Chapter 11 AIR CARRIERS

Aviation is divided into separate categories with specific functions.This chapter will focus on air carriers, both large and small. Although quite different in size and function, they all have in common the movement of people and cargo from one place to another. This chapter will describe these categories and their functions in the aviation community.

Objectives

Define air carriers.
Describe why the Airline Deregulation Act had more serious effects on the older airlines than on the newer ones.
Define modern airliner, all-cargo carrier and regional/commuter carrier.

Major Air Carriers

In this chapter, we will categorize the air carriers as follows:

1. Large Air Carrier: The largest carriers in terms of the number of passengers carried regardless of the length of the routes.
2. Cargo Carriers: These carriers carry mainly freight but now are also allowed to carry passengers.
3. Regional and Commuter Carriers: These are smaller airlines that carry passengers within a certain limited geographical region. They serve many of the smaller cities that the larger airlines have dropped.

The first category we will discuss is the major air carrier aircraft. In this case, the payload includes the passengers and their baggage, as well as airmail, air cargo and anything else that the airlines carry for the purpose of making money.

The air carriers include the companies generally referred to as commercial airlines. There are several other groups not normally considered airlines also included in the air carrier category. These include carriers that transport only cargo and the commuter air carriers. The thing that all of them have in common is that they all fly on regular schedules and they are all transporting people or cargo as a commercial business.

The air carriers are considered common carriers along with the railroads, bus lines and steamships. Common carriers are in business to serve the public, and thus, they are very closely regulated and controlled to ensure the safety of the public. The Federal Aviation Administration (FAA) is in charge of regulating the safety of the airlines and of controlling the flight of all air traffic while flying over the United States.

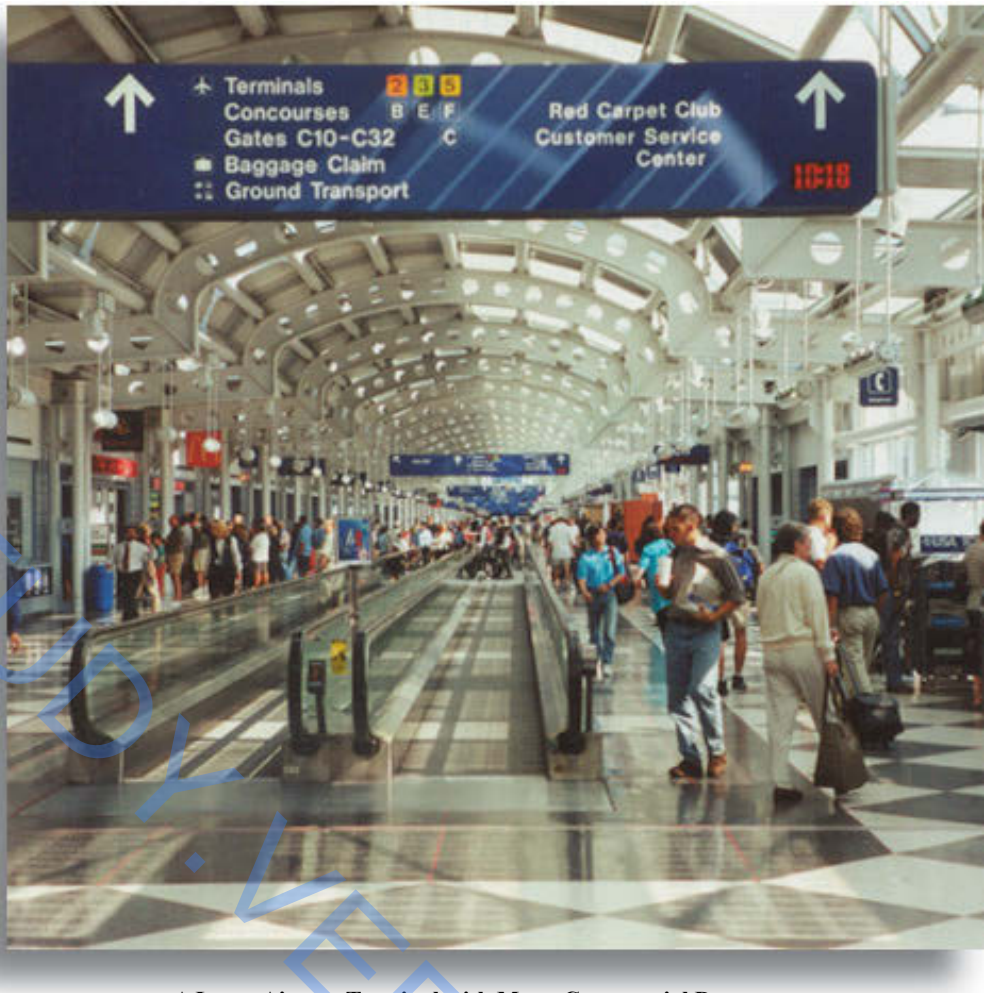
Prior to 1978, the Civil Aeronautics Board (CAB) very strictly regulated the fares and routes of the air carriers. Fares could not be changed without CAB approval, and every airline was restricted to flying only certain routes.

