kaen	3,261
	Ko Samui	6,883
	Krabi	3,550
	Lampang	1,297
	Loei	42
	Nakhon Phanom	122
	Nakhon Si Thammarat	1,837
	Nan	514
	Narathiwat	732
	Phuket	10,640
	Sukhothai	1,084
	Surat Thani	1,476
	Trat	852
	Ubon Ratchathani	1,800
	Udon Thani	2,994
Australia	Brisbane	98
	Melbourne	416
	Perth	169
	Sydney	450
Austria	Vienna	534
Azerbaijan	Baku	81
Bahrain	Bahrain	213

Country	Airport	Frequency (Flight per year)
Bangladesh	Chittagong	524
	Dhaka	5
Belgium	Brussels	157
Bhutan	Paro	208
Brunei Darussalam	Bandar Seri Begawan	172
Cambodia	Phnom Penh	2,373
	Siem Reap	1,108
China	Beihai	18
	Beijing (Capital)	829
	Beijing (Daxing)	64
	Changsha	37
	Changzhou	34
	Chengdu	519
	Chongqing	73
	Fuzhou	162
	Guangzhou	2,257
	Guiyang	46
	Haikou	107
	Hangzhou	110
	Harbin	9
	Hefei	65
	Jinan	64
	Kunming	720
	Lanzhou	52
	Lianyungang	58
	Lijiang	16
	Linyi	28
	Luoyang	20
	Nanchang	27
	Nanjing	49

Country	Airport	Frequency (Flight per year)
	Nanning	328
	Ningbo	104
	Ordos	8
	Qingdao	58
	Shanghai	2,613
	Sanya	36
	Shenyang	66
	Shenzhen	930
	Shijiazhuang	92
	Tianjin	64
	Urumqi	30
	Wenzhou	62
	Wuhan	122
	Wuxi	28
	Wuyishan	26
	Xiamen	378
	Xi'an	152
	Xinzhou	22
	Xuzhou	18
	Yangzhou	65
	Yantai	2
	Yinchuan	8
	Zhengzhou	142
Taiwan	Kaohsiung	270
	Taichung	130
	Taipei	4,466
Denmark	Copenhagen	310
Egypt	Cairo	198
Ethiopia	Addis Ababa	415
Finland	Helsinki	662

Country	Airport	Frequency (Flight per year)
France	Paris	795
Germany	Frankfurt	819
	Leipzig/Halle	64
	Munich	362
Hong Kong	Hong Kong	7.066
India	Ahmedabad	214
	Bagdogra	26
	Bengaluru	507
	Chennai	337
	Delhi	1,500
	Gaya	198
	Guwahati	1
	Hyderabad	151
	Jaipur	123
	Kolkata	746
	Lucknow	114
	Mumbai	995
	Varanasi	174
Indonesia	Denpasar-Bali	166
	Jakarta	948
Republic of Iran	Tehran	156
Israel	Tel Aviv	189
Italy	Milan	101
	Rome	105
Japan	Fukuoda	136
	Nagoya	426
	Okinawa	173
	Osaka	523
	Sapporo	130
	Sendai	54

Country	Airport	Frequency (Flight per year)
	Tokyo (Haneda)	2,281
	Tokyo (Narita)	2,369
Jordan	Amman	155
Kazakstan	Almaty	164
Kenya	Nairobi	131
Korea	Busan	542
	Cheongju	18
	Daegu	88
	Jeju	118
	Muan	60
	Seoul Incheon	3,147
Kuwait	Kuwait	114
Laos	Luang Prabang	638
	Pakse	92
	Vientiane	1,045
Luxembourg	Luxembourg	91
Macau	Macau	230
Malaysia	Kuala Lumpur	1,801
	Penang	622
Maldives	Male	208
Mongolia	Ulaanbaatar	30
Myanmar	Mandalay	408
	Nay Pyi Taw	130
	Yangon	1,973
Nepal	Kathmandu	221
Netherlands	Amsterdam	1,152
New Zealand	Auckland	172
Norway	Oslo	255
Oman	Muscat	391
Pakistan	Islamabad	94

