

DEVELOPMENT OF THE AIR TRANSPORT INDUSTRY

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Abstract

The presentation will focus on the major developments in the U.S. scheduled air transport industry both domestic and international, together with a brief history of the European air transport system. The role and formulation of the U.S. Civil Aeronautics Board, International Civil Aviation Organization, and International Air Transport Association will also be covered.

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The early development of the commercial air transport industry was made possible through government financial support, although this support varied in nature and degree from country to country. In Europe most of the research and development in early aviation was undertaken in one way or another for defense purposes. In the United States, since the transportation of mail had always been the function of the government, public funds were justified to develop the system. Even the "bush-pilots" in Canada were somewhat dependent on government support. In general, this financial aid consisted of air mail payments, grants for offering service on certain routes, outright monetary gifts, aircraft development costs, extremely low interest loans to purchase aircraft and special depreciation allowances. It was assumed that these supports would be temporary and that eventually the industry would become self-supporting.

Prior to the first World War, the United States lagged behind Europe in the development of aircraft, with France considered the pioneer in design and production of early heavier-than-air aircraft. According to one source <sup>1</sup>, at the beginning of the first World War, France had 1400 airplanes, Germany 1000, Russia 800, Great Britain 400, and the United States 23. One explanation for this is the amount of military aviation budget for each of these countries. For example, by 1913 the military aviation budget in France had reached almost 7.5 million dollars, while the figure for the

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1. CAB Publication - Reference 1. Page 204

United States was closer to \$125,000.<sup>2</sup>

Although the history of the commercial air transport industry can be traced back to 1905; apart from some of the experimental flights and routes, regularly scheduled air services were not offered until 1918 in the U.S. and 1919 in Europe. In general, the development of the industry focused on the transportation of mail in the United States and passengers in Europe. The U.S. mail service was inaugurated on May 15, 1918 on the New York-Washington route using army equipment and personnel and five months later the air transport part of the service was taken over by the Post Office Department. The fleet consisted mostly of war-surplus aircraft with some new aircraft specially built for the Post Office Department. By December the service was offered in the New York - Chicago market and within two years transcontinental air mail service was in operation between New York and San Francisco with the airplane flying during the day only. In Europe, after the war, England, France and Germany, all within a few months of each other, started scheduled air services. In Germany Deutsche Luft Reederei began operating a passenger service<sup>3</sup> in February 1919 between Berlin and Weimar via Leipzig; in France Farman Airlines started scheduled operations on the Paris-London and Paris-Brussels routes; and in England, Aircraft Transport and

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2. Miller and Sawers - Reference 2. Page 9.

3. Davies - Reference 3. Pages 11-20.

Travel offered scheduled service in August on the London-Paris route.

The fleets of these early airlines consisted mostly of single and twin-engined bombers which were modified to carry passengers. The British and the French used the early biplanes with capacity ranging from four to twelve seats, while the Germans used the Junker monoplanes. These aircraft had very limited payload capacity, cruising speed and range. By the mid-twenties these early carriers had upgraded the fleets to tri-motors and development was underway for radial air cooled engines which were more powerful and more efficient.

Since the transportation by air crossed national frontiers, a need arose for establishing some principles of international law regarding aerial navigation and a state's sovereignty over its airspace. The Aeronautical Commission of the Peace Conference held in Paris in 1919, established the basic rule of international law regarding commercial aviation. This law stated that every nation has complete and exclusive sovereignty over the airspace above its territory. Although, the United States did not ratify this convention, the Pan American convention signed in Havana in 1928 agreed to most of the principles of the Paris convention. Also in 1919, six European nations, Denmark, England, Germany, Holland, Norway and Sweden, jointly created an organization called the International Air Traffic Association, the predecessor of the present International Air Transport Association. The initial functions of the organization were to clarify international

aviation law and to standardize aviation technology. The main aim of the member airlines was to standardize the conditions and facilities of air travel between their countries.

The mid-1920's represented a period of consolidation in Europe. In many cases the government made consolidation and sometimes partial state ownership a necessary condition for subsidy. For example, Imperial Airways was incorporated in England by merging four separate companies. The Civil Air Transport Subsidies Committee (Hambling Committee) organized in 1923 recommended that the existing four carriers should be merged into one Imperial Airways, partially government owned, which received a total subsidy of one million pounds, spread in decreasing amounts over a ten year period.

Expansion to other countries and continents was largely a result of the European countries expanding operations within their colonial empires. The Belgians, for example, set up services in the Congo in 1920. Since the Treaty of Versailles restricted the Germans from manufacturing aircraft and operating any German international airline, they followed a strategy of setting up local operations in various countries around the world, beginning with South America. The objective was to initially develop local airlines in as many countries as possible and eventually to connect them with a trunk service operating from Germany. Using this strategy, Germany set up local lines in South America,

Eastern and Central Europe, and eventually Persia and China.

Other countries to realize the potential of air transportation were often the ones with poor communication due to natural barriers such as forests, rivers, and mountains, creating a situation for the establishment of air services. For the most part, though, these countries had no aviation industry and exploited some tie with those nations who did in order to obtain aircraft for their air services. In Australia, mail service was started in 1919 on the west coast between Perth and Derby by West Australian Airways. The following year Qantas started the mail service in the east. By the early twenties, similar service was started in Canada, Japan, Latin America, Middle East and South Africa.

In the U.S., while business was not too successful over short distances, great opportunities existed for long-haul transportation of the mail. This was well demonstrated by the time savings produced in an experimental flight from San Francisco to New York taking about 34 hours. By 1924 the transcontinental flight time had further been reduced when the operation had been extended to include night service. The introduction of more reliable and durable engines, radio communication and navigational aids significantly improved the reliability of airline operations. Although there had been a number of early attempts at regular air passenger service in the United States, it was not until 1925 that service

was offered on a year-around basis on the Los Angeles-San Diego route. The 120 mile trip took an hour and a half and cost \$17.50 one-way or \$26.50 round trip. From here on, the passenger traffic began to grow rapidly and by 1930, the passenger traffic in the United States was about equal to the rest of the world taken together. In Europe, Deutsche Lufthansa was the leading airline in 1930 having carried well over 100,000 passengers. In France in the same year, four airlines put together had carried less than fifty percent of the passenger traffic carried by the German carrier.

