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MIDDLE EAST

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FOREWORD

Background of the study

This is one of a series of regional air transport studies produced in accordance with Resolution A18-20 adopted by the Assembly of the International Civil Aviation Organization in 1971. Since 1976, these studies have examined the development of both air passenger and air freight transport, with particular emphasis on trends and developments during the most recent five-year period for which information is available. The most recent ICAO regional studies are:

Asia and the Pacific	Circ. 201 (1986)
Africa	Circ. 189 (1984)
Latin America and the Caribbean	Circ. 175 (1983)
Middle East	Circ. 167 (1982)

Purpose of the study

In Resolution A18-20, the Assembly recognized the importance of the efficient and economic development of international air passenger and air freight services in connexion especially with the growth of tourism and trade and the usefulness of studies designed to further this development. The Assembly resolved that regional studies of the development of international air transport should be undertaken and decided that the contents of these studies should be condensed to the extent feasible. They were to have the over-all objective of assisting States by providing current information on trends and developments in air transport, indicating obstacles to further development, and measures to overcome these obstacles.

Scope of the study

This study deals with the development of international air passenger and air freight services to, from and within the 14-State Middle East region. It spans a period from 1977 to 1987, using some 1988 data where available. It also forecasts the international traffic of the airlines of the region for the period 1988 to 1998.

As with previous studies an underlying assumption is that States make and implement their own policies and plans for air transport system development and that this study may be of value in the preparation of such plans and in the formulation of such policies. Similarly, its usefulness could extend to the several parts of the air transport system, especially the airline and airport components.

Sources and limits of information

One of the main sources of information used in this and other ICAO air transport studies is the data regularly filed by Contracting States on Air Transport Reporting Forms and published in seven series of statistical digests: Traffic — Commercial Air Carriers; Traffic by Flight Stage; On-Flight Origin and Destination; Airport Traffic; Fleet — Personnel — Commercial Air Carriers; Civil Aircraft on Register; and Financial Data — Commercial Air Carriers. There are some deficiencies in the statistical material and not all States are able to file all of the data requested.

To supplement the data available from the statistical programme, questionnaires were addressed to the Contracting States in the region, and to the other ICAO States with airlines operating to the region. Replies to these questionnaires were received from Cyprus, Czechoslovakia, France, Federal Republic of Germany, Hong Kong, Kuwait, Pakistan, Spain, Switzerland, Saudi Arabia, Syrian Arab Republic and Turkey.

Information was also obtained from Bahrain, Iraq, Israel, Kuwait, Jordan, Saudi Arabia, Syrian Arab Republic and United Arab Emirates, during missions undertaken by the Headquarters Secretariat to establish direct personal contact with appropriate officials of governments, air carriers, and other entities.

Another source of information used for this study was the large and constantly updated collection of research material on hand at ICAO, including completed ICAO studies, periodical and occasional publications of national administrations and international organizations, studies prepared by research agencies and individuals and the aviation press. A selected bibliography follows the Appendices.

The monetary unit used throughout this study is the United States dollar.

Review of the text

This study, completed on the basis of the information sources indicated above, was reviewed by the Air Transport Committee. Taking into account the comments made by the Committee, the present text was prepared by the Secretary General and published by decision of the Council.

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The Middle East lies on major air and surface trade routes between Asia and Europe. It has 14 sovereign States, all of which are Contracting States of ICAO: Bahrain, Democratic Yemen, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen.

The region has 112 million inhabitants, or 2.3 per cent of the world's population. The populations of most countries are relatively small, except for the Islamic Republic of Iran and Iraq. Three out of four inhabitants live in oil-exporting States, and in most countries are concentrated in and around urban centres. Migrant workers are important to many economies.

The Middle East region accounts for 3.6 per cent of the world's imports and 3.7 per cent of its exports, notwithstanding that all the States of the region (except Israel) are developing countries. The combined Gross National Product (GNP) of Middle East States amounted to about $218 billion in 1986 with a high GNP in many States due largely to the export of crude oil.

