

Air Transport in Africa
A Case Study of "MAGHREB Airlines"

by

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(1979)

SUBMITTED TO THE DEPARTMENT OF
AERONAUTICS AND ASTRONAUTICS
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE
DEGREE OF

MASTER OF SCIENCE

at the

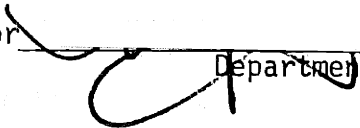
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June 1981


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MOULAYE AHMED BOUKHARY

Submitted to the Department of
Aeronautics and Astronautics on
May 15, 1981 in partial fulfillment of
the requirements for the Degree of Master of Science
in Aeronautics and Astronautics.

ABSTRACT

This report describes civil aviation's actual and future potential contribution to the development of African economics. First it deals with the actual present demand for air transport in Africa with the response to this demand and with existing economic operating conditions. The real need for air transport is examined together with the possible future growth of demand and capacity, depending on whether or not special measures are adopted to stimulate this growth.

Consideration is also given to other aspects of civil aviation in Africa such as training and cooperations between airlines and governments.

In the last part, the report looks into the issue of how the setting up of "AIR MAGHREB" (a North African Arab Airlines) would contribute and speed the economic development of the three potential countries member (Algeria, Morocco and Tunisia).

Thesis Supervisor: Prof. Robert W. Simpson

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ACKNOWLEDGEMENTS

I cannot adequately acknowledge my debt of gratitude to my thesis supervisor, Professor Robert W. Simpson for his helpful guidance and support throughout my graduate study at M.I.T. I very much appreciate his positive criticism that helped me realize many important details related to this matter.

I am also grateful to Ahmed Mayhoup and Lois Freeman for their moral support and encouragement. My special thanks are due to Nancy Ivey for typing this thesis fast and accurately.

Finally, I would like to thank ICAO and the Mauretania government for their financial support.

To all of these people, I am deeply indebted.

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INTRODUCTION

The requirement for a general study of air transport in Africa has arisen from the widespread recognition of the important role that this mode of transportation can play, if rationally organized, in the economic and social integration and development of independent Africa. One of the essential prerequisites for the growth and well-being of any region is an efficient transportation system. Yet in Africa, where vigorous efforts are being made to stimulate economic and social development, modern surface transport which should carry by far the greater part of all traffic is generally inadequate, and in many areas totally lacking. Air transport cannot permanently replace road and rail, but in the existing circumstances it can, because of its extreme flexibility and relatively moderate initial capital requirements, play much more important roles than it does in regions where surface transport is more highly developed. It can do this, however, only if it rationally planned and used efficiently to serve the public interest.

The objective of this report (which has concentrated on the economic aspects of air transport in Africa) is to produce a general report on the present state and future possibilities of air transport in Africa that will serve as an initial base from which to plan the regional development of this mode of transport. In view of the time

and resources available, the size and complexity of the region, and the variety of the activities to be surveyed, it is not intended that the report should provide more than a preliminary, overall view. This generalized picture will, it is hoped, be of assistance to those concerned in arriving at a broad determination of the types of action that might be taken and of the spheres of activity that require further, more detailed and specific study as a prelude to the adoption of concrete measures to further the development of African air transport.

The present report deals with the actual present demand for air transport in Africa at current fares and rates, with the response to this demand, and with existing economic operating conditions.

In the second chapter the real need for air transport in Africa is examined together with the possible future growth of demand and capacity, depending on whether or not special measures are adopted to stimulate this growth. In the third chapter, consideration is given to such other aspects of civil aviation in Africa as training, international cooperation by governments and airlines. The final chapter focuses basically on the potentiality of the setting up of a North African Arab airline "AIR MAGHREB".

CHAPTER I

PRESENT LEVEL OF AIR TRAFFIC AND CAPACITY IN AFRICAA. Actual Demand For Air TransportA.1 International Air Traffic and Capacity in Africa

The airlines registered in the African region in 1977 carried and estimated 16455 million passenger-km (see Table I) on scheduled international services, about 5.1% of the world total. This share was up from 4.4 in 1968, traffic having grown at an average annual rate of 14.2 percent during this period, compared to the world average of 12.3 percent. African traffic is expected by an ICAO forecast for 1986 to continue to grow at a rate of 14 percent compared to an expected world rate of 11 percent (see Table II). Africa's main international trading partner is Europe. Consequently, most African international air routes are towards Europe. Early air services were established to maintain communication with European colonial powers, but Africa is also gradually establishing air links with North America, while its geographic importance as a stop over point between South America and Europe is diminishing. Direct services to the Middle East, a growing market, and to the Far East are now available.

Most African airlines are associated to some degree with European airlines. The outstanding example of such relationship is the

TABLE I

PASSENGERS CARRIED AND PASSENGER-KM IN 1977 ON INTERNATIONAL SCHEDULED SERVICES
TO TEN AIRLINES REGISTERED IN AFRICA

Airline	Passengers Carried			Airline	Passengers Carried		
	Rank	# of Passengers	%Distri- bution		Rank	Passenger km(millions)	%Distri- bution
Air Algerie	1	1058	15.7	South African	1	4491	27.3
Egypt Air	2	959	14.2	Egypt Air	2	1886	11.5
Royal Air Maroc	3	890	13.2	Royal Air Maroc	3	1710	10.4
Tunis Air	4	775	11.5	Air Afrique	4	1439	8.7
South Africa	5	666	9.8	Air Algerie	5	1301	7.9
Air Afrique	6	471	7.0	Tunis Air	6	1032	6.3
Libyan Arab Airlines	7	368	5.4	Kenya Air	7	506	3.1
Sudan Air	8	377	3.5	Ethiopian Airlines	8	494	3.0
Ethiopian Airlines	9	147	2.2	Libyan Arab Air	9	479	2.9
Ghan Air	10	121	1.8	Sudan Air	10	461	2.8
TOTAL	-	5692	84.3	TOTAL	-	13799	83.9
Other African Airlines	-	1059	15.7	Other African Airlines	-	2656	16.1
GRAND TOTAL	-	6751	100	GRAND TOTAL	-	16455	100

SOURCE: ICAO Digest of Statistics, 1979.

TABLE II
ICAO FORECASTS OF SCHEDULED INTERNATIONAL PASSENGERS TRAFFIC FOR AFRICAN AIRLINES TO 1980

	Passenger-km (millions)		Average Annual Growth %		Regional Shares of World Traffic %			
	Actual 1968	1977	Actual 1968-1977	Forecast 1977-1986	1968	1977	1986	
Total for African Regions	4981	16455	54300	14.2	14	4.4	5.1	6.4
World Inter- national (Excluding) USSR	114468	323959	835000	12.3	11	-	-	-

ICAO: Forecast for 1986 at probable rate 1979.

close association between AIR AFRIQUE and U.T.A. AIR AFRIQUE operates most of the external services of its eight member states, and its European network terminates in France. Air Afrique's first obligation is to serve the member countries with regular frequencies. Its route network, Europe-Africa, which is 100 percent profited-oriented supports the existence of its intra-African service. Until a few years ago, the Europe-Africa routes⁽¹⁾ involved basically business and cargo traffic. Now tourism increases steadily each year, bringing in vacationers from France, Switzerland, Italy, Spain and Germany. The North America-Africa route is a whole story in itself. Beginning in 1965, Air Afrique bought blocked space across the Atlantic on PAN AM. In 1971 it started its own DC-8 weekly service between New York and Dakar. The traffic is extremely erratic, averaging a 40 percent load factor, but is sufficient to encourage Air Afrique officials to persevere with confidence in the task of selling a new destination on a new airline to a finicky American public. The New York office is currently pressing for twice-weekly service, because if the prospective passenger doesn't want to or can't fly on a Saturday, PAN AM gets the business. Africa produced one of the highest percentage gains in international tourist arrivals in the world during 1979, and now Air Afrique's intercontinental services are frequently profitable. When they are not, overly ambitious route expansion or frequencies are usually the cause. Profitable or not, intercontinental services may save foreign exchange by reducing

(1) Air Transport World: Air Afrique: Lifeline for Eight Nations, 1974.

the country's cost for intercontinental travel, and may earn convertible foreign exchange by transporting foreign businessmen and tourists. Scheduled freight services are available, mainly from West Africa.

Charter operations are important in some areas. Gambia's tourism depends entirely on charter. Also the "Haj" traffic to and from Mecca relies to a considerable degree upon charter operations. Nigeria and Cameroon use charters to import large volumes of freight. The remarkable example is the shipment by Pengeot from France to the Kadiena plant in Nigeria of 18,000 tons of car parts for the construction of 15,000 vehicles in 1976 (63,000 in 1978). The choice here was between 12 hours by air and at least 6 months by sea. Even when the difference is much smaller there is an increasingly marked preference for the aircraft. But neither country has as yet sufficient air exports to fully utilize the return of these charters.

A prerequisite for improvement of international air traffic is a bilateral agreement between the two interested governments. This is normally negotiated by the governments themselves on behalf of their flag carriers. The principal issues that arise in such negotiations (apart from consent to overfly the other country, the right known as 1st freedom of the air) or to land in the other country for technical reasons (known as the 2nd freedom) involve the carriage of traffic from the carrier's country to the other country (the right known as the 3rd freedom) or the carriage of traffic from the other country to the

carrier's own country (known as the 4th freedom) or the right to carry traffic between two foreign countries known as the 5th freedom. An example would be a route Lusaka-Khartoum-London, where Zambia Airways might be permitted to carry traffic in both directions between Lusaka and Khartoum (3rd and 4th freedom) as well as between Khartoum and London (5th freedom). Normally, in such negotiations, governments look for their own carrier's advantage and seek to obtain at least parity in market share and frequency. Obviously, the strongest negotiators are those countries which happen to be natural generating or terminating traffic points. A country with a large, relatively affluent population would be a natural traffic generating point, while one with outstanding tourist attractions would be a traffic terminating point. In all bilateral negotiations, a country may adopt one of the two approaches: Protectionism or "Open Skies".