The significant passenger traffic growth resulted in the development of larger capacity aircraft. For a long time, however, aircraft speed remained around 100 miles per hour. Although, up until the late twenties, Europe had maintained the lead in aircraft development, the United States took over this leadership in a relatively short period. While the total number of aircraft produced in the United States in the year 1924 amounted to approximately 60, the number increased to about 5,500 during 1929. The U.S. leadership in aircraft development began with the Ford Tri-motor of 1926, continued with the Boeing 247 and received world acknowledgement in 1935 with the DC-3. The DC-3 had a capacity of 21 passengers and a speed of almost two hundred miles per hour. This aircraft revolutionized the air transport industry. Due to its much lower direct operating costs, the carriers were

able to lower the fares and increase traffic. Miller and Sawers show that by the end of 1941, almost 800 DC-3's were delivered and over half of these were delivered to the airlines.

The Post Office Department in the U.S. operated the mail flights until 1927 in spite of the fact that protests were heard from the railroads in the early twenties regarding governmental competition in the transportation of mail. As a result of these protests the Air Mail Act of 1925 (Kelly Act) was passed to encourage commercial aviation and to transfer the air mail transportation operation to private carriers on the basis of competitive bids. Initially the contracts were awarded for four-year periods. Under competitive bidding the most significant contracts were awarded to Boeing Air Transport for the San Francisco-Chicago route and to National Air Transport for the New York-Chicago route. The transcontinental route was linked by about a dozen feeder routes such that almost every major city in the United States was linked on the air mail system.

The problem in the United States during this time period was that the mail revenues were too low to justify capital expense for better equipment. Poor equipment, on the other hand, resulted in poor service which in turn led to even lower revenues. Part of the unwillingness of the carriers to invest in new equipment resulted from the fear of losing mail contracts and the lack of adequate passenger traffic. The carriers needed some government

backing and the public needed assurance that air transportation was safe, fast and within their means.

There were four major factors which encouraged the development of the U.S. air transport industry at this very critical time. First, the Air Commerce Act of 1926 initiated the development by the federal government of civil airways, navigational aids, and provided for the regulation of safety. This Act, therefore, relieved the private carriers from heavy investments in ground facilities for air navigation. Second, Charles Lindbergh's transatlantic flight proved to be very timely in stimulating the early development of the air passenger market. Third, the Daniel Guggenheim Fund enabled an experiment to operate a "model airline" to encourage the development of passenger traffic, which was sometimes considered as a financial liability. Fourth, the Kelly Act was amended to include provisions whereby the original four year mail contracts could be extended to ten years, thereby promoting increased investment in the industry.

During this time period, most of the airlines in the world were still dependent on government subsidies. Again according to the research of Miller and Sawers, the French airlines received the highest amount of government financial support. In 1928 only ten percent or so of the airline revenues came from commercial operations. In Germany Lufthansa's commercial operations

accounted for roughly 30 percent of the total income. The data on the exact amount of subsidy by country are not readily available. Estimates are available, however, for the development costs of the air mail transportation system in the United States. According to Warner's <sup>4</sup> research, the United States government paid roughly ten million dollars for developing the early transport system. This estimate is based on a total government expenditure of roughly \$17.5 million for the nine year period from 1918 to 1927, while Warner estimated the income for this period to be roughly \$7.5 million based on the real value of inventory and capital items in hand and the receipts for postage during the nine year period.

In the summer of 1927, Juan Trippe, who was connected with Colonial Airways at the time, learned that the Post Office Department was considering an air mail contract between Key West, Florida and Havana, Cuba. There were two carriers in operation in Florida, Pan American and Florida Airways and neither of these two companies had the necessary financial backing or the equipment to negotiate the contract for the transportation of mail between Cuba and the United States. Although Pan American had acquired a contract from the Cuban government to fly the mail between the U.S. and Cuba, the company did not, however, possess the landing rights.

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4. Warner - Reference 4. Page 29

Trippe flew over to Havana and negotiated an exclusive flying permit between the U.S. and Cuba, ensuring that only Pan Am could operate on this route.

In 1928, the Foreign Air Mail Act was passed authorizing the Postmaster General to award contracts for the transportation of mail by air to foreign countries and territorial possessions of the United States. The carrier selected to offer foreign air mail services was Pan American. Since Pan American had already acquired the necessary landing privileges in other Latin American countries, virtually all of the foreign air mail contracts were awarded to the company at the highest rate permissible under the Act.

Initially the U.S. government did not negotiate the development of the international routes with these Latin American nations. Pan American on its own initiative went ahead and made private agreements with these foreign nations for landing rights in their country and since Pan American was not in a position to offer exchange landing rights, the agreements were made without reciprocal landing rights in the United States. With mail payments authorized by the Foreign Air Mail Act of 1928, and with exclusive landing rights, Pan American showed rapid development.

Although passenger travel was growing fairly rapidly by the end of the twenties, prior to 1929, there was no uniform law regarding the rights of the passengers, ownership of freight, or liability of the carriers. In 1929, an International Diplomatic Conference on Private Air Law was held in Warsaw, Poland

to establish the law regarding the liability of the airlines in international air transportation, towards their passengers and cargo in the event of an accident. The result of this was the Warsaw Convention, which initially limited the carriers' liability to \$8,300 for each passenger. The limit on the liability was doubled by the Hague Protocol of 1955 and further increased to \$75,000 by the Montreal Agreement of 1966.

In the United States, the Air Mail Act of 1925 was once again amended in 1930 (now called the McNary-Watres, or Watres Act). This Act authorized the exchange of air mail contracts for air mail route certificates with further authority to extend or consolidate routes. Furthermore, the Act authorized payment for the transportation of mail based on space available and distance flown rather than the mail load carried.