Country	Airport	Frequency (Flight per year)
	Karachi	144
	Lahore	167
Philippines	Cebu	70
	Manila	1,570
Qatar	Doha	2,124
Reunion	St-denis	38
Russia	Irkutsk	224
	Khabarovsk	26
	Krasnoyarsk	54
	Moscow (Domodedovo)	98
	Moscow (Sheremetyevo)	626
	Moscow (Vnukovo)	53
	Novosibirsk	318
	St. Petersburg	5
	Vladivostok	84
Singapore	Singapore	5,058
Sri Lanka	Colombo	470
Sweden	Stockholm	299
Switzerland	Zurich	567
Turkey	Istanbul	491
Turkmenistan	Ashgabat	66
Ukraine	Kiev	76
United Arab Emirates	Abu Dhabi	1,103
	Dubai	1,486
United Kingdom	London	821
Uzbekistan	Tashkent	98
Vietnam	Cam Ranh	92
	Da Nang	713
	Dalat	146
	Haiphong	64

Country	Airport	Frequency (Flight per year)
	Hanoi	1,621
	Ho Chi Minh City	1,666
	Phuquoc	298

2. ท่าอากาศยานดอนเมือง – Don Mueang International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Buriram	2,354
	Chiang Mai	14,816
	Chiang Rai	6,659
	Chumphon	1,340
	Hat Yai	10,547
	Khon Kaen	4,982
	Krabi	3,681
	Lampang	1,573
	Loei	1,650
	Mae Hong Son	162
	Mae Sot	1,488
	Nakhon Phanom	1,664
	Nakhon Si Thammarat	7,706
	Nan	1,914
	Narathiwat	580
	Phitsanulok	3,507
	Phrae	759
	Phuket	9,510
	Ranong	1,314
	Roi Et	1,851
	Sakon Nakhon	2,478
	Surat Thani	6,710
	Trang	3,732
	Ubon Ratchathani	6,173

Country	Airport	Frequency (Flight per year)
	Udon Thani	6,950
Australia	Brisbane	69
Bangladesh	Dhaka	123
Cambodia	Sihanoukville	106
	Phnom Penh	486
	Siem Reap	486
China	Changchun	10
	Changsha	253
	Changzhou	108
	Chengdu	222
	Chongqing	283
	Dalian	18
	Guangzhou	312
	Hangzhou	228
	Hefei	34
	Jieyang	74
	Jinan	109
	Kunming	183
	Linyi	26
	Nanchang	120
	Nanjing	270
	Nanning	26
	Nantong	34
	Ningbo	77
	Qingdao	37
	Shanghai	164
	Sanya	34
	Shenyang	42
	Shenzhen	170
	Tianjin	127

Country	Airport	Frequency (Flight per year)
	Wuhan	92
	Wuxi	35
	Xi'an	209
	Xuzhou	18
	Yancheng	28
	Yichang	6
	Yiwu	36
	Zhanjiang	26
	Zhengzhou	108
Taiwan	Taipei	575
Hongkong	Hong Kong	317
India	Ahmedabad	86
	Bengaluru	149
	Varanasi	44
	Chennai	147
	Delhi	75
	Gaya	148
	Guwahati	12
	Jaipur	85
	Kochi	82
	Kolkata	150
	Mumbai	130
Indonesia	Denpasar-Bali	496
	Jakarta	846
	Medan	160
Japan	Fukuoka	211
	Hiroshima	58
	Nagoya	236
	Osaka	490
	Sapporo	270

Country	Airport	Frequency (Flight per year)
	Tokyo (Narita)	990
Korea	Seoul Incheon	409
Laos	Luang Prabang	162
	Vientiane	174
Macau	Macau	317
Malaysia	Johor Bahru	240
	Kota Kinabalu	50
	Kuala Lumpur	1,598
	Penang	294
Maldives	Male	168
Myanmar	Mandalay	162
	Yangon	1,008
Nepal	Kathmandu	146
Philippines	Manila	246
Singapore	Singapore	1,154
Sri Lanka	Colombo	144
Vietnam	Cam Ranh	90
	Can Tho	44
	Da Nang	468
	Hanoi	472
	Ho Chi Minh City	748

3. ท่าอากาศยานเชียงใหม่ – Chiangmai Mai International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	15,116
	Bangkok Suvarnabhumi International Airport	12,107
	Hat Yai	662
	Hua Hin	84