A.2 Domestic Air Traffic in Africa

In domestic services, African airlines carried some 4676 million passenger-km in 1977, or about 1.3 percent of the world total of 366922 million passenger-km. This share is still small, although the average annual rate of growth of domestic traffic during the 1968-1977 period was 12.7 percent almost twice the world average of 6.9 percent.⁽²⁾ The development of domestic air services within Africa has been uneven. Those countries with the need, the resources and the

(2) ICA. Digest of Statistics, 1978.

determination to do so have provided significant domestic operations (example: Egypt, Algeria, Tunisia, Morocco, Nigeria, etc.). Others are working hard to maintain services. A few are losing the battle, Senegal, Libya, Niger, etc.

In some countries, domestic services are the "Cinderella" of civil aviation. They have a lower priority than international operations, and receive less government support. Often, governments are slow to pay their bills for the transportation of public servants, and the domestic airline, over which most of such transport takes place, is then unable to pay its own bills. Sometimes this is a result of poor fiscal policy or unexpected financial adversities, but whatever the cause, failure to give due support to a domestic airline can seriously constrain the country's economic, social and political development. Domestic airline tariffs in Africa are among the highest in the world. The passenger fare per mile between San Francisco and Los Angeles can be as low as U.S. cents 4.8;⁽³⁾ for short journeys with Columbia and Venezuela it is U.S. cents 6.2; in India it is U.S. cents 8.4; in Zaire it is U.S. cents 14.3. Some explanation for high African rates is the fact that landed fuel costs, particularly in the interior, are two or three times those in Europe; expatriate personnel are expensive; aircraft maintenance performed abroad is expensive; and employee productivity is generally low. Again, while the reasons for them may be

(3) UNDP/ICAO, Project RAF/74/021, "Studies to Determine the Contributions That Civil Aviation Can Market to the Development of the National Economics of African States," March 1977.

understandable, high fares tend to depress traffic, limit expansion and hinder economic and social development. Because so few people (or goods) can afford to fly, African aircraft are often unfilled. There may be a surplus of certain foods in one part of the country (example: Mauritania, Algeria and Mali because they are so vast and deserted) and shortages in the other, but air, at prevailing cargo tariff levels, is too expensive to be used as a bridge between the two.

Unused capacity and domestic airlines is a luxury few African economies can afford. High fares and tariffs may be the principal reason why available space is not filled. Governments whose domestic airlines are operating well below their capacity should take a serious look at the situation, and introduce, if only on an experimental basis, lower fares and rates to determine if they will fill the available space. Even if the airline were no closer to profitability as a result, the increased utilization of an essential transport mode would be highly beneficial.

Air Afrique's first obligation is to serve the member countries with regular frequencies. This intra-African network is 100 percent service oriented, meaning that load factors are low and money is lost. Included in the intra-African network is the traffic which results from the annual pilgrimage to Mecca, which Air Afrique carries with supplementary charter flights. In 1973 some 138 flights transported 15680 Moslems to and from Mecca.

Airline service across Africa has developed steadily, but is not yet of a density that satisfies every requirement. It may still be true that the fastest way to travel from certain points in Africa to others is to go via Europe, but such instances are unusual if the itinerary is carefully planned. Evidently, it would be a convenience to travellers to be able to complete any air journey in Africa within 24 hours, but the present volume of domestic traffic in Africa does not justify the frequencies that would make this possible.

A.3 Non-Scheduled Traffic

Although on the African continent itself, charter traffic is almost non-existent; charter traffic is high on some routes between Europe and Africa. We have recorded six of these:⁽⁴⁾ Germany-Kenya with 72314 charter passengers in 1979, which was far ahead of the others; Germany-Senegal with 21437, France-Ivory Coast with 14445, Kenya-United Kingdom with 14280, Switzerland-Togo with 12869 and Spain-Senegal with 11938 (in 1978).

There are also three routes with traffic between Africa and the United States which accounted for over 20,000 passengers in 1979. They were Liberia-United States with 27903 passengers; Senegal-United States with 23439 passengers. The only South Atlantic route, Brazil-Senegal, accounted for 5937 passengers in 1978.

(4) ICAO Study: "The Development of Air Transport in Africa," "Situation and Outlook Obstacles and Remedial Action," ITA Bulletin, 1980.

In Africa, the attitudes of African states to foreign air charter operations vary. Where the traffic to be carried is essentially business-oriented, most countries oppose a charter operation, which would simply divert passengers from scheduled services. Where the traffic is tourism, the question becomes more difficult. In most cases the best course is to attract tourists to scheduled services through the introduction of special low-cost fares. This may have the effect of improving empty space, and may increase the frequency of air services, which is a good thing in all respects. However, when even low-cost fares on scheduled services are too high for certain economic segments of tourism, or where scheduled airlines are full with other traffic, or when no scheduled service exists from the tourists' originating point, air charters may well be the answer.

A rather different problem, to which there is the same solution, arises in the case of air cargo. A larger charter (example: Nigeria alone imported 63,000 tons in 1978) activity exists from Europe to Africa, and the aircraft need return loads. If scheduled carriers cannot accommodate certain export materials, because no air service exists to the importing country, or scheduled tariffs are too high to make the export profitable, or the scheduled airlines are full, there may be sound economic reason to take advantage of the cargo capacity offered by air charters returning to Europe.

Obviously if such cargo moves on a regular basis in substantial volume, scheduled airlines, and particularly African flag carriers, should be given the opportunity to compete for this business. When, however, exports are erratic and vary greatly in volume, it may be uneconomic to require the scheduled airlines to procure additional equipment to handle it. The matter is complex. It is difficult to determine when charters become competitive to scheduled airline activity, or merely supplement it. When it is clearly competitive, it may drain traffic away from the national carrier. But when, for any reason, the national airline is unable to carry the traffic, refusing to allow charter operators to do so may harm the economy. A balanced approach, which avoids arbitrary policies for or against air charters, is certainly the best one for governments to adopt. African governments should welcome charter flights when they are needed to complement scheduled services.

A.4 Freight Transport (Scheduled Traffic)

The scheduled airlines registered in the African region in 1977 carried an estimated 488 million freight lb-km in scheduled international services, about 3.3 percent of the world total, see Table III.

In domestic services, these airlines carried 63 million scheduled freight t-km in 1977, or about one percent of the world total, nearly double the 1968 share as a consequence of the average annual

TABLE III
 ICAO FORECASTS OF SCHEDULED INTERNATIONAL FREIGHT TRAFFIC FOR AFRICAN AIRLINES TO 1986

	Freight t-km (millions)		Average Annual Growth %		Regional Shares of World Traffic %		
	Actual 1968	1977	Actual 1968-1977	Forecast 1977-1986	1968	1977	1986
Total for African Regions	156.6	488	13.5	14	3.6	3.3	3.5
World Inter- national (Excluding) USSR	4374.2	1482.1	14.6	13	-	-	-

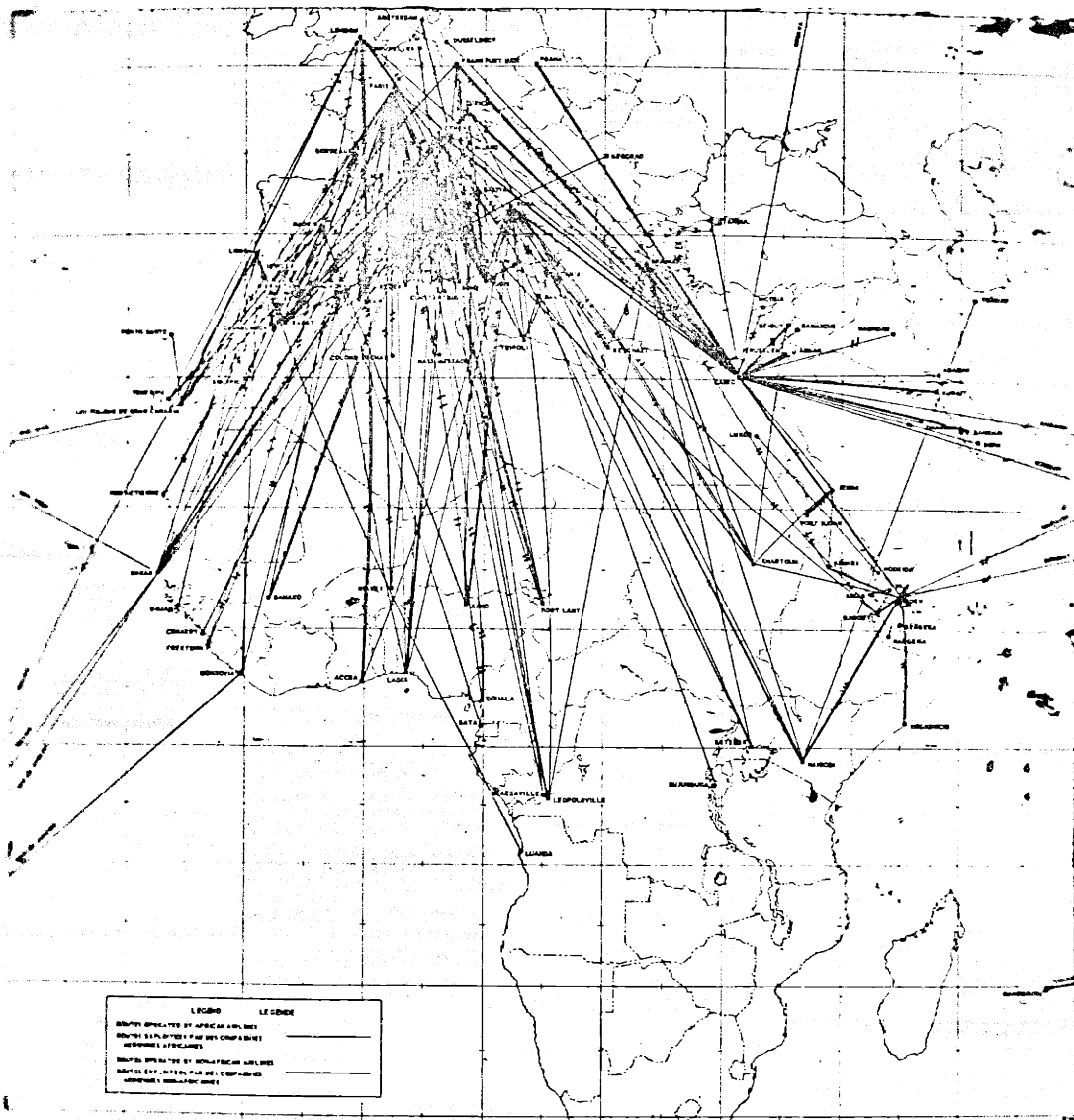
ICAO: Forecast for 1986 at probable rate 1980.

growth rate of 11.6 percent for the African carriers compared to the world average of 5.7 percent. About 89 percent of the freight lb-km carried in scheduled operations by the African airlines in 1977 were on international services, showing little change from 1968. However some African countries such as Nigeria and Cameroon use charters to import large volume of freight. So if this is taken into account and referring to an ICAO forecast for 1986 (Table III), freight traffic is expected to grow. Table IV shows the top ten African airlines in freight terms in 1977.

