

Chapter 12

International Air Transportation

International Air Transportation

- Types of Service
- Types of Aircraft
- International Regulations
- Freight Tariffs
- Environmental Issues
- Security

Types of Service (I)

Cargo can travel by air under one of five different types of services:

- Airmail Services

The origin of air freight, air mail services still account for a small percentage of all shipments.

- Express air services

Express air services guarantee a pre-determined delivery date; the service is called “time-definite delivery,” generally the next day or overnight. Examples include FedEx, UPS, DHL.

Types of Service (II)

- Scheduled Airfreight Services

Air freight is transported by airlines that operate on a regular schedule between two cities.

The airline can operate a passenger aircraft, in which case the cargo is placed in the belly of the airplane, or a freighter, in which case the cargo is placed on the main deck of the aircraft. On rare occasions, the freight and the passengers share space on the main deck, in an aircraft called a “combi,” or combination aircraft.

Regulations restrict the type of cargo that is allowed to be shipped on passenger aircraft.

Types of Service

- Charter Airfreight Services

Charter services do not operate on a regular schedule and depend on demand. they fulfill emergency shipments of large parts, or operate on seasonal traffic, such as wine, flowers, or fruits.

- Leased Airfreight Services

Freight can also travel in leased aircraft. Leases are contracts between the owner of the aircraft and the user, and can take multiple forms. Leased aircraft are used by carriers to reduce their capital costs, and to satisfy short-term demand fluctuations (end-of-year volume increases).

Types of Leases

- Wet Lease

A lease agreement in which the owner of the aircraft provides the airplane, insurance, maintenance, fuel and a flight crew. The lessee has to cover all other costs, such as airport fees.

- Dry Lease

A lease agreement in which the owner of the aircraft provides only the airplane to the lessee, who is responsible for all other costs.

- ACMI Lease

The owner of the aircraft provides the airplane, crew, maintenance, and insurance to the lessee. The lessee has to cover all other costs, such as fuel and airport fees.