It has been said that the Postmaster General, Walter Brown was the chief planner of the Watres Act. He wanted to restructure the industry from a random assortment of short unconnected mail routes to a stable integrated nationwide airline system. He intended to expand passenger services and establish a self-sufficient air transport industry. His plan was to set up three major transcontinental routes coordinated and integrated with several feeder routes. Brown felt that the smaller companies were under capitalized and nearly all of them completely dependent upon the government contracts for their survival. He was con-

vinced that the solution was to eliminate competitive bidding and to use the mail pay to support the carriers whom he considered strong enough to contribute to the development of commercial aviation.

He was able to achieve this by first awarding mail contracts to the lowest bidder who showed a daily operation for a period of at least six months over a route of 250 miles in length and, secondly, through extension or consolidation of routes which in his opinion were in the public interest. The provision providing the substitution of mail contracts for ten-year route certificates had already been in existence. The extension and consolidation provision allowed the establishment of major transcontinental routes. Finally, the form of payment represented an indirect subsidy which enabled the carriers to purchase and operate larger aircraft and develop the passenger market. Mail contracts were not necessarily awarded to the lowest bidder because there was no guarantee that the lowest bidder would be able to survive the cut-throat competition. However, cases when a contract was given to a larger carrier over a smaller carrier the larger carrier was obliged to buy out the smaller carrier at a "fair" price.

Somewhat similar developments were taking place in Europe. For example, the Empire Air Mail Scheme which included provisions that all mail dispatched to or from those parts of the British Commonwealth served by Imperial Airways would automatically be

carried by air. This scheme enabled Imperial to intensify the services and capacity it offered in the knowledge that much of its payload was guaranteed. On this basis, Imperial Airways introduced faster aircraft with more frequent service. This program provided the carrier with substantial subsidy for development in addition to reimbursement for the costs of transporting mail.

During early 1933, charges were made against Brown for collusion, illegal administration and unfair mail awards. A special investigating committee was set and hearings began in September 1933. Although during the investigation it became clear, among other things, that almost all of the mail contracts were awarded to three carriers, some writers claim that the investigation did not probe deeply into the causes of Brown's actions or the sincerity of his national plan. The result of the investigation was that the President cancelled all mail contracts held between the Post Office Department and the private carriers. The Army Air Corps was asked to fly the mail. Severe weather and flying over unknown routes caused some fatal accidents with about a dozen deaths in the first few weeks. As a result of this the transportation of the mail was curtailed and finally came to a standstill in June, 1934.

The Air Mail Act of 1934 set up a threefold control of the air transport industry in the United States. The air mail contracts

were to be awarded by the Post Office Department. The Interstate Commerce Commission was put in charge of setting "fair and reasonable" rates for the transportation of air mail and the Bureau of Air Commerce in the Department of Commerce was made responsible for the regulation of safety. Under this Act, mail contracts were to be awarded on the basis of competitive bidding. Furthermore, the carriers involved in the previous "collusion" charges could not be awarded the contracts, a stipulation which caused the carriers to change their corporate names. In addition, the Act made holding companies illegal and, therefore, separated the historical affiliation between the major airlines and the aircraft manufacturers. Finally, the Act also established a five-man Federal Aviation Commission to study and recommend future aviation policy for the Federal Government. The most important recommendation of this commission was that a single independent agency should be created to regulate civil aviation.

Meanwhile, on the international scene, the determination of landing rights at foreign ports was still the responsibility of the carrier, and Trippe with his position secure in Cuba, had been negotiating exclusive landing rights from the governments of the other Latin-American nations. A decision was made to offer flying boat services based out of Miami and this became the gate-

way to the Caribbean and Latin America. The use of flying boats had two definite advantages: First, whereas airports were scarce, sheltered bodies of water were plentiful; and second, the flying boats seemed to provide a measure of safety in case of a forced landing at sea.

Pan American expanded very aggressively through outright purchase of local airlines or companies if it proved necessary commercially and/or legally. For instance, having won rights to the Caribbean, Pan American proceeded to expand service to the west coast of South America and to Argentina. This was achieved through the formation of Pan American-Grace Airways, Inc., (Panagra) of which Pan American held 50 percent of the stock and W. R. Grace, the steamship company held the other 50 percent of the stock. The firm W. R. Grace and Company ran ships, banks, warehouses, stores, and dominated almost the entire economy on the west coast of South America. From the political and economic points of view, this proved to be a great asset for Pan Am's expansion. There were certain other advantages to the formation of Panagra, for example, the Grace Line steamers provided the radio weather service needed for air transportation. Similar acquisitions of airlines gave Pan American a dominance in Latin America.

Negotiations for the North Atlantic route had begun as early as 1929 resulting in preliminary agreements to offer service twice

a week between the United States and England. However, the British insisted that Pan American could not offer the service until such time when a British carrier could also offer similar service. Since the British did not possess an appropriate commercial aircraft capable of flying the North Atlantic, service was delayed. In the meantime, Trippe involved himself with establishing service on the Pacific. Survey flights were made as early as 1931. While the northern Great Circle route (Seattle-Alaska-Siberia-Japan) required landing permission from Russia and Japan, the central-Pacific route contained fueling points which were American possessions. The mid-Pacific route linked San Francisco and Manila via Hawaii, Midway, Wake and Guam. In October 1935, Pan American received the trans-Pacific mail contract for service from San Francisco to Manila (Philippines). The service was extended to passengers in 1936 and in 1937 the route was expanded to Hong Kong. By 1940, Pan Am had also expanded its trans-Pacific route from Hawaii to New Zealand and Australia.

On the U.S. domestic scene, the air transport industry was passing through a state of ruinous competition. Some carriers were submitting ridiculously low bids to obtain the air mail contracts and routes. Many of the smaller carriers could not bid against the giants, and public investment was beginning to shrink. Legislation was needed to financially stabilize the industry by providing control of competition, assurance of the operation of the carrier, and an end to the confusion of responsibility

through the establishment of a single regulatory agency.