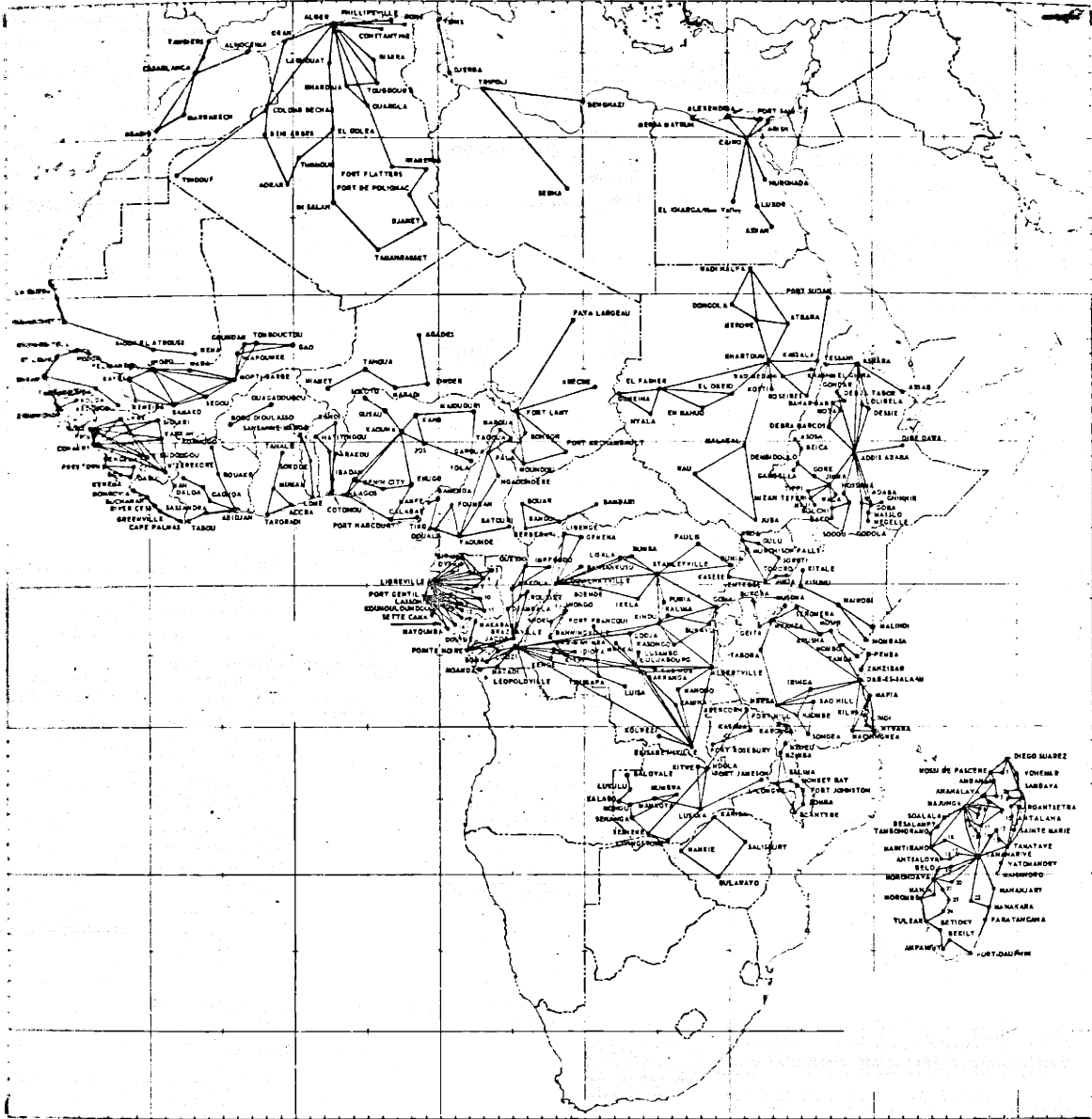
B. The Supply: Response to Current Demand

B.1 Routes Operated

To meet the actual demand for air transport that exists in Africa at current prices a large number of airlines, both African and non-African now offer services that combine to form the networks shown in maps 1 and 2. A large number of operators serve the African demand. Thirty-four non-African airlines provide scheduled and non-scheduled services linking Africa with all other regions of the world, but particularly with Western Europe and the Middle East. Of these thirty-four carriers which include most of the major international airlines, 16 are based in Western Europe and 10 in the Middle East. In addition, 18 African airlines provide scheduled services to points outside Africa, especially in Western Europe. The pattern of existing air routes becomes apparent from the maps.



Air Routes Linking Points in Africa Directly with Other Regions



Domestic Air Routes Within African States Covered By the Study

TABLE IV
 FREIGHT TONNAGES CARRIED IN 1977 ON INTERNATIONAL SCHEDULED
 SERVICES: TOP TEN AIRLINES REGISTERED IN AFRICAN REGION

AIRLINE	Rank	Freight Tonnes (Units)	% Distribution
Air Afrique	1	41297	27.0
South Africa	2	22319	14.6
Kenya Airways	3	14098	9.2
Royal Air Maroc	4	10390	6.8
Egypt Air	5	9660	6.3
Ethiopian Airlines	6	9259	6.0
Air Algerie	7	7607	5.0
Air Zaire	8	7254	4.7
Tunis Air	9	5462	3.6
Zambia Airways	10	4948	3.2
TOTAL	-	132294	86.4
Other African Airlines	-	20799	13.6
GRAND TOTAL	-	153093	100

SOURCE: ICAO Digest of Statistics, 1980.

Considering first the intercontinental services the most striking fact is the great preponderance of flights connecting points in Africa directly with Western Europe. The services that are provided by African carriers in fact fall almost exclusively into this category. The relatively few links that do exist with other continents are generally operated by non-African airlines.

This pattern, as might be expected, coincides with Africa's historical and political links with other continents, and also it clearly reflects the present pattern of international trade. The pattern followed by international routes connecting points within Africa is more complex. These routes in general tend to provide connections within rather than between the various sub-regions of the African continent. They are, as might be expected, most numerous where economic development is greatest and population is most dense. There are a comparatively large number of African links between the coastal centres of West Africa. The purely domestic route patterns are shown on map 2, and compared to the international routes, they are very underdeveloped. From map 1, it is easy to notice that routes served to Europe are much more numerous than intra-African routes (map 2).

In fact intra-African air services could be greatly improved if both short and long haul operations were concentrated around hub points, where traffic could make rapid connections. Good communications can stimulate trade. Africa is so large, and surface transport so

underdeveloped that the only practical way to get from sub-region to another is by air. Today it is possible for passengers and cargo to fly from any European city to another within 24 hours. This is certainly not possible between many African cities. Table V shows how many times a week passenger or cargo may travel (non-stop) between coastal cities. This also shows that flight frequencies are generally low between African cities. A great deal would have to be done before the hub system could achieve its purpose: to transport passengers and cargo from any city in Africa to any other within 24 hours.

TABLE V
WEEKLY SERVICE BETWEEN SELECTED AFRICAN CITIES

West African Coastal Cities	DAK.	BAN.	BIS.	CON.	FRE.	MON.	ABI.	ACC.	LOM.	COT.	LAG.	DOU.	LIB.
DAKAR	-	7	4	1	8	11	11	8	2	2	7	4	3
BANJUL	7	-	0	1	10	7	7	7	0	0	4	0	0
BISSAU	4	0	-	0	0	0	0	0	0	0	0	0	0
CONAKRU	1	1	2	-	2	3	3	0	0	0	0	0	0
FREETOWN	8	10	0	2	-	14	13	10	0	0	6	0	0
MONROVIA	11	7	0	3	14	-	17	11	1	1	10	2	0
ABIDJAN	11	7	0	3	13	17	-	12	8	7	12	7	5
ACCRA	8	7	0	0	10	11	12	-	3	3	14	3	0
LOME	2	0	0	0	0	1	8	3	-	2	4	2	6
COTONOU	2	0	0	0	0	1	7	3	2	-	5	4	1
LAGOS	7	4	0	0	6	10	12	14	4	5	-	6	3
DOUALA	4	0	0	0	0	2	7	3	2	4	6	-	3
LIBREVILLE	3	0	0	0	0	0	8	0	1	3	7	-	5

According to the schedules published in the ABC World Airlines Guide, February, 1977.

B.2 Flight Equipment Needs of African Airlines in the Eighties

The fleet is used to provide domestic air services, intra-African services as well as international services. According to ICAO estimates, average growth for African air transport expressed in t-km carried will be 13 percent from 1976 to 1986, as compared with the world average of 9 percent. This development will necessitate the replacement and modernization of African airline fleets. In order to see flight equipment needs for the eighties more clearly, it may be advantageous to review the main existing fleets and their trend in the last decade. In this connection, we must state that the study prepared by the Institute of Air Transport (ITA) at the request of AFCAC and entitled "Forecasts for African Airline Fleets", is our main source.