The Airline Deregulation Act of 1978 changed everything. This act allowed the airlines free entry into the air routes of the nation. This means that the airlines were allowed to start flying on new routes without approval of the CAB.

The idea behind this decision was that as more airlines began flying certain routes, competition would cause fares to be reduced. This happened on certain routes, but something else occurred. As the airlines began flying more profitable routes, they began to cut back their services on the less profitable routes. In some cases, they actually eliminated stops in certain smaller, unprofitable cities.

The result of this was twofold. First, many new airlines sprang up, both to provide service to the smaller cities and to compete with the larger airlines. Secondly many of the existing airlines merged to form larger airlines. In 1978, there were 36 scheduled airlines serving the United States. In 1988, this had grown to 76 even though there had been mergers and bankruptcies in the airline business.

Immediately after deregulation, many of the older airlines began to have serious financial problems.



A Large Airport Terminal with Many Commercial Departures

These problems were caused by a number of factors. The airlines were suddenly faced with competition on air routes, which they previously monopolized. Not only were new airlines beginning to fly on these air routes, but many of them charged lower fares. The older, established airlines had very high labor costs. The new, smaller airlines were nonunion; therefore, the employees were paid less. These savings were passed on to the passengers. Operating costs skyrocketed as fuel prices tripled because of the energy crisis, and interest rates soared because of the inflation of the late 1970s. Many of the older airlines had ordered new fuel-efficient aircraft to cut down on fuel costs. However, when these new, higher-priced aircraft were delivered, the airlines did not have the money to pay cash for them and they had to pay 15 to 20 percent interest on their loans to pay for the aircraft. The newer airlines were buying cheaper, used aircraft and did not have these large interest payments. To further compound the problem, the recession of the 1970s and early 1980s reduced the number of passengers, and the air traffic controllers' strike reduced the number of flights to and from many areas.

Aircraft Used by Large Carriers

These carriers are the most common and most familiar to the general population. Their job is to haul passengers to all parts of the world in only hours. The aircraft in this category generally carry over 100 passengers, with some carrying over 500 passengers. Most major carriers only travel from large city to large city. This ensures most of the seats on the airplane are filled. Airlines are businesses and empty seats do not generate income. The major airlines fly all sizes of aircraft, depending on the size of the cities being served. In this section, we will emphasize the larger, long-range aircraft that the major carriers use to serve their larger markets.