Country	Airport	Frequency (Flight per year)
	Khon Kaen	690
	Ko Samui	205
	Krabi	639
	Mae Hong Son	178
	Nakhon Si Thammarat	71
	Phuket	1,205
	Surat Thani	396
	Udon Thani	1,049
	U-Tapao	1,107
	Ubon Ratchathani	484
China	Beijing	158
	Changsha	82
	Chengdu	30
	Chongqing	20
	Guangzhou	296
	Jinghong	98
	Kunming	257
	Nanchang	44
	Nanjing	26
	Nanning	6
	Quanzhou	27
	Shanghai	298
	Sanya	24
	Shenzhen	96
	Wuhan	18
	Xi'an	70
Taiwan	Kaohsiung	42
	Taipei	300
Hong Kong	Hong Kong	358
Korea	Seoul Incheon	404

Country	Airport	Frequency (Flight per year)
	Busan	26
Laos	Luang Prabang	224
Macau	Macau	76
Malaysia	Kuala Lumpur	294
Myanmar	Mandalay	92
	Yangon	160
Qatar	Doha	119
Singapore	Singapore	210
Vietnam	Danang	156
	Hanoi	154
	Ho Chi Minh City	78

4. ท่าอากาศยานแม่ฟ้าหลวง เชียงราย – Mae Fah Luang Chiang Rai International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	6,739
	Bangkok Suvarnabhumi International Airport	4,133
	Hat Yai	70
	Phuket	442
	Udon Thani	92
China	Changsha	52
	Chengdu	106
	Guangzhou	26
	Hangzhou	40
	Jinghong	72
	Kunming	38
	Shenzhen	36

5. ท่าอากาศยานน่านนคร – Nan Nakhon Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,914
	Bangkok Suvarnabhumi International Airport	514

6. ท่าอากาศยานลำปาง – Lampang Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,573
	Bangkok Suvarnabhumi International Airport	1,297

7. ท่าอากาศยานแม่ฮ่องสอน – Mae Hong Son Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	162
	Chiang Mai	30

8. ท่าอากาศยานแพร่ – Phrae Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	759

9. ท่าอากาศยานบุรีรัมย์ – Buriram Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	2,354

10. ท่าอากาศยานขอนแก่น – Khon Kane Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	4,982
	Bangkok Suvarnabhumi International Airport	3,261
	Chiang Mai	690
	Hat Yai	236
	Phuket	242
	U-Tapao	38

11. ท่าอากาศยานนครพนม – Nakhon Phanom Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,664
	Bangkok Suvarnabhumi International Airport	122

12. ท่าอากาศยานร้อยเอ็ด – Roi Et Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,851

13. ท่าอากาศยานเลย – Loei Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,650
	Bangkok Suvarnabhumi International Airport	42

14. ท่าอากาศยานสกลนคร – Sakon Nakhon Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	2,478

15. ท่าอากาศยานอุดรธานี – Udon Thani International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	6,950
	Bangkok Suvarnabhumi International Airport	2,994
	Chiang Mai	1,049
	Chiang Rai	92
	Hat Yai	178
	Hua Hin	70
	Nakhon Si Thammarat	24
	Phuket	386
	U-Tapao	240

16. ท่าอากาศยานอุบลราชธานี – Ubon Ratchathani Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	6,173
	Bangkok Suvarnabhumi International Airport	1,800
	Chiang Mai	484
	Hat Yai	12

17. ท่าอากาศยานภูเก็ต – Phuket International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	9,845
	Bangkok Suvarnabhumi International Airport	10,729
	Chiang Mai	1,204
	Chiang Rai	442
	Hat Yai	318
	Khon Kaen	242
	Ko Samui	1,090
	Udon Thani	386
	U-Tapao	528
Australia	Melbourne	87
	Sydney	72
	Phnom Penh	64
	Siem Reap	92
China	Beijing	238
	Changsha	50
	Chengdu	363
	Chongqing	61
	Guangzhou	294
	Guiyang	54
	Hangzhou	132
	Hefei	38
	Hohhot	8
	Jinan	42
	Kunming	110
	Nanjing	154
	Nanning	26
	Shanghai	733