Long-Haul Aircraft

African long-haul flights, which are generally Africa-Europe flights, are operated by wide body jumbo jets and four-engined jets.

Wide Body Aircraft

So far these aircraft types have been few and far between in African airline fleets. No African airline owned a Boeing 747 until 1976. Traffic was not sufficient on most African routes for the capacity of such aircraft. The wide body aircraft owned by the airlines consisted of five DC-10's. But in 1979 three African airlines

(Air Algerie, Air Libya and Nigeria Airways) acquired the B-747. Other airlines (Air Gabon, Air Afrique, etc.) have placed orders for deliveries in 1980 and 1981. With the development of traffic which is 14.5 percent in North Africa, a region which accounts for over 50 percent of African air traffic, the number of B-747's in African airlines will increase substantially in the late eighties. This trend will make it possible to improve the fleet productivity and the profitability of African airlines since high-capacity aircraft, when they are justified by traffic give the lowest operating cost per capacity seat-km.

The DC-10, for which a stretched version for 393 passengers is about to go into production, may replace in certain airlines the B-707's and DC-8's which have become obsolete. At present, African airlines have seven DC-10-30's. The previously mentioned ITA study forecast that in 1982 there would be 22 widebody aircraft B0747's, DC-10's and L-1011's as against five DC-10's in 1976.

Four-Engined Aircraft

These are Boeing 707's and DC-8's and comprise the bulk of the fleets operating long-haul flights. Their number rose from 31 to 61 from 1970 to 1976. Apart from the B-707-320's, these aircraft are no longer being produced. Airlines not prepared to move up to widebody aircraft will expand their fleets with these aircraft, generally on the second-hand aircraft market. Although these aircraft are dated,

technically speaking, and not very efficient, their number in African fleets should still rise after an increase from 31 to 61 from 1970 to 1976 it is put at 92 for 1982 by ITA.

Medium-Haul Aircraft

More B-737's and B-727's are being used, particularly in North Africa; 47 aircraft in this region operate domestic and regional routes and routes between the two banks of the Mediterranean. Also used on medium-haul flights are the DC-9's, the BAC-111's, the Caravelle and the Fokker F-28's. All in all, these aircraft represent the highest proportion of African fleets: 32 percent in 1970 and 91 percent in 1976. Coming into the medium-haul aircraft bracket is the Airbus which, after making a remarkable breakthrough on the international market, has just entered the African market. Two airlines (Tunisia and Libya) have just placed orders for the Airbus A300; a third is on the point of doing so and others will certainly follow.

The new-generation aircraft with 180 to 200 seats, like the Airbus A310, the Boeing 767 and the 757 will be going into service starting in 1983 and will be a most suitable aircraft which African airlines will endeavor to obtain for intra-African services.

Short-Haul Aircraft

They mainly comprise aircraft serving domestic routes within states. They are turbo-prop or piston aircraft.

Turbo-Props

Four-engined aircraft: the Britainia, Hercules, AN-24 and IL-18; they have gone down in number: 24 in 1970, 15 in 1976. Twin-engined aircraft: the most significant are the F-27 (37 in 1970, 53 in 1976), the Twin Otter (7 in 1970 and 25 in 1976) and the HS-748 (6 in 1970 and 14 in 1976).

Piston Aircraft

They are very old aircraft which are disappearing from the fleets. Their number has gone down from 99 to 60, and includes in particular the DC-3, the DC-4 and the DC-6. These aircraft have been replaced over the last decade by turbo-props (in particular the F-27 and the Twin Otter). This trend will be stepped up in the eighties.

In the 1970-1976 period, the African fleet rose from 297 aircraft all types to 377. For the eighties the only indication we can give is the ITA estimate for 548 aircraft in 1982.

Another characteristic in the development of African air transport which should influence fleet composition in the eighties is spectacular development of freight. In the last decade freight rose to 13.5 percent a year on average. In the case of Air Afrique, for example, freight revenues represented over a third of total revenues. But at present, few African airlines have all cargo aircraft. In the eighties, more airlines will probably be equipped with them. The trend

is already under way with the acquisition of Boeing 747's in the last two years by African airlines; the three aircraft in service with a mixed passenger/cargo layout. The replacement of the fleets in the eighties will probably necessitate heavy investment as the prices of aircraft incorporating the latest technological progress are very high. They too are hit by the general inflation affecting the world economy. The basis reference prices, fixed for a given year and periodically adjusted are subject to an annual increase now coming to about 8 to 10 percent. Thus a DC-10-30 bought for \$23 million in 1973 costs \$42 million in 1979. Additionally, for each aircraft bought it is necessary to obtain parts for which the average value represents at least 10 percent of the price of the aircraft and 20 percent in the case of the first aircraft sold, owing to the engines. Below we give some information on the 1979 prices for some aircraft which will be in airline service in the 1980-81 period:

Boeing 747-200	-	\$54 million
DC-10-30	-	\$42 million
Airbus A300 B4	-	\$31 million
B-727-200	-	\$12 million
B-737-200	-	\$10 million
DC-9-50	-	\$9-10 million
F-28	-	\$8-9 million
F-27	-	\$3.5-4.5 million

(5) ITA Bulletin, "Financing of Flight Equipment in the Eighties," July 1979.

An idea of the volume of investment to be made for the replacement of fleets is provided by the Air Afrique forecast⁽⁶⁾ for its investment from 1979 to 1985:

	<u>Price in Millions of US Dollars</u>
1979-one DC-10-30	42
1980-one Boeing 747-200 freighter	63
1981-one Airbus A300 super B4	50
1982-exchange of the DC-10-30 for a DC-10-63 (stretched) or one Pax B-747	59
1983-two Airbus A310's	100
1984-one B-747 freighter	86
1985-one DC-10-63 or one Pax B-747-200	93

TOTAL	493 Million (U.S.)

The ITA report approximately assesses the volume of investment to be made by all African airlines at: \$3,290 million.

B.3 Operating Economics of African Air Transport:

Cost and Revenues

The economic operating situation of African carriers is widely different from other airlines. Government subsidies have been perhaps less available to compensate the heavy operating losses. But in many

(6) ITA Report, "African Airtransport Growth in the Eighties," July 1979.

instances, costs have been held down by various arrangements with non-African airlines. The pricing structure in Africa is very uneven. Distance, the usual determinant for setting rates, is often ignored. For example, a rate from East Africa to Europe may be the same as or lower than a rate from West Africa, an area which is much closer to Europe. The establishment of international fares and freight rates is ultimately complex. For this reason, the airlines constituting the International Air Transport Association (IATA) jointly develop international fares and rates subject to the approval of governments. Each member airline has considerable influence upon the tariffs charged on his principal routes. Various regional airline associations such as the Association of African Airlines (AFRAA) provide carriers within their areas with an opportunity to adopt common positions on fares and rates which affect them directly. Acting as a block obviously strengthens the carrier's position in IATA negotiations. Certain area carriers establish charges different from those agreed upon by IATA. In Africa, a notable example is the Association des Transports Aeriens de la zone Franc (ATAF). Elsewhere, there is intergovernmental machinery to fix fares, while IATA seeks to conduct on dialogue with non-IATA carriers. African costs are influenced by a number of factors:

- a) Fuel Costs are extremely high.
- b) Utilization of expensive aircraft and ground equipment is relatively low. If improved, it could spread the incidence

of depreciation over a greater volume of capacity, and might reduce other unit costs, such as those of crews.

- c) Major aircraft and engine overhauls are normally performed overseas.
- d) Many airline managements and personnel are experienced, by world airline standards. This is the reason why a number of carriers rely on assistance from the personnel of overseas airlines.

Difficulties such as the high costs of fuel are intractable, but others might be eased through government assistance. For example, maintenance can reduce aircraft time lost, and may cut costs; better training can improve personnel efficiency; lower fares may increase traffic and therefore aircraft utilization.

B.4 Elasticity of Demand

There is no statistical information on which to base an estimate of the elasticity of demand for air transport in the region. However it is generally believed to be lower for the high proportion of passengers traveling on business and governmental mission (where considerations of travel costs is not so important) and higher for passengers traveling for private purposes. The elasticity of demand for air transportation of cargo may also be low since response to reductions in rates would not be expected to be rapid where there is not

a large volume of surface transportation. In both passenger and cargo traffic, any increase in air transportation within Africa itself achieved by reducing rates must largely consist of new traffic that would not have travelled at all. The elasticity of demand for air transport within the African continent in response to reductions in fares and freight rates would express itself as an acceleration in the normal growth trend over a period of years. It would also depend on progress in other forms of transportation which would themselves require planning and action of various kinds. Given such action, the response to reductions in fares and freight rates should be as great as elsewhere. For example, if average fares and freight rates were reduced to half of their present level, the volume of air transport demand might show a relatively small increase initially, but the annual rate of growth would rise, and if energetic steps were taken to stimulate tourism and to develop light industry the cumulative effect of the increased rate of expansion would produce impressive changes in the total of volume over a period of years.

The change of demand for air transport to and from the African continent, would probably rise more rapidly. There is a big potential tourist market both in Europe and in North America waiting for reduced fares to Africa, and increased tourist traffic would stimulate cargo and mail traffic. However, strong steps would also need to be taken in order to provide adequate hotels and their tourist facilities at reasonable prices.