Boeing 747-400 *(Boeing Photo)*

Boeing 747

There have been about 1600 of the giant Boeing 747s built in 21 models. The 747-400 has been produced in the greatest numbers. The Model 400 has a range of 8,200 miles. It was followed by the 747-8 with a fuselage stretch of 18.3 ft over the 747-400, bringing the total length to 250 ft 2 in. The maximum take-off weight is now 975,000 lb. The 747-8 is the heaviest aircraft, commercial or military, manufactured in the U.S. Compared to the 747-400, the changes have been to the wings, which have undergone a complete design overhaul. The wing sweep angle was been kept the same to control costs; however, the wing is thicker and deeper. The new wing features single-slotted outboard flaps and double-slotted inboard flaps. They can carry 500 passengers. The passenger compartment is 185 feet long and 19 feet wide. The 747-8 has a fuel capacity of 60,000 gallons. It would take 50 years to burn the same amount of fuel (or gas) in a car. The 787-8F is augmenting the cargo carrying workforce described below. Production is ending.

McDonnell-Douglas (Now Boeing) DC-10/MD-11

The second jumbo jet to enter service was the McDonnell-Douglas DC-10. By the beginning of 1987, 357 DC-10s in 3 models were flying with the world's air carriers. The DC-10-10 is the standard version and the DC-10-30 and DC-10-40 are the extended-range intercontinental versions. There were also two convertible passenger/cargo models designated the DC-10-10CF and the DC-10-30CF.

The DC-10 is smaller than the 747. It is about 44 feet shorter (181 feet), has a 30-foot-shorter wingspan (165 feet) and weighs about 250,000 pounds less.

The DC-10 carried between 255 and 380 passengers, depending on the design. The maximum operating range was from 3,600 miles in the Model 10 to 6,100 miles in the Models 30 and 40. All DC-10s have been retired.

The MD-11

In November of 1982,a new designation system for McDonnell Douglas commercial aircraft combined the "M" of McDonnell and the "D" of Douglas. First aircraft to use the designation was the DC-9 Super 80, which became the MD-80. The MD-11 followed the DC-10.

The MD-11, the world's only modern large, wide-cabin trijet, offers a highly sophisticated flight deck system controls that substantially reduces pilot workload. Advances in aerodynamics, propulsion, aircraft systems, cockpit avionics and interior design contributed to the performance and operating economy of all MD-11 models. The MD-11 is 18.6 feet longer than the DC-10 trijet and carries about 50 more passengers. It was first delivered in 1991. There are about 100 still flying in the cargo configuration; none are flying in the original passenger configuration.

Lockheed L-1011 Tristar

Lockheed entered the commercial jet transport field with the introduction of the L-1011 jumbo jet in 1972. This was the first commercial airliner that Lockheed had produced since the Electra.

The L-1011 is very similar to the DC-10 both in external appearance and performance, and was produced in three models. Three British-built Rolls-Royce turbofan engines power all L-1011s. The 747s and DC-10s are powered by US-manufactured Pratt and Whitney and General Electric turbofans. Rolls-Royce engines are available on special order.

Both the DC-10 and the L-1011 were originally designed to be profitable on high-density short-to-medium-length routes. They were built to meet the airlines' needs to carry larger passenger loads than the current medium-range jets and still be able to operate from comparatively short runways. After they were introduced into service, the DC-10 and the L-1011 became so popular that the airlines wanted to use the same type of aircraft on longer routes. This led to building longer-range models. The outward appearance of the longer-range models is the same as the shorter-range ones. The long-range models have larger fuel tanks in the wings and, sometimes, higher thrust engines. The long-range version often has a shortened fuselage. This reduces the number of passengers the aircraft can carry. It also allows the weight of the fuel the aircraft carries to be increased by the amount the passenger weight is reduced. As an example of this, the original model of the L-1011 has a maximum range of 3,600 miles, while the long-range version has a maximum range of 6,100 miles. Production of the L-1011 stopped in 1984 with 250 built. Only 3 Tristars remain operational, all with Orbital Sciences.