Top Cargo Airlines

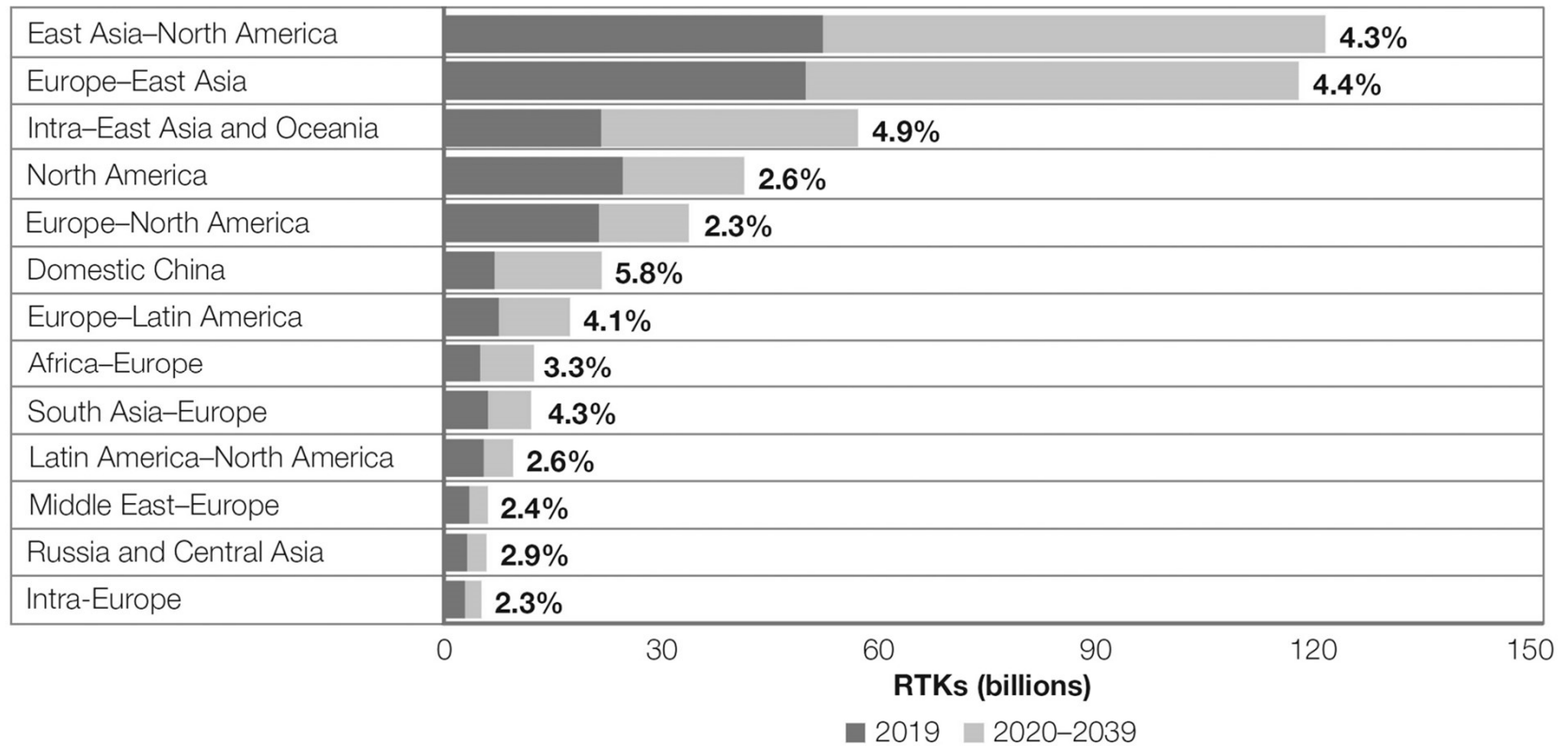
| Top Ten Cargo Airlines (2019) in millions of FTKs | | |
|---|-------------------------|--------|
| 1 | FedEx | 17,503 |
| 2 | Qatar Airways | 13,024 |
| 3 | UPS Airlines | 12,842 |
| 4 | Emirates | 12,052 |
| 5 | Cathay Pacific Airways | 10,930 |
| 6 | Korean Air Lines | 7,412 |
| 7 | Lufthansa | 7,226 |
| 8 | Cargolux | 7,180 |
| 9 | Turkish Airlines | 7,029 |
| 10 | China Southern Airlines | 6,825 |

Source: IATA *World Air Transport Statistics*

Top Cargo Airports

| Top Fifteen Cargo Airports (2019) in '000s of tonnes loaded | | | |
|---|----------------------------|-----|-------|
| 1 | Hong Kong, China | HKG | 4,809 |
| 2 | Memphis, United States | MEM | 4,323 |
| 3 | Shanghai, China | PVG | 3,634 |
| 4 | Louisville, United States | SDF | 2,790 |
| 5 | Incheon/Seoul, Korea | ICN | 2,764 |
| 6 | Anchorage, United States | ANC | 2,745 |
| 7 | Dubai, UAE | DXB | 2,515 |
| 8 | Tokyo, Japan | NRT | 2,104 |
| 9 | Paris, France | CDG | 2,102 |
| 10 | Miami, United States | MIA | 2,092 |
| 11 | Los Angeles, United States | LAX | 2,092 |
| 12 | Frankfurt, Germany | FRA | 2,091 |
| 13 | Singapore | SIN | 2,057 |
| 14 | Beijing, China | PEK | 1,958 |
| 15 | Guangzhou, China | CAN | 1,922 |

Source: ACI World Air Traffic



Largest international markets and expected growth, 2019.

Source: Boeing Air Cargo Forecast

Types of Aircrafts

- Passenger Aircrafts
- Freighters
- Combi Aircrafts
- Quick-Change Aircrafts
- Charter Cargo Aircrafts



The largest passenger aircraft in operations, the Airbus A 380. Almost half of these aircrafts are operated by Emirates Airlines.