Country	Airport	Frequency (Flight per year)
	Shenzhen	196
	Taiyuan	26
	Tianjin	50
	Wuhan	69
	Xiamen	8
	Xi'an	182
	Zhengzhou	74
Denmark	Copenhagen	23
Finland	Helsinki	98
Germany	Frankfurt	74
Hong Kong	Hong Kong	660
India	Bengaluru	200
	Delhi	249
	Mumbai	122
Korea	Seoul Incheon	391
Macau	Macau	44
Malaysia	Kuala Lumpur	1,266
	Penang	94
Oman	Mascat	16
Qatar	Doha	541
Russia	Irkutsk	46
	Moscow (Sheremetyevo)	364
	Moscow (Vnukovo)	128
	Novosibirsk	112
Singapore	Singapore	1,702
Switzerland	Zurich	75
Turkey	Istanbul	164
Uzbekistan	Tashkent	8
United Arab Emirates	Abu Dhabi	168
	Dubai	335

Country	Airport	Frequency (Flight per year)
Vietnam	Ho Chi Minh City	204

18. ท่าอากาศยานหาดใหญ่ – Hat Yai International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	10,871
	Bangkok Suvarnabhumi International Airport	4,859
	Chiang Mai	652
	Chiang Rai	70
	Khon Kaen	236
	Phuket	318
	Ubon Ratchathani	12
	Udon Thani	178
	U-Tapao	498
Malaysia	Kuala Lumpur	156
Singapore	Singapore	230

19. ท่าอากาศยานชุมพร – Chumphon Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,340

20. ท่าอากาศยานกระบี่ – Krabi International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	3,550
	Bangkok Suvarnabhumi International Airport	3,681
	Chiang Mai	639

Country	Airport	Frequency (Flight per year)
	Ko Samui	86
China	Chengdu	8
	Hefei	5
	Shanghai	8
Denmark	Copenhagen	20
Finland	Helsinki	20
Malaysia	Kuala Lumpur	52
Norway	Oslo	25
Qatar	Doha	70
Singapore	Singapore	72
Sweden	Stockholm	21
UAE	Dubai	44

21. ท่าอากาศยานตรัง – Trang Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	3,732

22. ท่าอากาศยานนครศรีธรรมราช – Nakhon Si Thammarat Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	7,706
	Bangkok Suvarnabhumi International Airport	1,837
	Chiang Mai	71
	Udon Thani	24

23. ท่าอากาศยานนราธิวาส – Narathiwat Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	580
	Bangkok Suvarnabhumi International Airport	732

24. ท่าอากาศยานระนอง – Ranong Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,314

25. ท่าอากาศยานสุราษฎร์ธานี – Surat Thani International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	6,710
	Bangkok Suvarnabhumi International Airport	1,476
	Chiang Mai	396
China	Chengdu	4
Malaysia	Kuala Lumpur	26

26. ท่าอากาศยานสมุย – Samui International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	6,883
	Chiang Mai	205
	Krabi	86
	Phuket	1,090
	U-Tapao	242
China	Chengdu	28

Country	Airport	Frequency (Flight per year)
	Chongqing	6
Hong Kong	Hong Kong	263
Malaysia	Kuala Lumpur	161
Singapore	Singapore	656

27. ท่าอากาศยานอู่ตะเภา – U-Tapao International Airport

Country	Airport	Frequency (Flight per year)
Thailand	Chiang Mai	498
	Hat Yai	498
	Khon Kaen	38
	Ko Samui	242
	Phuket	528
	Udon Thani	240
China	Guiyang	34
	Haikou	53
	Jinan	43
	Shijiazhuang	8
	Yunheng	9
Malaysia	Kuala Lumpur	85
Vietnam	Ho Chi Minh City	54

28. ท่าอากาศยานตราด – Trat Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Suvarnabhumi International Airport	852

29. ท่าอากาศยานแม่สอด – Mae Sot Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	1,488

30. ท่าอากาศยานหัวหิน – Hua Hin Airport

Country	Airport	Frequency (Flight per year)
Thailand	Chiang Mai	84
	Udon Thani	70
Malaysia	Kuala Lumpur International Airport	28

31. ท่าอากาศยานสุโขทัย – Sukhothai Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Suvarnabhumi International Airport	1,084

32. ท่าอากาศยานพิษณุโลก – Phitsanulok Airport

Country	Airport	Frequency (Flight per year)
Thailand	Bangkok Don Mueang International Airport	3,507

Sources: Department of Airports, Airports of Thailand Public Company Limited, U-Tapao Airport Authority, and Bangkok Airways Public Company Limited