The Civil Aeronautics Act of 1938 placed the development, regulation and control of air carriers under the jurisdiction of a single independent administrative body later known as the Civil Aeronautics Board. This Act broadened the scope of safety regulation and subjected the airlines to economic regulation. The regulation of the industry was performed with "public interest" and "public convenience and necessity" as main considerations. The major functions of the CAB were to approve passenger fares, freight and mail rates, certificate carriers, monitor competition, and approve mergers and subsidies.

Under the "grandfather" clause of the Civil Aeronautics Act of 1938, 16 remaining airlines were given permanent certificates of convenience and necessity for routes which each of them possessed at the date of adaptation of the Act. The Board also certificated the Railway Express Agency as an indirect air carrier with exemptions from the economic provisions of the Civil Aeronautics Act. The nonscheduled carriers were not required to have certificates of public convenience and necessity and were also exempt from economic regulation by the Board.

Pan American introduced the first regular scheduled mail service on the Atlantic in May 1939, between New York, Lisbon and Marseilles. One month later a similar mail service was offered to England via Newfoundland and Ireland and in July of 1939 passenger service was opened to both countries. The transatlantic crossing took approximately 29 hours using the Boeing 314 flying

boat. The British began a similar service in August. Initially, the passenger fare was set at \$375 one way or \$675 round trip.

By 1940, the U.S. government's policy towards exchanging landing rights had changed. The landing privileges on international airports were to be negotiated by the Department of State and subject to presidential approval. The CAB was to decide as to which United States carrier should be authorized to operate the negotiated routes. This, in essence, put an end to Pan American's monopoly on negotiating and operating exclusive landing rights.

With the beginning of World War II, Pan American's projected expansion came to a halt. The U.S. government took over the trans-atlantic operations with Pan American and American Export Airlines being the sole operators. Regular schedules were maintained on the Atlantic and the Pacific. Furthermore, a lot of the aircraft belonging to the U.S. domestic airlines were either purchased or leased by the government. With very few aircraft left in their hands, the carriers were forced into more efficient operations and greater utilization from their fleet on restricted routes which received service. Most of the airlines began to show profit during the war years due, basically, to high load factors, high utilization of equipment and elimination of discount fares such as for round trips and those offered to credit card holders.

During the War normal airline operations were curtailed throughout Europe due to shortage of equipment or enemy action.

Passenger traffic dropped to about a third of the level achieved in 1939. Britain's air transport industry felt a very severe impact. The routes of BOAC had to be restructured completely: the Empire Route had to by-pass Europe and the North Atlantic service was discontinued while the carrier concentrated in keeping open critical lines of communication. The airlines of Allied countries were cooperative in transporting government officials, military personnel and supplies. In Germany Lufthansa's commercial operations were ended abruptly.

The War was responsible for the rapid technical and operational development of transport aircraft. Many refinements were introduced to the aircraft which were in existence prior to the War. Aircraft introduced during the War period such as the DC-4 and the Lockheed Constellation possess higher payload capacity, range and speed. Other areas where refinements were introduced rapidly included radio communication, navigational aids, instrument flying and airport facilities.

Towards the end of the war, many nations were interested in formulating a universal international air transport policy with regard to commercial air rights and in establishing rules governing technical and navigational aspects. In 1944, at the invitation of the United States, 54 nations sent their representatives to the Chicago Conference to formulate universal international air transport policy for international travel and commerce. Due to

the conflicting interests of the various nations present at the conference, an agreement was not reached to provide a means for exchanging commercial rights to fly in and out of independent nations. Basically, there were two conflicting views-- one of relatively complete competitive freedom desired by the U.S. having the aircraft, experience, and finances to dominate such a state of affairs; and the other of rather heavily regulated operations supported by most other nations in their poor economic state following the War and fearing just such a U.S. dominance from which they might never escape.<sup>5</sup> The British wanted to set up an international agency to control capacity, frequency and fares. The routes were to be assigned through bilateral agreements. The Americans, on the other hand, agreed that the routes should be negotiated through bilateral agreements, but the international agency should perform a consultative function only with respect to economic regulation. Instead they suggested, the agency should be restricted to control the technical side of the air transportation.

The outcome of the Conference was an establishment of the International Air Services Transit Agreement and the Provisional International Civil Aviation Organization (PICA0). The former agreement allowed civil aircraft of the signatories to (a) fly across another nation's territory (if the nation was a participant to the agreement) without landing and (b) land for non-commercial purposes. The function of PICA0 was to coordinate the activities of the nations signing any agreement made at the Chicago Conference.

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5. See Robert Thornton - Reference 5

This organization was also to act as an arbitrator in case of conflicts between the various member states. PICAQ, however, did not possess any economic powers to be applied to the international air transport industry.

In 1945, the International Air Transport Association (IATA) was formally established at Havana, Cuba. This organization superseded the original one formed in 1919. Unlike the old organization, the principal function of the new IATA was to control rates on international routes. There are no provisions for controlling capacity or frequency. The extent of capacity was to be negotiated in the bilateral agreements. In addition, some of the functions of the old IATA were still to be performed by the new IATA. The two most important provisions in the functioning of IATA with regard to controlling fares are: (1) a proposed tariff has to be approved unanimously by all the members (2) the approved tariff is still subject to the approval of the aeronautical agency of each of the member nations, which would be affected by the proposed tariff.