CHAPTER II

FUTURE DEVELOPMENT OF AIR TRANSPORT AND TRAFFIC CAPACITYA. Growth of DemandA.1 The Need for Air Transport

The previous chapter was concerned with the demand of air transport in Africa as it actually exists at current fares and rates. However, behind this actual realized demand, there is a far greater potential demand based on the real needs of the region for efficient transport. The great need results from the general lack of adequate surface transport in almost all parts of the continent and from the generally long distances between centres of population and industry. The growth for air transport has been held back by the fact the its operating costs and fares and rates charged are high in relation to African incomes also inrelation to developmental activities which directly affect the life and work of the population in remote areas. Activities such as crop dusting and insect control for agriculture, veterinary services for livestock, medical, educational and even financial services for people. These kinds of activities can be carried out or promoted through air transport. The low cost; simple development possibilities inherent in aviation do provide opportunities for developing countries to exploit the unique advantages of air transport. In the absence of other reliable transport systems, air is a

practical low-cost means of stimulating economic development in the remote areas, by providing the essential supply links. An air bridge carries automobile parts from France to Nigeria, where the assembly plant is located.

Another important role which aviation can play is to help promote tourism. Tourism, like any other export, is a source of foreign exchange earnings, a generator of employment. A modern air transport system is vital and required for the establishment of these endeavors. Thus, air transport can contribute to a country's balance of payment in a number of ways. First, if the country has its own flag carrier, it is a direct foreign exchange earner, which is needed for a variety of economic reasons. Second, both international and domestic operations make a large contribution to the growth of tourism, which in turn with its multiplier effect, contributes to the economic growth of the country.⁽⁷⁾ Thirdly, tourism contributes to economic development or industrialization of the country through the opportunity it provides for the country to start manufacturing the goods and services required for tourism, and through the opportunity it provides for foreign investment. Air transport is also a necessary tool for the development of international trade. It has become necessary because of its single greatest advantage - reduced delivery time. In today's competitive business environment, the reduction of total distribution cost and the

(7) UNDP/ICAO, Project RAF/74/021, "Studies to Determine the Contribution that Civil Aviation can make to the Development of National Economies of African States," March, 1977.

increase in the reliability of delivery are major objectives. This could be difficult to achieve without air transportation, because of the requirement of more transit days for other modes of transportation. Another important aspect is that the growth of international trade and the growth of foreign investment in a country can be fostered only on a mutual trust and accessibility of the country. To this, vast, if latent, demand for transport to further the social and economic development of Africa can frequently be met most rapidly and most efficiently by air. Beside the need for improving the movement of passengers, cargo and mail (between the main centres of population and industry), there is a need for new routes to encourage the growth of new industries and markets. There is also need for better services to engender new traffic for existing routes, and for non-scheduled transport when need arises to bring personnel and equipments into areas otherwise difficult to reach. In these circumstances of need, if the kind of social and economic integration that produces a demand for the movement of passengers, cargo and mail, were as great in Africa as in other regions, and if the price was right, the volume of air transport there would be far greater than it is now. It is worth noting that Brazil,⁽⁸⁾ a vast country with an enormous potential for economic growth has relied almost entirely on air transport to redistribute its population and to build a new capital in what was little more than a jungle.

(8) Stokes, Charles S.J., "Transport and Economic Development in South America," New York, F.A. Praeger, 1979.

A.2 Growth of Demand and Measures to Stimulate It

If no special measures are taken to develop African air transport, it would be no doubt, continue to expand, but at a pace far below what is possible. The airlines would continue to operate services where revenue could be made approximately to cover costs with whatever assistance could be obtained from government subsidy and from other sources. The progressive transfer from the older aircrafts to a new aircraft will certainly lead to utilizing loans from international sources. The effect of the replacement would probably be an increase in average unit operating costs. In the long period, little reduction in operating costs can be expected since the volume of the traffic would not be great enough to provide economic loads for the larger aircraft that are necessary to achieve low operating costs. Fares and freight rates and also service frequencies may continue at about their present level. Air transport would, in fact keep pace with the general development of the region but would not make any special contribution of its own to that development. If African governments wish to use air transport as an instrument to stimulate industrialization and the general economic integration of the continent, it will be necessary to adopt special measures to achieve the following objectives:

- a) A general improvement in air service frequencies will be required together with the addition of new air services, aiming to provide reasonable air connections throughout the continent for passengers, cargo and mail.

- b) A substantial reduction for passenger fares would be necessary primarily to stimulate private passengers travel both on the part of visitors from other parts of the world and also, on the part of African residents.
- c) A substantial reduction in freight rates would also be necessary applied particularly to products of industries with good development prospects or items whose transportation would stimulate economic progress.

Objectives such as these are, unfortunately economically incompatible with each other in the sense that they would all tend to cost the airlines significant sums of money. Selective reduction of passenger rates and freight rates would itself produce some increases in passengers and freight traffic, but it would be some time before it could avoid a reduction of the total airline revenue. Also an increase in frequency and the addition of new services would raise costs because, additional aircraft and aircrews would be required. The building up of the African services of African airlines clearly would produce substantial operating deficits which would have to be covered by subsidies of one kind or another. How much subsidy would be required and for how many years, could be decided only by African governments, according to how much they desire to stimulate air transport in the continent. The United States domestic air transport system achieved a rapid rate of expansion in its early years under the stimulus of government subsidies.

But the conditions for the expansion of air transport in African in the next ten years will certainly be very different from those of the United States. In the United States, air transport came as new superior method of transportation in an already developed region, where demand for transportation for (passengers, cargo and mail) was already high. In Africa the total transport demand is relatively small, but since surface transport is generally inadequate, air transport, if it is made cheap and efficient, is expected to carry a much higher percentage of the total demand than it did in the United States. Also, if economic progress in African takes place as planned, the volume of demand for air transport could expand as fast as it did in the United States.

The reduction of passenger fares on international services within Africa would develop a certain amount of tourism among African residents themselves. But the main expansion of the African industry should come from attracting a greater volume of tourists from Europe and North America.

B. Growth of Capacity

B.1 Replacement of Existing Capacity

With the transfer from older to newer aircraft described above, it is necessary to examine now the developments in the capacity situation that may occur over perhaps the next five years. In the present circumstances, the general situation varies widely among different airlines

and different aircraft. In some cases aircraft were fully utilized and load factors were high (60 to 70%)⁽⁹⁾ on occasion too high for satisfactory service. In other cases load factors were very low (30 to 40%) or aircraft were scarcely used at all. Some services found satisfactory passenger loads, but insufficient cargo or vice versa; and others suffered from the lack of balance between the load available in the two directions. In the African context, airlines, in order to encourage and to prepare for the expected growth of traffic, must acquire new aircraft that will generally be both larger and faster than those they replace and will tend to expand capacity ahead of demand. They must also attempt, wherever possible, to increase frequencies sufficiently to provide satisfactory services to integrate new services in order to stimulate demand in the near future therefore it may not be possible to reduce the relative excess of capacity that now exists in African transport. If governments decided to take radical measures to stimulate the growth of demand for African air transport both to and from within Africa as suggested above, the total volume of transport might increase as much as three or four times.

(9) Kilweo, A.B.S., "Transport Progress in Practice: Air Transport in Africa, East African Airways Corporation Experience," Chartered Institute of Transport Journal, July, 1976.

CHAPTER III

OTHER ASPECTS OF CIVIL AVIATION IN AFRICAA. Training of Aviation Personnel

Inadequacy of well qualified personnel for civil aviation is a major shortcoming. It is one of the most intractable of problems and exists in most countries of the world, to a greater or lesser degree. It affects all specialized fields of the ground services and, in the high ports especially, the difficulty is often aggravated by too frequent changes of personnel for economic, political or other reasons. Modern aviation equipment cannot give continuous satisfactory service unless operated and maintained by competent personnel. The obvious requirements for an adequate output is an adequate input. In Africa, it is becoming increasingly difficult to get government authorization and funds to recruit the necessary numbers of students with sufficient basic training to enable them to absorb specialized aviation training and then to provide ports for them when trained. Low salaries and poor conditions of employment, lack of familiarity or even interest in technological skills, compound these difficulties and are prevalent over many wide areas. Even with training it takes many years for a technician to gain the necessary experience in his profession or occupations. This slow breaking-in process is not geared to the circumstances in many countries because the demands are too great. Often circumstances necessitate assigning men with little

practical experience to operating posts. The organization, guidance and direction that good supervision and good leadership can give are then needed. But if the supervisor is himself not well qualified by training and experience, the new employee has nowhere to turn for advice when he deals with a situation with which he is unable to cope. Furthermore, unless the supervisor is well-qualified, it is impossible for him to enforce good discipline and develop a sense of responsibility in his staff because he is too aware of his own limitations.

The usual result of all these factors is poor attention to duty by the operating staff and generally inefficient and unsatisfactory operation of the facilities. Vigorous efforts are being made in Africa to cope with the training program.

It might be considered that personnel deficiencies could be overcome by expanding training resources; however, while some expansion of training resources is desirable, it alone will not solve the problem. Well qualified students must be attracted; resources must be found to pay students during and after training; good salary scales and conditions of employment to attract and retain staff of the right calibre must be established; suitable employment policies and practices must be developed to maintain good morale. Finally, it must be accepted that rate of improvement cannot be a very fast one.

It is desirable to consider the problems of technical training for aviation personnel in Africa not only on a continent wide basis but also

on a more localized basis. The sub-regions discussed below are:

- a) Northwest Africa (Morocco, Algeria, Tunisia)
- b) Northeast Africa (Libya, Egypt)
- c) Equatorial Africa (Chad, Cameroon, Central African Republic, Congo, Brazzaville, Zaire)
- d) West Africa (Mauritania, Senegal, Guinea, Ivory Coast, Togo, Dahomey, Upper Volta, Niger, Sierra Leone, Liberia, Ghana, Nigeria)

In the Northwest Africa sub-region as described above, there are three training centres (Morocco, Algeria, Tunisia) assisted by ICAO (in Morocco and Tunisia they are special fund projects) with an annual student capacity of 290 and an average annual output of 180. In addition, one of these states (Tunisia) offers aircraft maintenance training for 120 students. The proportion of national to foreign personnel in both the government departments and the national airlines varies greatly between 50 and 60% and the programs for employment of nationals have reached various stages. The areas where the difficulties are most noticeable are the higher grade positions in the government departments and in those positions in the airlines requiring high technical skills and much experience. Thus there is a substantial shortage of flight crew and maintenance personnel in the airlines, and in the higher operational and technical branches of the government departments of civil aviation.