Analysis by Division of Economics and Civil Aviation Authority of Thailand

HHI Index and Operational destination of airliners for domestic flight route

Route	Airlines	HHI index
BKK/DMK-HKT	Thai AirAsia Thai Vietjet Thai Lion Air Thai Airways International Thai Smile Airways Bangkok Airways Nok Air	17%
BKK/DMK-CNX	Thai AirAsia Thai Vietjet	19%

Route	Airlines	HHI index
	Nok Air Thai Lion Air Thai Smile Airways Bangkok Airways Thai Airways International	
BKK/DMK-CEI	Thai Vietjet Thai AirAsia Thai Lion Air Nok Air Thai Smile Airways Bangkok Airways	20%
BKK/DMK-KBV	Thai AirAsia Thai Vietjet Thai Lion Air Bangkok Airways Thai Airways International Thai Smile Airways Nok Air	20%
BKK/DMK-UTH	Nok Air Thai AirAsia Thai Lion Air Thai Smile Airways Thai Vietjet	21%
BKK/DMK-HDY	Thai AirAsia Thai Lion Air Nok Air Thai Smile Airways Thai Vietjet	23%
BKK/DMK-NST	Nok Air Thai AirAsia	26%

Route	Airlines	HHI index
	Thai Lion Air Thai Vietjet Thai Smile Airways	
BKK/DMK-UBP	Nok Air Thai Lion Air Thai AirAsia Thai Smile Airways Thai Vietjet	26%
BKK/DMK-KKC	Thai AirAsia Thai Smile Airways Thai Lion Air Thai Vietjet Nok Air	28%
BKK/DMK-URT	Thai AirAsia Thai Lion Air Nok Air Thai Smile Airways Thai Vietjet	29%
BKK/DMK-PHS	Thai AirAsia Nok Air Thai Lion Air	36%
BKK/DMK-TST	Thai AirAsia Thai Lion Air Nok Air	37%
BKK/DMK-NAW	Thai Smile Airways Nok Air	50%
BKK/DMK-CJM	Thai AirAsia Nok Air	50%
BKK/DMK-BFV	Thai AirAsia Nok Air	51%

Route	Airlines	HHI index
CNX-NST	Thai Vietjet Thai Smile Airways	51%
BKK/DMK-LPT	Nok Air Bangkok Airways	52%
BKK/DMK-UNN	Thai Airasia Nok Air	54%
CNX-UTP	Thai AirAsia Thai Lion Air	60%
BKK/DMK-LOE	Thai AirAsia Nok Air Thai Smile Airways	60%
DMK-SNO	Nok Air Thai AirAsia	61%
HKT-UTP	Thai AirAsia Bangkok Airways	64%
CNX-HKT	Thai AirAsia Thai Smile Airways Bangkok Airways	67%
CNX-KBV	Thai AirAsia Bangkok Airways	75%
BKK/DMK-NNT	Thai AirAsia Thai Smile Airways Nok Air	78%
BKK/DMK-KOP	Thai AirAsia Thai Smile Airways	89%
CNX-KKC	Thai AirAsia Nok Air	99%
DMK-HGN	Nok Air	100%
DMK-MAQ	Nok Air	100%
BKK-TDX	Bangkok Airways	100%

Route	Airlines	HHI index
BKK-THS	Bangkok Airways	100%
DMK-PRH	Nok Air	100%
DMK-ROI	Thai AirAsia	100%
BKK-USM	Bangkok Airways	100%
CEI-HDY	Thai Vietjet	100%
CEI-HKT	Thai Vietjet	100%
CEI-UTH	Thai Vietjet	100%
CNX-HDY	Thai AirAsia	100%
CNX-HGN	Bangkok Airways	100%
CNX-HHQ	Thai AirAsia	100%
CNX-UBP	Nok Air	100%
CNX-URT	Thai AirAsia	100%
CNX-USM	Bangkok Airways	100%
CNX-UTH	Nok Air	100%
HDY-HKT	Bangkok Airways	100%
HDY-KKC	Thai AirAsia	100%
HDY-UBP	Nok Air	100%
HDY-UTH	Thai Lion Air	100%
HDY-UTP	Thai AirAsia	100%
HKT-KKC	Thai AirAsia	100%
HKT-USM	Bangkok Airways	100%
HKT-UTH	Thai AirAsia	100%
KBV-USM	Bangkok Airways	100%
KKC-UTP	Thai AirAsia	100%
NST-UTH	Thai Smile Airways	100%
HHQ-UTH	Thai AirAsia	100%
UTH-UTP	Thai AirAsia	100%
UTH-USM	Bangkok Airways	100%