Source: Soos Jozsef



A Boeing 747 airfreighter, used by an express air cargo service, TNT.
Source: Lerner Vadim



Cargo being loaded in the belly of an Airbus A 330 passenger aircraft.
Source: Peter Titmuss



A Boeing 747 cargo airfreighter, dedicated to cargo transport.
Source: EQRoy



An airfreighter carries cargo on its main deck. The roller deck of an Airbus 330F.
Source: Tratong



Airfreighters can be loaded more easily if their tail is stabilized, so that they do not tip over.
Source: US Air Force



An airfreighter can be loaded through its nose (Boeing 747F).
Source: Tratong



Cargo can be loaded through a side door (Boeing 737, converted from passenger to cargo).
Source: unknown

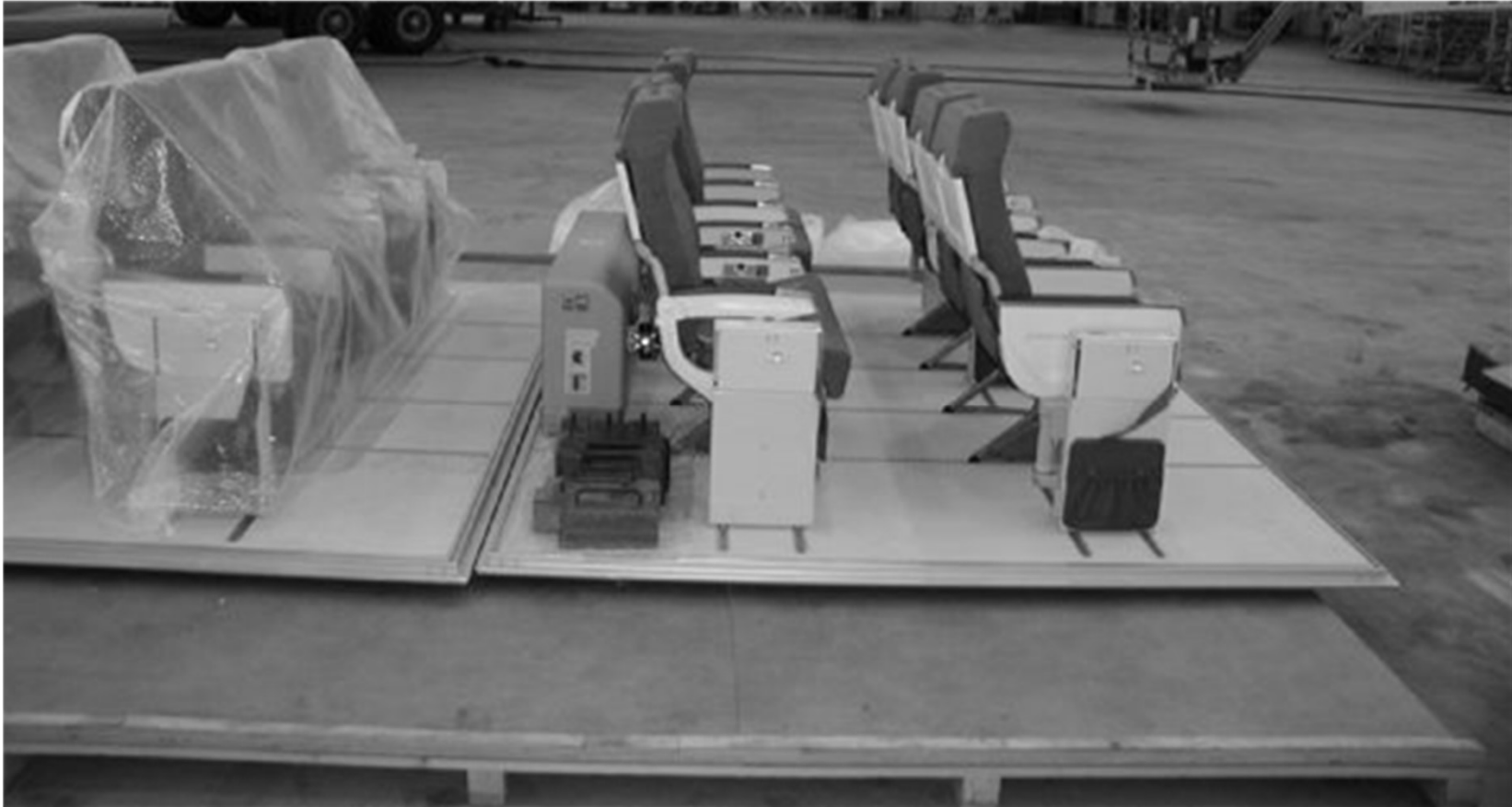


A combination aircraft, with cargo in the front of the main deck, and passengers in the back.

Source: Philip Pelosian

The cargo area of a combi aircraft, with the seats visible behind the partition.
Source: unknown





A quick-change aircraft carries cargo at night and switches to passengers during the day.

Source: unknown

Some charter aircrafts are hired to transport goods that cannot be shipped through traditional airfreighters:

- The goods do not fit into a regular freighter because there are too heavy and/or too large.
- Goods need to be delivered to a location not serviced by regular routes.
- Goods need to be delivered to an airport where the runway is sub-standard, or the cargo handling facilities are poor.

Several aircraft have been designed to service these specific needs.



The Antonov *Ruslan* is an airfreighter designed to handle project cargo.

Source: Vicspacewalker



The Antonov 225 *Mriya* is another airfreighter designed to handle project cargo.

Source: Liner



The Antonov 225 *Mriya* is equipped with two onboard cranes to handle project cargo.

Source: Abdul Hafiz ab Hamid



The Airbus *Beluga* is used to ship airplane parts from manufacturing plant to final assembly.

Source: Dmitry Finkel



The Boeing *Dreamlifter* is used for the same purpose.

Source: Rocky Grimes

International Air Regulations

- International Air Transport Association

The International Air Transport Association (IATA) works with governments and airlines to ensure that goods move around the world as easily as if they were traveling domestically.