In the Northeast Africa sub-region, as described, there is one large training centre (a special fund project in Egypt) assisted by ICAO with

an annual student capacity of 130 and an average annual output of 100. In addition there are national schools for flying training and for various forms of technical training.

In Equatorial Africa, the aviation training establishment is provided in major part by ASECNA (Agence Pour La Securite de la Navigation Aerienne). A school has been established at Brazaville in 1976. Specialized training of French speaking personnel is offered at the national civil aviation and meteorological training centres in France.

In West Africa, the main organized training facilities in the French-speaking states are provided by ASECNA and school exists at Dakar. One of the difficulties in attempting to organize a flying and aircraft maintenance training centre in this region is the diversity of equipment; the aircraft used by the airlines are manufactured in at least six different states.

Ghana and Nigeria have well established technical training facilities of various kinds. A regional aviation training centre has opened and began training in Nigeria in 1969. It is a government organization assisted by the special fund with ICAO as the executive agency.

Matching the requirements to the number of available qualified students and existing training facilities leads to the conclusion that the full Africanization of aviation personnel will take some time. This is an overall summation and does not, of course, apply to all countries. Furthermore, although only relatively small numbers may be needed, the

fact that the needs are for the more highly technical and professional skills of aviation means that more time may be needed to produce such skills and experience. Even when the 100 percent level is reached this does not mean that the need for training disappears. It is apparent that increasing numbers of trained persons are being demanded by the aviation industry, and though increasing numbers are being trained, the gap between supply and demand is widening in certain countries and trades. The reason is that the requirement is growing for highly specialized staff to service the more complex facilities coming into general use. Training of such staff can normally be given at regional training centres, or through fellowships abroad, or by the equipment manufacturers, but can seldom be given locally without special arrangements and assistance.

Thus, aviation training in African countries faces two problems. One is to accelerate initial training of nations capable of absorbing that training and the other is to keep the employees up to date of technological developments. Additionally, working conditions of the employees must be attractive in order to retain them and not to lose them to other industries.

That is true of the civil aviation departments of the governments is probably more true for the airlines. It will be some time before they can reach the 100 percent stage of Africanization. This is, however, not an unusual occurrence in the aviation industry in its development stage. Many European airlines, for example, were compelled after the

was to use foreign personnel for a considerable time before they attained the status of complete Europeanization. This situation was created not by lack of personnel (there were plenty of former military pilots and mechanics) but because of the necessity of retraining the available personnel in the methods of civil air operation and because of the need of giving these people the opportunity to gain the required experience before they could take over. In order to alleviate the African problem in this respect, it would be helpful if the various governments set up, with the assistance of airline managements, a long-range training program, particularly in the field of aircraft operations and maintenance, to ensure a constant flow of initially trained personnel to the aviation industry.

B. International Cooperation Between Government and Between Airlines

There is a great deal of cooperation in air transport matters between the governments of African states and between their airlines. There are also many cases where more cooperation would be essential if African air transport is to develop efficiently and economically. Several groups of neighboring states have arranged for the cooperative provision of such services as aircraft certification, personnel licensing and accident investigation, as well as in the cooperation of airports and air navigation facilities. Similarly many airlines cooperate with each other in pools of spare parts, engines, and arrange revenue pools on common

routes. There are many cases also where African governments or airlines receive cooperation assistance of various kinds from governments and airlines in Europe and elsewhere.

On the other hand cases of non-cooperation are almost as frequent as cases of cooperation. The outstanding cases of governmental cooperation are to be found in a group of French-speaking countries in West Africa, joined by Madagascar in integrating their ground air navigation facilities and services (ASECNA). On the side of airline cooperation again a group of French speaking countries in West Africa have fully integrated in a multinational airlines (Air Afrique). Other groups of airlines and governments have occurred in the past and have broken up for one reason or another; still others are in process of formation or consideration. The same applies to the granting of airline traffic rights by African states to each other and to non-African states.

CHAPTER IV

AIR MAGHREB: AN AIRLINE FOR NORTHWEST AFRICAA. Introduction

Air Maghreb is a projected Northwest African Arab Airline which was proposed by the regional governments of Algeria, Morocco, and Tunisia in 1972 and is still under consideration as a joint venture for medium to long-haul international operation. Since then, measures have been taken to standardize their respective airline fleets.

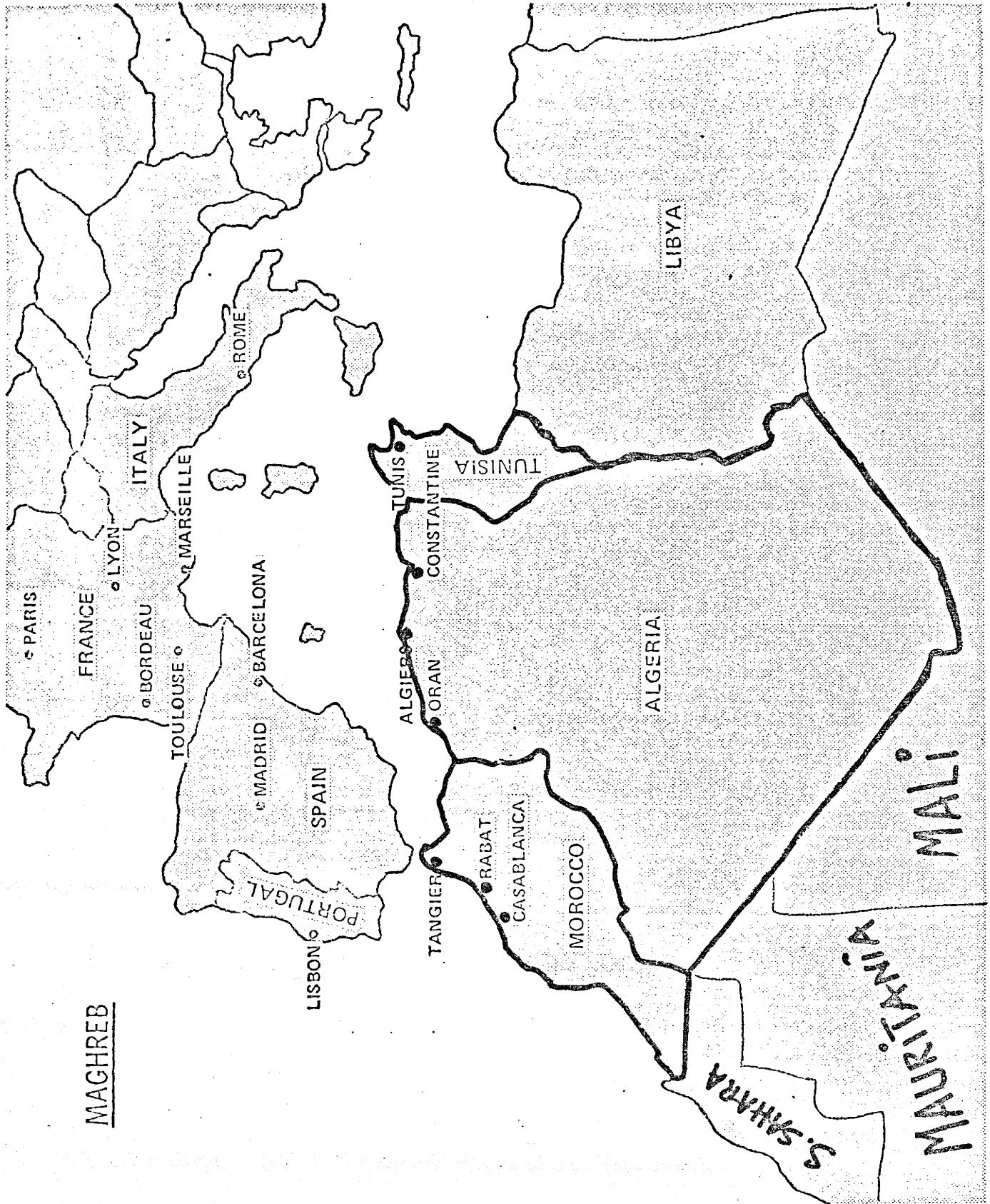
Air Maghreb is expected to have a separate identity, although in the long run, Air Maghreb, is expected to have close relations with the three national airlines: Air Algerie, Royal Air Maroc and Tunis Air. However, with the wide political divergences between Algeria and Morocco over the Western Sahara (former Spanish Sahara) and between all three countries over some of the problems which such a consortium could face, it is anticipated that this dream has a long way to go before it is materialized.

Some of the problems which such a consortium face can be obtained from a study of a joint airline company.⁽¹⁰⁾ Of these, one in particular is a potential source of trouble. It is the establishment of the objective for the airline. The Moroccan government, is likely to establish different objectives from those of the other potential members.

(10) Thorton, R. L., "International Airline and Politics," Ch. 5.

MAP 3

MAGHREB



The Moroccan government thinks of national flags on aircraft as an image of national technological and political prowess. On the other hand, the two other potential members of air Maghreb, Algeria and Tunisia while still possessing some political motives for supporting their airlines, are more interested in commercial and economic objectives.

This chapter basically studies the existing three airlines, their historical traffic volumes, regional economic development, and the tourism policies of respective governments.

a. Air Algeria

Air Algeria was founded in 1953 by the merging of the original Air Algeria and Company Air Transport. The Algerian government holds 100 percent of the stock after having bought 17 percent from Air France in January, 1973. Services are operated throughout North Africa and to France, Belgium, Spain, Italy, Germany, Switzerland, Egypt, Yugoslavia, Bulgaria, the U.K., Libya, Czechoslovakia, the USSR plus domestic services in Algeria. The number of total revenue passengers flown on Air Algeria increased 15.0 percent in 1975 and an ICAO forecast expects this rate to remain constant until 1985 (see Table VI). Domestic services also registered a 15.0 percent annual increase in 1975 and the same ICAO forecast is predicting that this rate will fall to 12.0 percent in 1985. But the most encouraging sign is the average distance flown by passenger on international services which is around 1100 km.