Airbus

The Airbus A300 series includes the A310, A320, A330, A340. The largest is the Airbus A380, with a double-decker fuselage that is larger than a Boeing 747. An entry into the wide-body jumbo jet field was the A300B. An international corporation (Airbus Industrie) made up of industries from England, France, Germany, the Netherlands and Spain builds this aircraft. The French are manufacturing the nose section, lower center fuselage and engine pylons. Germany is responsible for the forward fuselage, the upper center fuselage, the rear fuselage and the vertical tail. England is building the wings; the Netherlands builds the wing control surfaces; and Spain builds the horizontal tail surfaces, fuselage main doors and landing-gear doors.

The engines are American-made, but are assembled in France and Germany. All of the parts are shipped to France for final assembly.

The A300B is smaller than the DC-10 or the L-1011. It is about 11 feet shorter, weighs about 100,000 pounds less, and carries between 220 and 320 passengers. Two General Electric turbofan engines mounted under the wings power the A300.

Airbus has two long-range aircraft—the A330 and the A340. The A330 is a twin-engine, medium-range aircraft, and the A340 is a four-engine (the first four-engine aircraft ever for Airbus), long-range aircraft. The A340 is not as large as the Boeing 747. Additions have included the A350 and A380.

Boeing 767

The Boeing 767-200

In 1982, the first of the new Boeing 767s went into service with the major carriers. United Airlines was the first to fly the 767 and Delta was second. This aircraft uses the latest technology in design, new engines and computerized flight controls. Not only does this provide better fuel efficiency, and thus better profits for the airlines, it also provides for the ultimate in comfort, convenience and safety for the passengers.

The 767 is a twin-engine, wide-body jetliner, but it is not as wide as the 747. The 767 fuselage is 15 feet wide compared with 20 feet for the 747. The tourist-class cabin features seven-abreast seating with two aisles. The 767 typically carries all passengers (18 first-class, 193 tourist) in mixed-class seating or 230 in all-tourist configuration. The size of the 767 can best be demonstrated by comparing it with the 747. The 767 is 70 feet shorter (159 feet vs. 231 feet) and has a wingspan that is 39 feet shorter (156 feet vs. 195 feet). Also, the 747 maximum takeoff weight is more than twice that of the 767 (710,000 pounds vs. 300,000 pounds).

The basic version of the 767 can serve such medium-length routes as San Francisco to Chicago, Los Angeles to Miami, or London to Cairo. The advanced transcontinental version (767-300) can operate nonstop between New York and Los Angeles.

Boeing 777

Boeing 777

The 777 family is designed to fill the size gap between the 767 and 747. The market-driven 777-200 twinjet seats from 305 to 328 passengers in a typical three-class configuration. The initial 777-200, which was first delivered in May 1995, has a range of up to 5,925 miles.

The 777-200ER (extended range) was first delivered in February 1997. This model is capable of flying the same number of passengers up to 8,861 miles.

The latest derivative is the 777-300, a stretched version that provides seating for 328 to 394 passengers in a typical three-class configuration. The first airplane was delivered in 1998.

Boeing is studying new versions of the 777-200 that could fly nearly 10,000 miles, as well as a longer-range version of the 777-300. In addition, Boeing has built the Boeing 787 Dreamliner to compete with the Airbus A380.

Boeing 727

The three engines mounted on the rear of the aircraft and the T-tail are the unique features of the 727. The first model (727-100) can carry up to 131 passengers and has a range of about 2,500 miles. The later "stretched" 727-200 can handle up to 189 passengers and has a range of up to 2,900 miles. The last 727 commercial flight was flown in 2019.

Boeing 737

Boeing 737

The 737 is a twin-engine, short-range jet transport which entered airline service in April 1967. Still in production, the 737 has surpassed the 727 in terms of the number built. Depending on the model, the 737 can carry from 110 to 190 passengers. The 737 is attractive to the airlines because its fuselage is the same diameter as the 727. This offers better passenger comfort. This feature is also attractive because many parts are interchangeable between the 727 and 737. The advanced 737s can also operate from runways as short as 4,000 feet, and some can even operate from unpaved runways. This provides many small communities with jet service where it was previously unavailable.