As in other developing regions of the world, the air transport system of the Middle East has grown in large part to meet transport needs not served or not best served by surface modes. Railways in the region are relatively few and far between. The highways infrastructure has received heavy investment so that highway transport competes increasingly with air transport in some markets.

Business travel predominates in the Middle East travel market. Other important components are foreign worker movements, travel for educational reasons and for medical treatment not locally obtainable, and travel for religious reasons, including Haj pilgrim traffic, "Holy Land" travel and visits to Shiah Moslem shrines in Damascus. Tourism demands for air travel to the region as a whole are of relatively limited importance; tourist travel by nationals of the region is significant, however, and encompasses a wide variety of destinations.

The demand for air freight is changing from one focused on the import of goods required for project development to satisfaction of the growing demand for foodstuffs and consumer goods. The demand for air freight services for the export of goods from the region is very limited, except from Israel. As a result there is a noticeable imbalance in the directional flow of air freight, one which influences airline operating economics and the ability of airlines to meet demand in the dominant direction. A partial offset to this directional imbalance is found at airports located near Gulf ports where facilities have been provided for the sea/air transfer of Asia to Europe freight.

The population of the region is expected to continue to grow at about 3 per cent per year. Future changes in the aggregate GNP of the region, which has declined since 1983, are closely linked to changes in the price of oil and to the settlement of armed conflicts in the region.

Airports of the Middle East

The Middle East is now well equipped with international airports as a result of decisions taken in the 1970s. The economic prosperity experienced by most countries of the region following major oil price increases in 1973-1974 had resulted in exceptionally high traffic growth which placed strains on all transport systems. The States of the region undertook major programmes to establish a system of modern airports and navigational facilities capable of meeting anticipated requirements to the end of the century. Added impetus to airport development programmes was given by further increases in the price of oil in 1979-1980 which helped maintain a strong growth in traffic while at the same time ensuring the availability of necessary financial resources.

Almost all large population centres in the Middle East are now within relatively short driving times of one or more of the 28 airports receiving scheduled international air services, all of which are of recent construction or have been modernized and expanded. Fifteen are served by 10 or more international airlines, led by Dubai and Jeddah with no fewer than 45 and 41 international airlines respectively.

New airports have been opened in recent years to serve Jeddah (1981), Abu Dhabi (1982), Baghdad (1982), Riyan (1982), Amman (1983), Riyadh (1983), Isfahan (1986) and Al Fujairah (1987), and new terminals built at airports serving Aden, Damascus, Dhahran, Dubai, Hodeidah and Kuwait. Major expansions of existing facilities were also completed at Bahrain, Muscat, Ras Al Khaimah, Salalah, Sana'a, Sharjah and Tel Aviv.

Few Middle East airports generate revenues sufficient to cover their relatively high costs of operation and maintenance, much less their capital costs which have also tended to be high, especially in the south, because most of the materials, services and labour have had to be imported.

Aeronautical revenues (such as landing, parking and passenger service charges) constitute the major source of operating revenues for airports in the region. However, charges at most airports, especially those handling transit traffic, are well below the world average and vary considerably from one airport to another.

Non-aeronautical revenue sources, including concessions and rentals, are increasing in importance at several airports, especially Abu Dhabi, Amman, Bahrain, Dubai and Tel Aviv and contribute at those airports towards offsetting operations and maintenance costs. Additional revenues are also generated in some locations by other activities such as maintenance bases and flight kitchens.

Most international airports in the region are managed by the national civil aviation administration. However, some States have established separate authorities operating under over-all government control. In other instances, contracts exist with foreign enterprises for the operation of an airport or of specialised services. At some airports, ground handling and the management of cargo terminals are provided by a semi-public or commercial agency. Long-term training programmes and increased experience have gradually reduced the need for contract personnel to provide technical and management expertise necessary to the provision of airport and route facilities, although many expatriates still work in advisory capacities.