TABLE VI

NUMBER OF REVENUE PASSENGER FLOWN BY MEMBER
AIRLINES OF FUTURE AIR MAGHREB CONSORTIUM IN (000)

Years	DOMESTIC			% OF ANNUAL INCREASE					
	Total	Air Algerie	Royal Air Maroc	Tunis Air	Total	Air Algerie	Royal Air Maroc	Tunis Air	
70	244	142	63	39	35.0	38.0	37.0	25.0	
71	315	206	66	43	29.1	45.1	4.8	10.3	
72	415	281	80	54	31.7	36.4	21.2	25.6	
73	523	366	92	65	26.0	30.2	12.2	20.4	
74	616	440	101	75	17.8	20.0	10.0	15.0	
75	701	506	111	84	15.7	15.0	10.0	12.0	
					<u>FORECASTED</u>				
80	1118	1020	163	135	13.5	15.0	8.0	10.0	
85	2260	1800	262	198	11.4	12.0	10.0	8.0	

SOURCE: ICAO, Manual of Air Traffic Forecasting, 1977.

TABLE VI Continued
 NUMBER OF REVENUE PASSENGERS FLOWN IN (000)

Years	INTERNATIONAL				% OF ANNUAL INCREASE			
	Total	Air Algerie	Royal Air Maroc	Tunis Air	Total	Air Algerie	Royal Air Maroc	Tunis Air
70	874	406	263	205	15.5	18.4	12.8	13.5
71	1042	477	299	266	19.2	17.5	13.7	29.8
72	1223	528	344	351	17.4	10.7	15.1	32.0
73	1477	650	406	421	20.8	23.1	18.0	19.9
74	1731	767	471	493	17.2	18.0	16.0	17.0
75	1986	882	537	567	14.7	15.0	14.0	15.0
80	3994	1774	1080	1140	15.0	15.0	15.0	15.0
85	7030	3130	1900	2000	12.0	12.0	12.0	12.0

FORECASTED

SOURCE: ICAO, Manual of Air Traffic Forecasting, 1977.

TABLE VI Continued
 NUMBER OF REVENUE PASSENGERS FLOWN IN (000)

TOTAL Years	TOTAL				% OF ANNUAL INCREASE			
	Total	Air Algerie	Royal Air Maroc	Tunis Air	Total	Air Algerie	Royal Air Maroc	Tunis Air
70	1118	548	326	2114	18.4	21.5	15.7	15.5
71	1357	683	365	309	21.4	24.6	12.0	26.6
72	1638	809	424	405	20.7	18.4	16.2	31.1
73	2000	1016	498	486	22.1	25.6	17.5	20.0
74	2347	1207	572	568	17.4	18.8	14.9	16.9
75	2687	1388	648	651	14.5	15.0	13.3	14.6
80	5312	2794	1243	1275	15.0	15.0	14.0	14.0
85	9290	4930	2162	2198	12.0	15.0	14.0	12.0

FORECASTED

SOURCE: ICAO, Manual of Air Traffic Forecasting, 1977.

When the high density passenger traffic between Algeria and France is considered, it will make wide-body equipment's use for this company doubly economical in the late eighties.

Algeriers-Paris market has grown 12 percent annually between 1970-75 and is expected to grow at 15 percent between 1975-70. Algiers-Marseille market has grown 16 percent annually between 1970-75 and is expected to follow the same pattern as the Algiers-Paris between 1975-80. Two or three medium routes could use wide-body equipment all year round. (The most likely prospects are London, Frankfurt, and Madrid.) Algiers-Marseille accounts for 50 percent of the total international revenue passengers carried.

Oran-Toulouse accounts for 20 percent of international revenue passengers carried, which makes over 70 percent of Air Algeria's revenue* passengers carried between Algeria and France. (11)

Air Algeria's Fleet (12)

<u>Boeing</u>			<u>Douglas</u>	<u>Total</u>
727	737	747	DC-8	
6	13	1	1	21

(11) Source, Bulletin Statistics De La Compagnie Nationale Algerienne, 1979.

(12) Source, Exxon Air World Survey Supplement to Volume 32, No. 3, 1980.

A.2 Royal Air Maroc

Royal Air Maroc operates within Morocco⁽¹³⁾ and to Algeria, Libya, Belgium, Canary Islands, France, Germany, Italy, The Netherlands, Senegal, Spain, Switzerland, Tunisia and the U.K. The airline was formed in 1953 and the title Royal Air Maroc adopted in 1957. The airline is owned by the Moroccan government 67.7 percent, by Air France 17.5 percent, and the rest by various other companies. Royal Air Maroc also operates charter flights. Total revenue passengers flown on Royal Air Maroc increased 13.3 percent in 1975 and the same ICAO forecast is expecting it to grow about 14.0 percent in 1985. International services increased 14.0 percent in 1975 and is expected to fall to 12.0 percent in 1985 (see Table VI). Average km flown by passengers is about 1500 km.

Royal Air Maroc Fleet

707	<u>Boeing</u>			<u>Fokker</u>	<u>Total</u>
	727	737	747	F-27	
2	5	3	1	2	13

A.3 Tunis Air

Tunis Air was founded in 1948 by the Tunisian government, Air France and other interests. Internal services are operated as well as routes to Algeria, Libya, Morocco, France, Holland, Switzerland, Italy,

(13) Royal Air INTER, subsidiary of Royal Air Maroc, has operated the domestic services since April 1970. Scheduled services provided between Casablanca to Agadir, Marrakesh, Rabat, Fes, Tangier etc. Fleet: Fokker F-27-600.

Belgium, Germany, the U.K., Luxemburg and Jeddah (Saudi Arabia). The total revenue passengers flown on Tunis Air increased 14.6 percent in 1975 but is expected to fall to 12.0 in 1985 (see Table VI). International services showed 15.0 percent increase in 1975. Domestic services also increased 12 percent in the same, and passenger km increased 16.0 percent also in the same period (see Table VII). Charter operations are the key to Tunis Air's tourist business. Although this country relatively a newcomer to the mass tourism market, Tunis Air realized that reducing the air fares increased the traffic flow.

Tunis Air Fleet

<u>Boeing</u>		<u>Total</u>
<u>727</u>	<u>737</u>	
10	2	12

B. Analysis of Passenger Traffic Between North Africa and the World

In 1974, air and passengers travelling to North Africa numbered 2,026,800 (see Table VIII). In 1974, air traffic for the first line accounted over 50 percent (53.0) of the total traffic. Since then its share has risen to a point where sea traffic has become insignificant. In 1974 total air passenger traffic between France and North Africa was 1,075,300. In the same year, the consortium member airlines of future Air Maghreb carried 565,887 passengers to and from North Africa in their

TABLE VII Continued

REVENUE PASSENGER KILOMETERS FLOWN (MILLIONS) BY MEMBER
AIRLINES OF FUTURE AIR MAGHREB CONSORTIUM

Years	TOTAL				% OF ANNUAL INCREASE			
	Total	Air Algerie	Royal Air Maroc	Tunis Air	Total	Air Algerie	Royal Air Maroc	Tunis Air
70	1162	505	402	255	17.4	21.0	13.5	18.3
71	1419	621	481	317	22.1	23.0	19.7	24.3
72	1644	685	567	392	15.9	10.3	17.9	23.7
73	2144	936	678	530	30.4	36.6	19.6	35.2
74	2559	1138	786	635	19.4	21.6	16.0	19.8
75	2965	1335	894	736	16.0	17.3	13.7	16.0
80	6039	2783	1787	1469	15.0	16.0	15.0	15.0
85	10804	5090	3138	2576	12.0	13.0	12.0	12.0

FORECASTED

TABLE VIII
ANALYSIS OF PASSENGER TRAFFIC BETWEEN
FRANCE AND NORTH AFRICA

Year	Air	Sea	Total	Air Traffic as % of Total
1965	596600	999200	1595800	37.3
1966	715900	1204000	1919900	37.2
1967	927300	1641400	2568700	36.1
1968	1033200	1664400	2697600	38.3
1969	1068900	1398600	2467500	43.3
1970	1194800	1451600	2646400	45.1
1971	1312800	1371100	2683900	48.9
1972	1383500	1418000	2801500	49.3
1973	1479300	1573400	3052700	48.4
1974	1075300	951500	2026800	53.0

SOURCE: IATA Bulletin, 1976.

international services which is almost 50 percent of the total air traffic.

Development of foreign tourism continues to be one of the promising source of foreign revenue of Northwest Africa (Morocco, Algeria, and Tunisia) with a considerable prospect for future expansion (see Table IX). A particular attraction for Northwest Africa for the foreign tourist is the fact that is very close to the main tourist generating countries of western Europe. Also North African countries are romantic and entirely different from western cities and relatively unexplored. It is a different experience for Europeans. Tunisia and Morocco have systematically developed their tourist potential, Algeria has so far not made very positive efforts to develop tourism. Algeria intended to double its accommodation capacity from 14,600 to 30,000 beds between 1976 and 1980.⁽¹⁴⁾ It is still far off the mark since its capacity was still under 17,000 beds in 1978.

In these countries, political factors have played a considerable role in the restrained welcome to non-Arab tourist travellers and sometimes to Arab travellers. As an example, the Algerian/Moroccan border is practically closed. Morocco and Tunisia attach great importance to the American market: in 1977, Morocco took over 100,000 visitors from the United States, and Tunisia only 12,200. The latter country made a considerable financial effort in 1979 to publicize the Tunisian tourism in the United States. Both countries which are equipped (and sometimes

(14) ITA Bulletin, "Tourist Travel to North Africa," 1980.