Since the Chicago Conference did not result in an agreement to decide on a means of exchanging commercial rights, representatives from Great Britain and the United States met in Bermuda in 1946 to exchange operating rights between the two nations. The Bermuda Agreement resulted in the famous "five freedoms" of the air. The first two freedoms were essentially agreed at the Chicago conference, namely to fly across and to land for non-

commercial purposes in another nation's territory. The remaining freedoms are: to disembark passengers and cargo in a foreign country which originated in the carrier's home country; to pick up passengers and cargo from a foreign country destined for the carrier's home country; to transport passengers and cargo from one foreign country to another foreign country. The freedom classification is based on the origin and destination of the passenger and the nationality of the airline and not the passenger. For instance, a Canadian in London boarding a flight to Rome is a third freedom on a British carrier, fourth freedom on an Italian carrier and fifth freedom on a U.S., Canadian or a French carrier.

Most countries were in favor of the Bermuda type of agreement for exchanging international traffic rights for commercial civil aviation. The terms of the original Bermuda Agreement between the United Kingdom and the United States are fairly liberal. For example, the agreement did not include provisions for restricting frequencies or number of carriers of either country. Since then, however, the policies of countries have changed. For instance, in 1966, a special bilateral agreement was signed between the U.S. and the U.S.S.R. to provide service between New York and Moscow. This agreement is different in format from the usual Bermuda type, since it contains provisions on the number of frequencies that may be operated between the two countries

as well as a designation of the carrier which may operate these flights.

In international operations, a country may sometimes designate two or more national carriers to offer parallel services on a given route. The United States has authorized this type of designation on the North Atlantic. London is served, for example, by National, Pan Am, TWA, and Seaboard, the all-cargo carrier. The decision for multi-designation on an international route involves many factors, such as density of the route, the extent of traffic generated by each country, the market share of the carriers of each country, fifth freedom traffic, national interest, etc. While some of these factors are market related and based on simple economics, others are of a political nature and as such very difficult to evaluate.

After the War, Pan American was a strong promoter of the "chosen instrument" concept. Under this concept, all international services were to be operated by a single carrier. Again the concept involves many factors such as prestige, defense, public interest, competition with subsidized carriers, the value of the market, etc. In the United States, the Civil Aeronautics Board, however, favored competition. As early as 1942, American Export Airlines (a shipping company) was awarded a temporary certificate to offer transatlantic service. The Board justified this by saying that an additional carrier would improve the service and serve as a yardstick for comparison of costs. Soon after the war,

Pan American was given further competition when another U.S. carrier, TWA, and a number of foreign flag carriers were authorized to offer scheduled service on the North Atlantic.

With expansion of routes, excess capacity, and heavy investment committed in larger and faster aircraft, the U.S. domestic air transport industry was facing economic crisis in 1948. The scheduled carriers were facing another problem, that of competition from the nonscheduled carriers which came into existence at the end of the War. These nonscheduled operations were started by ex-military personnel who purchased the war-surplus aircraft. The Board exempted these nonscheduled carriers from the economic regulation to carry passengers and/or property in the case of domestic operations and property only in the case of international operations on selected heavy traffic routes. The Board's exemption was based on the assumption that the service provided by these carriers would supplement the scheduled carriers. In order to improve the economic situation of the industry, the Board authorized high mail rates. This was supplemented by larger passenger traffic growth due to the introduction of lower fares, partly a result of the economics of larger and faster aircraft and partly due to management initiative in introducing differential pricing mechanisms such as coach-type service and family fare plans.

The other line of development in the aviation industry after the War, was the air freight. Although, in the United States the history of air freight dates back to 1930 when many companies made arrangements with the Railway Express Agency to transport packages on regularly scheduled flights, it was not until 1945 that all-freight airlines came into existence. In 1947, the Board permitted ten all-cargo carriers to offer scheduled air freight transportation on a non-certificated basis. By 1949, six of these had declared bankruptcy and the remaining four were issued temporary certificates of public convenience and necessity to perform scheduled service.

There are four other types of U.S. air carriers which need some explanation. First, there were carriers such as Alaska and Hawaiian Airlines which were located in the U.S. overseas territories. Since Hawaii and Alaska did not enter the Union until 1959, and for other reasons of special operating rights with respect to other U.S. airlines, these carriers were not classified under the category of domestic. Even today they are classified as Intra-Alaska or Intra-Hawaii carriers and both carriers possess the Board's permanent route certificates. Secondly, after the War, there was yet another category of carriers called the intra-state carriers. The operations of these carriers were restricted to within state borders and regulated by the state's Public Utilities Commission. These carriers were exempt from the Board's regulations. Third, in 1952, the CAB authorized a group of small

irregular carriers to offer service between communities not served by scheduled airlines to points receiving scheduled airline service. These carriers, called the air-taxi operators or commuter carriers in their scheduled form, offering service with aircraft weighing less than 12,500 pounds were also exempt from the Board's Economic Regulations.

The fourth category of carriers consisted of the helicopter air service operators. The Helicopter Air Service Program started in the United States after the War with subsidies to helicopter carriers in a few major cities for the carriage of mail. Until 1953, the three United States helicopter carriers carried no passengers at all and their sole source of transport revenue was from mail. In the early years the subsidy exceeded overall transport revenues, but as passenger traffic increased, it passed subsidy levels by 1964. The subsidy was completely cut off by the end of 1965 and the major trunk airlines were persuaded to supply financial aid to the helicopter carriers. Since most of the helicopter passengers were airline connecting passengers, the rationale for this action lay in offering better services for the airline passengers with the costs to be borne by the profits of the trunk-line industry.

In Europe, BEA and Sabena made significant inroads in the development of helicopter service. BEA started the scheduled

helicopter passenger service in 1950. Over the years, many routes were tried on an experimental basis and most of these proved to be unprofitable because of excessive costs. Although Sabena was far more successful in its helicopter passenger service, the carrier had to curtail the operations for economy and other non-market reasons. The year 1958 was a boom year when, due largely to the Brussels World Fair, the helicopter services carried over 50,000 passengers and an additional 65,000 sight-<sup>6</sup>seeing passengers over Brussels.