Boeing 757

Another new, advanced-technology jet for the 1990s is the short-to-medium-range Boeing 757. This aircraft is being manufactured as a replacement for the older 727s and DC-9s, which are aging.

The 757 is a twin-engine airliner with the same fuselage diameter as the 727. With six-abreast seating, the 757 can carry 178 passengers in mixed first-class/economy seating or up to 220 in all-tourist configuration.

The 757 has an overall length of 155 feet 3 inches. Its wing makes use of the same advanced technology used in the 767 and spans 124 feet 6 inches. The advanced flight deck employs the same technological concepts as the 767 Boeing jetliner.

As a replacement for the DC-9 and 727 aircraft, the 757 is attractive to the largest airline market in the world—the short-haul market. Currently, 70 percent of all jet passengers in the world fly on trips of less than 2 hours duration. On these short-duration flights, turnaround time becomes very important. The 757 is precisely suited for these routes. It offers the same number of seats as the larger trijets, with

65 percent more flights per day. Compared to current larger trijets, it will cut airplane-mile costs by 40 percent. This cost-cutting combination makes it the world's most economical short-to-medium range jet transports.

Because it consumes less fuel per seat, the 757 saves money and/or provides additional revenue on fixed fuel allocations. For example, 10 of the 757s replacing equal numbers of 727-100s can save about $15 million a year (based on fuel costs at 60 cents a gallon). If fuel costs are $1 per gallon, about $25 million can be saved. The 10-airplane 757 fleet can provide 70 percent more seat-miles or $60 million in additional revenue given an equal amount of fuel.

Savings with the 757 are not limited only to fuel. The 757 is certificated for a two-crew member operation, whereas the 727s they replace are all operated by three crewmembers. This factor can result in a $9 million per year savings for a 10-aircraft fleet. New, lower-maintenance systems can save the same 10-aircraft fleet an additional $2 million per year.

The Boeing 757

McDonnell-Douglas DC-9 / MD80 / MD90 / Boeing 717

Six models of the twin-engine DC-9 were produced. The DC-9 can carry 90 to 172 passengers and has a range of from 1,000 miles to almost 1,500 miles. Their reliability and ease of maintenance made them a favorite with the smaller airlines. The last model of the DC-9 was the DC-9 series 80; this became the MD-80. Folowing that was the MD-90 series.

This aircraft entered airline service in October 1980 as the first of the new, high technology jet airliners. The DC-9 Series 80 is 147 feet long, has a wingspan of 107 feet and can carry up to 172 passengers. Less than 30 DC-9s and 182 MD-80 series are in service. Delta has 26 MD-90 series, but plans to phase them out by 2022. When Boeing acquired McDonnell-Douglas, the MD-95 was redesignated the Boeing 717; there are 148 Boeing 717s in service.

Aircraft used by Air Cargo Carriers

It is important to understand that all of our major air carriers also fly a great deal of air freight in addition to their passengers, and they also have airplanes that are designed to carry only cargo. The important difference is that before the Airline Deregulation Act of 1978, the all-cargo carriers were

prohibited from carrying passengers, and they still carry very few.

The all-cargo carriers fly a wide variety of cargoes— from livestock and machinery to fresh flowers and fruit. Their major market is a medium or long route where speed of delivery is of prime importance. They cannot compete with railroads or truck lines on short distances (under 500 miles) or for cargo where speed is not important. If time is not a factor, cargo will usually be shipped by rail or roadway.