- International Civil Aviation Organization

The International Civil Aviation Organization (ICAO), an agency of the United Nations, designs and implements standards for international civil aviation practices regarding safety, security, and other operational issues.

International Air Regulations

International aviation operates under the principle that every country has complete and exclusive sovereignty over its airspace.

No scheduled international air service may operate over or into the territory of a country without specific authorization.

Recent developments, such as open-skies agreements, have relaxed those restrictions. Under open skies agreements, air carriers from one country are allowed to serve any of the other country's airports.

Freight Tariffs

The tariff structure on international air cargo is much simpler than that used by the ocean cargo industry. It is based on the weight and volume of the cargo.

Airlines will calculate the freight charge two ways:

- The weight of a shipment
- The volume weight of the shipment, also called “dimensional weight,” that is calculated based upon the dimensions of a shipment.

The airline will then charge the higher of the two prices.

Environmental Issues

- Because of their heavy reliance on fossil fuels, airlines and aircraft manufacturers have been active in reducing the carbon footprint of the industry. IATA and ICAO have been involved in those efforts as well.
- Progress on noise reduction has also been made in the last decades. Still, some airports close at night to reduce the impact of air traffic on the populations living near airports. This affects cargo transport substantially, since most of the airfreighter traffic takes place at night. Some freight traffic is therefore diverted to secondary airports.

Air Cargo Security

Security concerns in the air freight industry are dominated by requirements similar to the ones put in place by the Transportation Safety Administration as well as Customs and Border Protection in the United States.

- **Advanced Manifest Rule:** All cargo manifests must be sent to CBP at least four hours before the cargo is to arrive in the U.S.
- **Certified Cargo Screening Program:** All cargo shipped on passenger aircraft must be 100-percent inspected prior to being loaded. Inspections must be conducted by Certified Cargo Screening Facilities.