TABLE IX

TOURIS ARRIVALS FROM EUROPE AND NORTH AMERICA*

Country of Nationality	MOROCCO			TUNISIA			Avg. Ann. Inc. %
	1970	1975	1978	1970	1975	1978	
France	94959	129130	184420	37836	72389	130000	17.6%
U.K.	48496	74445	108000	14946	46451	75000	33%
Germany	32876	44727	70000	21682	74380	132000	30%
Belgium	15974	26812	38000	11609	19063	31000	33%
Italy	16436	24141	35000	16934	25443	48000	21%
Switzerland	15646	20911	35000	14795	29084	42000	23%
Scandinavia ⁽²⁾	17773	36444	52000	11493	39293	56000	46%
Spain	39907	46869	72000	n.a.	n.a.	n.a.	n.a.
U.S.S.R.	n.a.	n.a.	n.a.	10386	11072	12000	19.9%
U.S.A.	28933	66411	90000	14058	18619	25000	15.6%
Canada	n.a.	19306	26000	n.a.	n.a.	n.a.	n.a.

*Does not include citizens of both countries returning home from abroad.

(1) Source, Problems of Tourism for Selected Countries in Mediterranean Area with Reference to Local Conditions, 1979, Institute for Tourism, University of Munich.

(2) Denmark and Sweden only.

over equipped) for tourism are dependent on the generating markets and the political situation on their own territory. The Cyprus crisis, the revolution in Portugal and the war in the Lebanon had varying effects over different periods on tourism results. Morocco in 1975 and 1976 was affected by the western Sahara war at its southern borders.

Tunisia's tourist results may well be affected by its internal conflicts.

However a certain shift in the relative shares of European and non-European markets has already started (see Tables X,XI). The share of the Middle East countries is becoming more pronounced, as visitors from the Persian Gulf countries no longer go to Lebanon and travel less to Egypt; North Africa is an agreeable alternative.

C. Socio-Economic Data

Algeria

Algeria with 18.6 million people and 919.951 square miles, is situated in Northwest Africa between Morocco and Tunisia. The climatic and geographic regions of Northern Algeria are determined largely by the Mediterranean Sea and the two Atlas mountain chains which cross the country laterally. Northern Algeria accounts for 12 percent of the country's size and 95 percent of population. Nearly all Algerians are Muslims of Arab, Berber or mixed Arabo-Berber stock. This part of the world has been successively invaded by many conquerors such as: Phoenicians, Romans, Turks, Arabs and French. The greatest cultural

TABLE X

SHARE OF THE MAIN GENERATING MARKETS TO NORTH AFRICA 1977

Receiving Countries Generating Regions or Countries	ALGERIA %		MOROCCO %		TUNISIA %		TOTAL %	
	Arrivals (000)	Share in Total	Arrivals (000)	Share in Total	Arrivals (000)	Share in Total	Arrivals (000)	Share in Total
France	166.0	68.7	822.1	57.6	849.1	83.6	1899.7	67.5
of which France	94.7	39.2	284.0	19.9	386.5	38.0	771.7	27.5
Germany (F.R.)	13.5	5.6	28.4	6.9	151.0	16.9	270.5	9.6
U.K.	8.2	3.4	104.8	7.3	58.9	5.8	182.9	6.5
Scandinavia	3.0	1.2	56.9	4.0	53.7	5.3	114.6	4.1
Italy	15.0	6.4	29.8	2.1	53.5	5.3	123.3	4.4
Middle East	7.2	3.0	n.a.	9.3	5.8	5.8	n.a.	n.a.
United States	6.6	2.2	108.5	12.2	1.2	1.2	132.9	4.7
TOTAL	241.7	100	1427.5	1016.0	100	100	2811.0	100

SOURCE: ITA Bulletin 10-E, 1980.

TABLE XI

ARRIVALS BY VISITORS RESIDENT ABROAD (IN THOUSANDS)

	1973	1974	1975	1976	1977	1978
ALGERIA	250.2	231.2	296.5	184.8	241.7	240.0
MOROCCO	1340.6	1204.7	1244.8	1107.7	1427.5	n.a.
TUNISIA	721.9	716	1013.9	977.8	1016.0	1141.9
TOTAL	2570.6	2447.9	2793.2	2500.6	2810.9	-

SOURCE: ITA Bulletin, 1980.

impact came from the Arab invasions which also brought Islam and the Arabic language. But in 1830, the French, began their conquest of Algeria brought in the French culture and influence which lasted until the mid-sixties. After independence, and through the development of modern economic sector, a large number of French remained here.

Algeria's Gross Domestic Product (GDP) was estimated at \$16.71 bil (U.S.) in 1979; and per capita income was \$914. Large deposits of petroleum, natural gas and coal exist in the Sahara area. Although about 65 percent of the population depends directly on agriculture for a living, only one third (1/3) of the national income comes from this source. More than 500,000 Algerians work in France and some 20,000 French teachers and technicians live in Algeria. Another major source of income is the recent development of a tourist industry.⁽¹⁵⁾

Morocco

Morocco with 20.6 million people and 171,953 square miles, is situated on the northwestern corner of Africa, with almost 1250 miles of coastline on the Atlantic Ocean and Mediterranean Sea. Morocco's population mostly live in cities and they are descended from indigenous Berbers and Arabs who invaded Morocco in the 9th and 11th centuries. Arabic is the basic language, but French and Spanish are spoken also.

(15) Pawera, J. C., "Algeria's Infrastructure: An Economic Survey of Transportation, Communication and Energy Resources," New York, F. A. Praeger, 1976.

Morocco's estimated Gross Domestic Product (GDP) was \$12.7 bil (U.S.) in 1979, or about \$678 per capita. The economy depends heavily on agriculture, more than 70 percent of the Moroccans deriving their living directly or indirectly from the soil. The leading agriculture products are grain, fruit, vegetables and wine grapes. Livestock raising is also important, minerals resources are an important contributor of the GNP. Phosphates, manganese, iron, lead, zinc and some petroleum are among the basic minerals produced. Other (less important) industries such as: textiles, cement and paints contribute to the national income. Tourism is growing rapidly and gaining an important part as a producer of hard currency. Since independence, the excellent infrastructure of roads, ports and other facilities inherited from the colonial power has been maintained and improved.

Tunisia

Tunisia with about 6.5 million people and 63.4 square miles, is situated between Algeria and Libya and has a long coastline with the Mediterranean Sea. Tunisia is subdivided by climate into the north area, which is wooded, fertile, and the source of most of the country's agricultural production; a central area comprising the coastal plains, noted for livestock grazing and olive groves; and a southern region which borders the Sahara desert and lacks sufficient rainfall to support more of the grazing herds and semi-nomade peoples. The Tunisian economy is

divided into three sectors: state, cooperative and private. Economic development is state-planned and given highest priority in government policy. Progress in economic development has been substantial, if uneven. The 1972-75 economic development plan called for an ambitious seven percent annual increase, but only 5.2 percent was obtained. In 1979 its GDP was estimated at \$6.2 bil (U.S.) and the income per capita \$934. Agriculture is the backbone of the economy. The principal crops are: wheat, olives, fruits, grapes etc. Livestock is also important to the economy. The primary industries include food and fertilizer processing and textiles. Although no extensive deposits have been found, commercially exploited deposits of phosphates, iron ore, lead and zinc are sources of foreign exchange.

D. Summary

With economic development taking place rapidly especially in Algeria (with exploitation of gas and oil), and an important tourist flows coming every year to the region, the three African Arab countries (Algeria, Morocco and Tunisia) should put aside their political differences and make an effort to achieve what could be a very bright future for their airlines. By doing so, their multinational carrier will serve a wider market, going where their individual airlines cannot go. By representing a block of states, it may have more political power than most individual airlines in negotiating route agreements, determining

fares and rates etc. Because it is a bigger customer for aircraft than the individual national airlines, the multinational airline generally would receive favorable terms from aircraft manufacturers.

The projected Air Maghreb has a strong potential for profit: scale economics, monopolistic advantages, over many African airlines, and schedule rationalization, all offer possibilities for making the projected consortium quite profitable. Even if they are not merged, Northwest African Airlines could cooperate in a number of ways such as a joint regional maintenance and spare parts pool, and commercial agreements.

CHAPTER V

CONCLUSIONS

The average per capita income is very low, and disposable income almost non-existent for large segments of the African population. Education and training facilities are insufficient, and the tourism infrastructure is in many places inadequate.

The results of this general situation are that the demand for international air transport services to, from and within Africa, although growing more rapidly than for the world as a whole, are at a relatively low level considering the size and population of the continent. Other problems resulting from the general economic situation of most the region include the scarcity of trained personnel to satisfy the technologically advanced requirements of economic and efficient air transport systems; difficulty in financing purchase of new aircraft; low flight frequencies; and transport delays resulting from the need to wait for connections; and relatively high operating costs. Coordinating action through many organizations, both global and regional, is required and is being taken through such programs adopted by the United Nations General Assembly as the International Development Strategy and the Transport and Communications Decade (1978-1988).

The remedy for personnel training, as with most the problems facing African air transport, lies partly in finding the necessary funds for

the support of students in Africa and abroad; but also in close co-operation and coordination between airlines and governments to maximize the usefulness of existing facilities. While understanding that it may be many years before demand for African air services is such as to produce the high density operations now achieved in more industrially developed regions, wide efforts should be made to ensure the continued growth of demand, in order that air transport may make its maximum contribution to African economic and social development and that the air services offered may be as frequent, efficient and economical as possible.

African airlines are suffering from the effects of the disorder, incoherence and unrealism in the fares field, and which are becoming more pronounced at present international air transport. The generally high cost of air transport constitutes another obstacle to development. To reduce airline tariffs and to improve revenue/cost ratios, measures must be found to reduce costs. Such measures might include increasing aircraft productivity and utilization, developing technical cooperation and coordinated fleet planning among airlines. The main recommendation to be formulated for Maghreb countries is the urgent need for those governments to achieve the realization of their projected multinational airline. The formation of this North African Arab consortium is politically possible and every effort should be made to encourage it in order for those countries to take full advantage of the services that

air transport can provide. For both, Maghreb countries, and other African countries, any other alternative would result in the paralysis of African airlines, which would become incapable of equipping themselves with more efficient and more economic fleets. They might then disappear with a resulting invasion of Africa by charter carriers and more powerful foreign airlines.

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