The aircraft flown by all-cargo carriers have been modified to carry freight. They resemble jet airliners, but the seats have been removed and special cargo-handling equipment has been added. Although bulk cargo is carried, the carriers are increasingly, turning to containerized cargo. This means that loose cargo is packed into large containers, which are designed to fit the contours of the aircraft. These containers permit easier handling and reduce losses from theft. Some of the all-cargo carriers are flying the civilian version of the C-130 Hercules. They also are still flying some converted piston-engine aircraft such as DC-6s and even some DC-3s. Some all-cargo carriers, like FedEx and United Parcel Service use hub-and-spoke systems to process freight shipments, especially overnight express services.

Boeing 747F

This is the giant of the air freight world. It is capable of carrying a payload of 200,000 pounds (100 tons) a distance of 3,500 miles at 575 mph. The nose section of the 747F is hinged so that it opens upward. This will allow straight-in loading of large cargo. The 747F has made possible the economic air transport of large pieces of cargo which previously had to go by rail. Bulldozers and other road-working equipment have been carried by air, and even small herds of livestock like sheep and cattle have been carried by air. When time is important, many companies now think nothing of shipping large cargo by air. The latest variant is the larger 747-8F. The AN 225 is the largest cargo aircraft by wing span. The A380 is the largest by weight.

Boeing 747F

Aircraft Used by Regional and Commuter Carriers

The final group of air carriers we will discuss are the airlines that serve very small cities or cities with little air traffic. These commuter airlines came into existence in the 1960s. When the major carriers began buying larger jet-powered aircraft, they found they could not economically serve many of the small communities. In some cases, the airports in the small communities could not handle the heavier and faster jet aircraft. The Civil Aeronautics Board allowed the major carriers to leave these small cities to the commuter airlines. This ensures that the smaller communities will continue to have air service, but allows the larger carriers to get out of an unprofitable market.

The Airline Deregulation Act of 1978 was good for the regional-commuter carriers. As the larger airlines dropped their less profitable routes, the regionals moved in to provide service. Many of the commuter carriers that were in existence in 1978 have grown quite rapidly and many others have been formed. A recent occurrence is for the regionals to affiliate with one of the major carriers and serve smaller communities around one of the major carrier's large hubs. The commuter carrier is a regularly scheduled airline and must meet all FAA safety requirements.

The average trip length for commuter airlines is several hundred miles, and the average load is about 20 passengers. This means that the type of aircraft they use is different than other air carrier aircraft. In most cases, commuter aircraft are twin-engine (for safety reasons) aircraft. Many of the very small regional airplanes have reciprocating engines, rather than turboprop or jet engines, because jet fuel is not available at all of the airports they serve. Most of the large regionals fly turboprop aircraft.

As the regional airline market developed, the airlines found that they had to turn to foreign-built aircraft. The US aircraft manufacturers had spent all their time building larger aircraft. In 1986, Boeing Aircraft bought out DeHavilland of Canada and entered the turboprop manufacturing business.

Fairchild Swearingen SA-266 Metroliner

This aircraft was designed as a commuter airliner, and it offers the commuter passenger the same luxury as larger airliners. The Metro II can carry up to 20 passengers or 5,000 pounds of payload. It is pressurized and can cruise at 20,000 feet at 280 mph. The range of the Metro II is more than 500 miles, and it operates off runways as short as 3,000 feet.

Short-takeoff-and-landing (STOL) aircraft are also finding their way into the commuter fleet. Their advantage is that they can operate off very short (less than 2,000 feet) runways and even ones that are not paved.

Short 360 (England)

The Shorts SD-3-30 is a STOL aircraft and carries up to 30 passengers or 5,900 pounds of cargo. The twin-turboprop engines allow it to cruise at 185 mph over a 1,000-mile range. It can takeoff in as little as 1,800 feet.

DeHavilland Twin-Otter

The DHC-6 Twin Otter was designed as a partial replacement for the the earlier single engine DHC-3 Otter. It is common among air charter services.

Beechcraft 99

This is a twin-turboprop airliner, which can carry up to 15 passengers or 5,000 pounds of payload. It can operate off 2,000-foot runways. It cruises at about 250 mph and has a range of 400 to 500 miles. The B-99 is not pressurized so it cannot fly above 12,000 feet.