By October of 1951, ten domestic trunk carriers had gone off federal subsidy. For those still receiving subsidy, the CAB announced that a separation should be made between service mail payments and subsidy mail payments. For the Big Four trunks -- American, Eastern, TWA, and United, the Board established a domestic service mail rate of 45 cents per ton-mile. Four years later the Board developed a uniform service mail rate structure called "multi-element rate formula." This was a two part rate structure consisting of a line haul charge per mail ton-mile and a terminal charge per pound of mail enplaned, varied according to the class of station served.

In Europe, after the war, the air transport industry grew very rapidly. Most of the route network consisted of pairs of airlines enjoying third and fourth freedom rights and even today

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6. World Airline Record - Reference 6, page 205.

there are usually only two dominant airlines on any given city-pair. Until about 1950, there was heavy competition between the two carriers. This was considered wasteful rivalry and was gradually eliminated and replaced on many routes by a system of commercial agreements between the airlines, generally known as pool agreements. Pool agreements generally tend to reduce competition and provide the carriers with high equipment and personnel utilization as well as high load factors. Economics can result through more uniform scheduling instead of "bunching" flights at peak demand periods. It is claimed by some that pooling agreements provide the passenger with a more uniform service at a lower price. This is debatable. The terms of the agreement can include sharing of revenue, capacity, costs, and can also include joint marketing studies, promotion and sale, etc. The extent of the agreement varies from carrier to carrier and the agreements are usually tied to the national agreements between the respective countries. According to the Edwards Report <sup>7</sup>, BEA for example, earns roughly 60 percent of its total revenue from commercial agreements. These agreements are not necessarily restricted to intra-European operations. For instance, the "Kangaroo" route which links England with India and Australia is operated through a tripartite agreement between BOAC, Qantas and Air India. The

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7. Edwards Report - Reference 7. Page 95.

distribution of revenue is based on a sophisticated formula which takes into account traffic on the various segments as well as the connecting traffic at various points.

These pool agreements generally apply only to the third and fourth freedom traffic. Within Europe fifth freedom traffic is generally limited. There is yet another type of traffic called cabotage. This refers to the transportation of passengers by a foreign carrier between two cities in the territory of one state or its dependencies. For instance, BOAC carrying passengers originating at New York to Los Angeles would be referred to as cabotage traffic. Another example of this would be for Pan Am to carry traffic originating in London to Bermuda. The German internal service operated by foreign carriers is sometimes confused with cabotage traffic; here however, the peace treaty which followed West Germany regaining its sovereignty prohibited Lufthansa from offering service to West Berlin and this service was offered by Air France, BEA and Pan Am. This is not cabotage traffic. However, there were some other routes within West Germany which were operated by the foreign carriers, which was cabotage and is now practically non-existent.

A large number of the scheduled airlines, with the exception of the United States air carriers, are partially or wholly owned by their governments. The extent of government ownership can range from a small percentage as in the case of Finnair (about 6 percent) to a complete control as in the case of BOAC, Qantas,

Air Canada, Air India, etc. Presently, out of the 107 IATA member carriers, 37 are completely privately-owned and forty are completely state-owned. Table 1 shows the extent of state ownership for the IATA member carriers.

The reasons for public ownership vary from political philosophy to market related factors. In England, for example, one reason for nationalization of the airlines was that these carriers were unable to compete with the subsidized foreign carriers. The size of the carrier is usually not the reason for public ownership; it is also important to keep in mind that private ownership, in the case of an international airline still involves government participation for at least two reasons. First, the carrier can prove to be a very useful element of national defense, and second, the carrier needs the government to negotiate bilateral agreements with other nations for landing rights.

Some analysts have attempted to find the relationship between government ownership and profitability. So far there is no conclusive evidence that government ownership leads to inefficient operations, lower profitability, etc. In fact, several government owned airlines have consistently shown profitable operations. In most cases, complete or partial public ownership also does not imply that these carriers exist solely to provide social services, carry the national flag, receive protection from competition and pay very little attention to the cost of providing the service.

TABLE 1

Extent of State Ownership

IATA Member Carriers

<u>Number of Carriers</u>	<u>Percent State Ownership</u>
37	0
9	1 - 49
13	50 - 89
8	90 - 99
<u>40</u>	100
TOTAL 107	

Source: Interavia November 1971 - Reference 8.

In many cases the nationalized airlines are eventually expected to pay their own way.

Joint ownerships are quite common in the airline industry. For example, in 1946, TWA acquired a 35 percent common stock interest in the Greek Company, Technical and Aeronautical Exploitations, in exchange for financial and technical assistance. In the same year, BEA held 30 percent interest in Alitalia. There are many reasons for holding financial interests in other airlines. These can range from pure commercial investment reasons to obtaining feeder traffic, developing new routes, and establishing an outlet for retired aircraft.

The establishment of airlines in many of the smaller or less developed countries was strongly influenced by non-economic or non-market factors. In many cases, the airlines were supported by the government for reasons such as national prestige and national defense. On the economic grounds, these international services are usually justified for such reasons as earning foreign exchange and developing tourism. In many cases the development of these airlines was enhanced significantly by the foreign aid through agencies such as the United States Export-Import Bank, ICAO, World Bank, A.I.D., etc. The United States, for instance, has provided low interest loans to purchase United States manufactured aircraft. Some of

the European countries have also provided similar sort of aid in the past. Besides financial aid, the airlines of these less developed nations have been given support in areas such as pilot training, technical services, management consultation, etc. The benefits gained by the nations providing aid and the airlines providing support have been mentioned previously.

By the mid-1950's, the airline industry in the United States could be considered as established. In 1955, the CAB granted permanent certificates of public convenience and necessity to the local carriers. Two years later, the CAB was authorized to guarantee loans to assist carriers to purchase flight equipment. The amount of loan was limited to 5 million dollars per carrier and maximum of 90 percent of the loan could be guaranteed. The following year, new legislation was introduced permitting the subsidized air carriers to retain profits from the sale of flight equipment on the conditions that the profits were reinvested in new equipment within a reasonable period of time.