Sources: Department of Airports, Airports of Thailand Public Company Limited, U-Tapao Airport Authority, and Bangkok Airways Public Company Limited
Analysis by Division of Economics and The Civil Aviation Authority of Thailand

List of Air Operation License (Air Operator License - AOL)

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
1	Thai Airways International Public Company Limited	✓	✓	✓			✓		
2	Bangkok Airways Public Company Limited	✓	✓	✓			✓		
3	Thai Smile Airways Company Limited	✓	✓	✓			✓		
4	Thai Airasia Company Limited	✓	✓	✓			✓		
5	Thai Lion Mentari Company Limited	✓	✓	✓			✓		

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
6	Nok Airlines Public Company Limited	✓	✓	✓			✓		
7	Thai Vietjet Air Joint Stock Company Limited	✓	✓	✓			✓		
8	Thai Express Air Company Limited (Carrier)	✓	✓	✓				✓	Request for extending the actual flight time.
9	Newgen Airways Company Limited	✓	✓	✓				✓	In the process of offering license revocation.
10	Nokscoot Airlines Company Limited	✓		✓				✓	The court has ordered the company to

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
									be under absolute receivership.
11	K-mile Air Company Limited	✓		✓			✓		
12	Thai Airasia X Company Limited	✓		✓			✓		
13	Asia Atlantic Airlines Company Limited	✓		✓				✓	
14	Thai Eastarjet Company Limited	✓		✓				✓	
15	Skyview Airways Company Limited	✓		✓				✓	The license has expired.
16	Jetasia Airways	✓		✓				✓	The license is invalid.

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
	Company Limited								
17	City Airways Company Limited	✓		✓				✓	The license is invalid.
18	Kannithi Aviation Company Limited		✓					✓	The license expires during the year 2020.
19	RPS System Company Limited		✓					✓	The license has expired.
20	Air Inter Transport Company Limited			✓			✓		
21	Siam Land Flying Company Limited			✓			✓		
22	AC Aviation Company Limited			✓			✓		

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
23	Advance Aviation Jet Company Limited			✓			✓		
24	Asian Aerospace Services Company			✓			✓		
25	Sriracha Aviation Compamy Limited			✓			✓		
26	Mjets Company Limited			✓			✓		
27	VIP Jets Company Limited			✓			✓		
28	H.S. Aviation Company Limited			✓			✓		
29	Thai Flying Service			✓			✓		

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
	Company Limited								
30	Thai Summer Airways Company Limited			✓				✓	
31	TSSP Platform Company Limited			✓				✓ (New Listing)	
32	Rabbit Wings Airways Company Limited			✓				✓	
33	Bangkok Helicopter Services Company Limited			✓			✓		
34	Thai Aviation Services			✓			✓		

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
	Company Limited								
35	Advance Aviation Company Limited			✓			✓		
36	United Offshore Aviation Company Limited			✓			✓		
37	SFS Aviation Company Limited			✓			✓		
38	Winsor Flying Company Limited			✓				✓ (New Listing)	
39	Andaman Flying Company Limited				✓				

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
40	Aeronautical Radio of Thailand Limited				✓				
41	Solaire Heliluck Aviation Service Company Limited					✓	✓		
42	Thai Sky Adventures Company Limited					✓	✓		
43	AG Global Company Limited					✓	✓		
44	Siam Yamaha Motor Robotics Company Limited					✓	✓ (New Listing)		

No.	List of the Licensee	Type of Business					Establishment		Notation
		Scheduled Commercial Services		Without Scheduled Services	Other Without Scheduled	Aerial Work (Other Commercial Services)	Operational	Non-operational	
		International	Domestic						
45	Avanti Air Charter Company Limited					✓		✓ (New Listing)	
46	Dropzone (Thailand) Company Limited					✓		✓ (New Listing)	
47	Asia Aviation and Technology Company Limited					✓		✓ (New Listing)	