Boeing / Dehavilland DHC-7 (Dash 7)

One of the larger of the commuter aircraft, the Dash 7 is a four-engine turboprop aircraft that carries 50 passengers. The Dash 7 is a STOL aircraft, which can operate off very short runways. It has a range of up to 1,400 miles at 225 mph. Another attractive feature is the larger size of the passenger cabin. Whereas most commuter aircraft have two-abreast seating in a very small cabin, the Dash 7 has 6 feet 4 inches of stand-up headroom and a cabin width of 8 feet.

British Aerospace Company

British Aerospace of England manufactures three aircraft that are widely used by regional carriers. Two of them—BAE Jetstream 31 and the ATF—are twin-turboprop aircraft, and the third—the BAE 146 —is a four-engine, turbofan-powered aircraft. The Jetstream 31 is the smallest, carries 18 to 19 passengers, and has a range of 700 to 800 miles. The ATF carries 60 to 70 passengers and has a 1,000 mile range. The BAE 146 is manufactured in two series: the 100 carries 82 to 93 passengers and has a range of 1,000 to 2,000 miles, and the 200, which is larger, carries 109 passengers to about 1,500 miles.

Embraer (Brazil)

This South American Company builds two twin-engine turboprop aircraft used extensively by our regional carriers. The EMB 110 Bandeirante carries 21 passengers and has a 1,200-mile range. In 1985, Embraer brought out its larger EMB 120 Brasilia, which carries 30 passengers and has a range of 1,000 to 1,800 miles.

Fokker (Netherlands)

Historically, the Fokker Company is best known for some of the World War I Axis fighter planes. Aviation historians have given the Fokker D-7 the honor of being the best aircraft to have been built in WWI. Manfried von Richthoften, the famous Red Baron, achieved some of his success in a Fokker Dr. 1 triplane.

In today's aviation world, the Fokker Company is dedicated to more peaceful pursuits. They are one of the premier builders of short-range commercial aircraft, most notably the F-27, the F-50 and their newer turbofan aircraft the F-28 and F-100.

The F-100 is the latest entry by Fokker. It carries 100 passengers and has a range of about 1,500 miles.

Hub and Spoke Systems

A Brief Description of Air Passenger Networks

Point to point air passenger networks are characterized by many links between city pairs, typically involving long chains of flight segments, which include several intermediate stops between the terminal cities. These multi-segment flights cover numerous city pairs in the process. In contrast, hub and spoke air passenger systems feature a radial design of the network with a hub, as the focus of numerous spokes to the outlying nodes. A bank of flights consists of the group of aircraft that converge on the hub at a given time. After arrival passengers deplane and proceed to their connecting flights, they continue their journey to their respective destinations. Generally the bank of flights are headed in the same direction.

Evolution of Hub and Spoke Networks

Most airlines started as point to point operations. This type of service was typical of the propeller flights that dominated commercial passenger aviation in the forties and fifties, and such services were remarkably similar to rail passenger services of that time period. Meanwhile, the introduction of long-range jet aircraft sparked the evolution of hub and spoke networks. Chicago/O'Hare International Airport, IL was operating by 1955 and was dramatically expanded by 1962, including a large terminal building with enclosed passenger loading bridges. During the sixties United Airlines was operating a major hub and spoke system out of O'Hare, which featured alternating banks of westbound and eastbound flights. By the early seventies hubs existed in several more cities including Denver, Dallas/Fort Worth, and Atlanta while coastal locations, such as Los Angeles and New York served as international hubs.

Airline deregulation, passed in 1978, fueled the development of numerous hubs. For example, United Airlines was operating hubs at Chicago/O'Hare, Denver, and San Francisco while American boasted hubs in Dallas/Fort Worth and Chicago/O'Hare. Delta Airlines utilized hubs at Atlanta, Detroit, Minneapolis- St. Paul, and Salt Lake City. United began hub operations at Washington/Dulles when European routes were acquired.