The Federal Aviation Act of 1958 amended and replaced the Civil Aeronautics Act of 1938. The safety rule making function was transferred to the newly created Federal Aviation Agency, while the regulation of civil aircraft accidents still remained the responsibility of the Civil Aeronautics Board. Parallel developments in streamlining the regulatory aspects of air transportation were taking place in many other countries of the

world. For instance, Britain's Civil Aviation (Licensing) Act of 1960 established the Air Transport Licensing Board to approve applications for operating licenses and regulate domestic fares in the United Kingdom.

The type of regulation applied to the airlines in the United States should not be taken as typical. For instance, the Australian civil air transport policy has been quite unique. Presently the Australian airline industry is basically made up of three airlines: Qantas, a public-owned carrier operating international services only, and two competitive domestic airlines, a private corporation called Ansett Airlines and a government-owned carrier called Trans-Australia Airlines. Under the Civil Aviation Agreement of 1957 and the Airlines Equipment Act of 1958, the government not only controls competition, but exercises a tight control on the commercial management decisions. For example, neither TAA or Ansett can purchase a new aircraft without the specific approval of the government, while each carrier is also supposed to inform the other of its decisions to purchase new equipment. The approval is granted if the regulatory authority considers that the new equipment will not result in excess capacity or produce a competitive edge for one of the carriers. In case of excess capacity, the authority can force the carrier(s) to review their fleets.

Although, research and development of the jet engine was well under way during and even prior to World War II, it was not until 1952 that the public was offered commercial jet service by BOAC (which unfortunately had to be withdrawn shortly after for technical reasons.) In 1956 the Russians introduced the TU-104. The year 1958 is, however, referred to as the "jet revolution" year when Pan American introduced the Boeing 707 on the North Atlantic, in October 1958, three weeks after BOAC introduced the second version of their jet, the DeHavilland Comet 4. For almost a full year there were no other competitors on the North Atlantic with jet aircraft until September and November of 1959 when QANTAS and TWA introduced the Boeing 707's. On the domestic side, National Airlines was the first to offer jet service in the United States, on December 1958, the carrier offered jet service on the New York-Miami route with a B-707 leased from Pan American Airways. A month later American put in a 707 on the transcontinental route, TWA entered the market in March, and United introduced the DC-8 in September of 1959 on this route.

Up to this point, the emphasis has been upon scheduled services, domestic and international, however of increasing importance has been the development of mass travel on non-scheduled or charter services due to the lower fares relative to scheduled services.

The scheduled air services have catered to this demand through excursion fares and other forms of differential pricing, however the lower costs obtainable through non-scheduled air travel have resulted in a tremendous growth in this form of air transportation.

The growth of non-scheduled air carriers started after World War II on both sides of the Atlantic, dependent largely upon the carriage of military cargo and troops for their survival. However before long the European carriers began to vigorously promote civilian commercial operations, in particular the inclusive tour charter. In an inclusive tour charter, a travel agent produces a "complete package" containing air travel, hotel accommodations, ground transportation, etc. and by arranging schedules to ensure full plane loads, the operators are able to offer packages at a considerably lower price compared to the price of air travel on scheduled carriers. By opening the air travel market to the lower income groups, the charter operators were able to achieve tremendous growth rates.

Prodded by the tremendous demand and realizing the economic importance of tourism, the European States formulated a Multilateral Agreement on Commercial Rights of Non-Scheduled Air Services in Europe at Paris in 1956. This agreement greatly facilitated the growth of inclusive tour travel between the 19 signatories, while attempting to protect their scheduled services.

The low price of the ITC's allowed the lower income workers in Northern Europe to holiday in the sunny South, with air travel to and from the resorts making such a vacation possible within the short time periods available to them. A number of combining factors meant that the United States was much slower in responding to this development and ITC's were not permitted until the mid-sixties while military charters still represent a significant proportion of the supplemental carriers' revenue.

Similar to the scheduled carriers, the United States charter carriers are owned privately. In Europe, although the charter operators are not owned directly by the state, many of them are owned by the national carrier which in turn is partially or wholly owned by the state. This is a critical issue regarding competition not only between charter operators and scheduled airlines in Europe, but between United States scheduled and European scheduled carriers. In the United States, scheduled airlines have not been allowed to own subsidiaries which offer charter services, although they may do so themselves.

Interesting agreements such as these were not always set up in Europe. A different, but interesting agreement was formed by the major airlines in the United States. In 1959, six U.S. carriers, American, Capitol, Eastern, Pan American, TWA and United entered into an agreement called the Air Carrier Mutual Aid Pact.

This agreement provides for financial assistance in case of a strike. The arrangement calls for payment to the struck carrier of any increased "windfall" revenues which they receive as a result of handling the struck carrier's business less the additional expense of handling such increased traffic. In addition, more recently the CAB has allowed some carriers to cooperatively restrict capacity on certain routes.

In general the United States policy reflected free trade. This has been made fairly clear in the various reports on the U.S. international air transport policy released in 1963 and 1970. The policy was essentially non-protectionist, promoting reasonable rates and equal opportunities for U.S. carriers in route exchanges with foreign nations, and opposing arbitrary capacity restrictions. Other significant recommendations were to retain a balance of U.S. flag competition on the North Atlantic, have more than one U.S. international air carrier and oppose pooling agreements with foreign carriers.

In Europe, cooperative agreements regarding maintenance and spare parts had begun as early as 1958, with the introduction of jet aircraft. Initially SAS and Swissair signed an agreement to coordinate equipment policy and pool resources in terms of operating workshops and technical organizations. By 1969, the agreement had been extended to include two other carriers, KLM, and UTA, to

form the KSSU group. Under the new program, KLM was to provide airframe maintenance for the B-747 and SAS was responsible for the engine maintenance. This type of cooperation provides the carrier with a small fleet with the advantages of a large fleet.

One other form of cooperative agreement which is significant is the concept of "blocked-space" agreement. Under this concept, a developing carrier with insufficient funds to invest in a large fleet and to minimize the financial risk involved in purchasing aircraft, can block space on another line to be sold under its corporate identity. For example, in 1969 Austrian Airlines entered into a pool agreement with Sabena to offer service on the North Atlantic. Under this scheme, Sabena operated a daily B-707 flight from Vienna to New York via Brussels. Austrian Airlines blocked half of the cargo capacity for its use and paid Sabena half the operating costs of the flight, and a fee for each passenger handled. The flag carrier of Portugal, TAP, had negotiated a similar blocked space agreement with Alitalia in 1966 to offer service between Lisbon and New York.

The mid-sixties not only set the pace for jet operations, but also began to focus on the supersonic aircraft. Pan American, BOAC, and Air France placed firm orders for the Concorde supersonic aircraft. Besides these three international air carriers, a U.S. domestic carrier, Continental Air Lines, also placed an order for three Concorde aircraft. In the meantime, two airframe manufacturers and two engine manufacturers undertook the design studies on the U.S. SST

for the Federal Aviation Agency. The major portion of the cost of research and development was to be borne by the United States Federal Government. Boeing and General Electric were selected to design the United States SST. This team won the competition but the project was abandoned in 1971 for political, environmental, and socio-economic reasons.

The mid-sixties once again witnessed a further streamlining of the transportation planning process in the United States. The Department of Transportation was created to provide total transportation planning, policy guidance and protection of public interest with the aim of achieving an integrated national transportation system based on economic criteria and not modal preferences. Prior to this organization, there were numerous uncoordinated modally oriented transportation agencies with virtually non-existent common goals. These agencies were generally unstructured and without sufficient authority to develop a national transportation system effectively. The Department was given the responsibility of coordinating transportation programs, providing transportation leadership, cooperating and coordinating transportation projects with federal, state, and local government agencies, and identifying prodigious transportation problems.

Parallel efforts took place in Canada, where the National Transportation Act of 1967 created the present Canadian Transport Commission to coordinate the development, regulation and control of the total transportation system; and in the United Kingdom where the Civil Aviation Authority (CAA) came into being in April of this year (1972)

with much the same powers but for aviation only. The functions of these Agencies are somewhat similar to those of the United States Department of Transportation as well as the Civil Aeronautics Board.

In this paper most of the attention has been devoted to the development of the air passenger transportation industry. Although the growth of air cargo has been very significant in the past, its contribution to the total revenue of the carriers is still fairly small. On the average, for all scheduled airlines taken together, approximately ten percent of the revenue is derived from air cargo. According to one report<sup>8</sup> less than one half of a percent of the total cargo moves by air. The same report estimates that if the bulk cargo such as oil, coal minerals, etc, is excluded then the share of cargo transported by air increases to almost four percent. In the past a large part of the air cargo has been emergency cargo. The stable cargo has in the past been restricted to goods of high value, fragility and perishability.

The most crucial factor in air cargo is, of course, the cost. It is now a generally accepted fact that roughly half of the cost of handling cargo is on the ground: loading, unloading, storing, documentation, etc. Recently, effort has been focused on reducing these ground handling costs. For instance, according to one detailed study,<sup>9</sup> a typical international shipment requires the preparation and processing of an average of 46 documents of which nine involve the carrier directly.

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8. Interavia - Reference 8.

9. Committee on International Trade Documentation - Reference 9.

Efforts to reduce ground handling costs in the past have been in the areas of containerization, computerized documentation systems, etc. Another critical and unfortunately unsolved problem is in the area of rates. So far no carrier or government agency has been able to set rates which take into account adequately, the cost, the value and the market elements of air cargo. The solutions to these problems will expand the air cargo market and its contribution to the total revenue of the air transport industry.

Although direct subsidy is non-existent with major airlines, indirectly the airlines are still aided a great deal by the governments. In most cases, the full cost of navigational and terminal services is still not recovered from the air carriers, but supported by national and regional governments. Since the Chicago Conference of 1944, much work has been done by ICAO to try to coordinate and standardize the charges made for airport and their facilities are open to use by anyone, the governments have had much trouble distinguishing between the services offered to different users. As a consequence, it is debatable whether the airlines have paid their full way on the ground or in the air.

Recently more accurate allocation of airports and navigational costs have become critical issues. In Europe, for example, an organization called Eurocontrol operates navigational facilities in the upper airspace and makes a charge for such services. In the United States the Airport and Airways Development Act of 1970 imposed new and increased aviation user charges to be used for expansion and improvement

of the airport and airway system. In addition, some airports have sought to meet their costs through "head taxes" levied on arriving and/or departing passengers. Recently, an agreement was reached in the United States to prohibit such state and local airport head taxes.

During this relatively short period of roughly sixty years, the progress in the commercial air transport industry has been spectacular. In 1970, over 300 million passengers were carried by the scheduled international and domestic carriers belonging to IATA. Today, the operating revenue of the United States airline industry is about ten billion dollars. We can expect even greater progress with the forthcoming supersonic age and the increasing growth of tourism with its mass travel implications.

References

1. U.S. Civil Aeronautics Board, "Handbook of Airline Statistics". 1969 Edition.
2. Ronald Miller and David Sawers, "The Technical Development of Modern Aviation", Routledge & Kegan Paul Limited, London. 1968.
3. Davies, R.E.G. "A History of the World's Airlines", Oxford University Press, England, 1964.
4. Warner, E.P., "The Early History of Air Transportation", Norwich University, Northfield, Vermont, November 21, 1937.
5. Thornton, Robert L., "International Airlines and Politics". University of Michigan, Ann Arbor, Michigan, 1970.
6. World Airline Record, Road Cap and Associates, 7th Edition, 1972.
7. British Air Transport in the Seventies: Report of the Committee of Inquiry into Civil Air Transport, London, May 1969.
8. Interavia, January 1971, "Air Cargo - The Sleeping Giant".
9. National Committee on International Trade Documentation, "Paperwork or Profits \$? in International Trade," 1971. Report by International Trade Documentation and Department of Transportation.