Advantages and Disadvantages of Each System

Point to Point: The primary advantage of point to point service is the low travel time between city pairs. These services are less likely to be affected by adverse weather or operational delays. Air traffic control is simpler because banks of flights do not have to be synchronized. Disadvantages include the requirement for robust origin-destination demand. The airlines need to fill airplanes. Seats are a perishable commodity – once the flight departs the empty seats are no longer available and produce no revenue. Maintenance and ground services are spread out among the cities. Point to point services often entail routes through a sequence of cities to increase the catchment area to those of all the involved cities, thus a transcontinental flight could involve two or more intermediate stops. On routes with high demand

or volume, the competition for available passengers forces down revenues while flight segments with lesser demand are often underutilized.

Hub and Spoke: The big advantage of the hub and spoke system is greater flexibility and economies of scale. A well-run system will minimize the number of aircraft and route segments required to serve the cities in the network. Shorter routes can be operated at higher frequencies by using smaller aircraft. Maintenance and other ground services can be consolidated. Synchronized arrivals and departures can allow passengers a much wider selection of destinations and flight time. Another major advantage is that smaller cities can be served. Hubs, however, also have significant disadvantages. Operational disruptions, particularly due to adverse weather, can cause a ripple effect through the entire system as aircraft and crews are displaced. Air traffic control is more difficult as flights tend to arrive and depart at nearly the same times. A large investment in gate positions, airport infrastructure, and ground crews is required.

Key Terms and Concepts

- air carriers
- Civil Aeronautics Board (CAB)
- Airline Deregulation Act of 1978
- modern airliner
- all-cargo carrier
- regional commuter carrier
- hub and spoke systems
- point to point systems

? Test Your Knowledge ?

SELECT THE CORRECT ANSWER

1. *The **(747/A380)** is the largest commercial airliner ever built.*
2. *The **(DC-10/A300/727)** is built by Airbus.*
3. *The **(DC-9/727/737)** was the most successful airliner ever built in terms of numbers.*
4. **(Seventy/ninety)** *percent of jet passengers fly on trips less than (2) hours in duration.*

MATCHING

5. ***Match the terms:***

a. modern airliner
b. all-cargo carrier
c. regional-commuter carrier

(1) smaller airlines that carry passengers in a limited geographical region
(2) largest carriers in number of passengers carried
(3) handle mainly freight, but now are allowed to carry passengers

FILL IN THE BLANKS

6. *All-cargo carriers are not competitive with railroads and truck lines for _____ _____ or where _____ is not important.*

7. *The big three U.S. manufacturers of passenger airliners are _____, _____ and _____.*

8. *Prior to 1978, the Civil Aeronautics Board (CAB) very strictly regulated _____ and _____ of the air carriers.*
9. *The average trip for _____ airlines is several hundred miles with an average load of _____ passengers.*

TRUE OR FALSE

10. *The Airline Deregulation Act of 1978 had more of an effect on air carriers since they were founded than any other piece of federal legislation.*
11. *Flying older aircraft and having non-union employees helped new airlines keep prices low to attract passengers away from the established airlines.*
12. *All major US aircraft manufacturers have multiple airplanes to serve the needs of regional airlines.*
13. *Since they are smaller, commuter carriers are not subject to the FAA safety requirements.*
14. *Most air cargo carriers fly freight versions of passenger airliners like the DC-10 or 747.*

SHORT ANSWER

15. *What do all air carriers have in common?*
16. *What was accomplished by the Airline Deregulation Act of 1978?*
17. *Why did the Airline Deregulation Act of 1978 affect the older airlines more significantly?*
18. *What is the name of the European aircraft consortium?*
19. *What are the advantages of containerized cargo for the all-cargo carriers?*
20. *Compare some of the advantages and disadvantages of point to point systems with those of hub and spoke systems.*