In a number of States in the region the full costs of providing route facilities have yet to be determined and certain cost elements (e.g. meteorological costs) are often not included. Nevertheless, route facility costs in the region are increasing in part due to the establishment of a flight information region (FIR) for the Emirates and another for Muscat which extend over airspace previously covered by parts of the Bahrain FIR.

Between 1970 and 1982, international passenger traffic at airports in the Middle East grew by some 14 per cent a year, slowing to only 1 per cent a year from 1982 to 1987 to reach an estimated total of 28.7 million passengers. By 1987, Bahrain, Jeddah and Tel Aviv were among the 50 largest airports in terms of international passengers while Dubai, Jeddah and Tel Aviv were similarly ranked in terms of freight.

With the exceptions of Dhahran, Jeddah, Riyadh and Tehran, most international airports in the region handle relatively little or no domestic traffic. Non-scheduled traffic is also of limited importance except at Eilat and Jeddah. However, direct transit international passengers are important at several airports, notably in the Gulf area.

Freight traffic at Middle East airports grew steadily, although more slowly than passenger traffic, from about 535 000 tonnes in 1977 to some 654 000 tonnes in 1982. Growth strengthened to reach a total of 868 000 tonnes in 1987. The proportion of the total regional air freight handled by the Arabian peninsula airports rose from less than one-third in 1977 to over two-thirds in 1987. Apart from Tel Aviv, airports of the region handle considerably more inbound cargo than outbound.

Closely related to the growth and development of international airports in the Middle East is facilitation, the goal of which is to assist the development of air transport by ensuring that its main advantage, speed, is not reduced by unnecessary and time-consuming formalities and ground-handling procedures. To further this goal, ICAO established a comprehensive facilitation programme on the basis of the Standards and Recommended Practices set forth in Annex 9 to the Chicago Convention. Contracting States are required to notify ICAO of any differences between Standards and their national requirements. Only one State in the region has officially done so, although five other States list differences in the facilitation section of their Aeronautical Information Publications (AIPs) and all indicate entry requirements elsewhere in their AIPs.

Procedures in the Middle East that impede facilitation include visa requirements for temporary visitors, the passenger manifest requirement, additional information requirements on embarkation and disembarkation cards, written baggage declarations, treatment of unaccompanied baggage as cargo, and excessive and complicated documentation for, and systematic inspection of, all shipments.

New international airports at Al Ain and Dhahran will be entering service in the Middle East in the near future, followed later by those at Eilat and Tehran. Some existing airports will open expanded facilities (Bahrain, Jeddah, Tel Aviv) and some temporarily closed airports can be expected to reopen (Abadan, Basrah). The continued development of international airports in the region will affect both the future volume of air traffic and its distribution among airports.

Airlines of the Middle East

Thirteen scheduled airlines and four non-scheduled operators based in the Middle East perform international services. Of the scheduled airlines, all but El Al, Middle East Airlines (MEA) and Trans Mediterranean Airways are wholly government-owned companies, while Gulf Air and Yemenia are owned by more than one government. All the scheduled airlines are members of the International Air Transport Association (IATA) and all but Alyemda, Emirates and Gulf Air participate in tariff co-ordination. Eleven airlines also belong to the Arab Air Carriers Organization (AACO).

At the end of 1988, the 17 international carriers of the region operated 258 commercial transport aircraft of which 238 were jet and 20 turbo-prop. Although the total fleet increased by only 7 per cent between 1981 and 1988, capacity grew substantially, the number of wide-bodied aircraft more than doubling from 55 to 120. Of

the jet aircraft, only one in eight now fails to meet ICAO Chapter 2 noise standards. Forty-four per cent meet the more demanding Chapter 3 noise standards, a higher proportion than that of the fleets of any other region except Asia and the Pacific.

The Middle East airlines incurred a cumulative operating loss of $130 million between 1977 and 1987, compared to operating profits of $27 400 million for the world's airlines as a whole. They did, however, achieve a combined operating profit of $100 million in 1987. Total operating revenues almost tripled from 1977 to 1987 to $5 550 million, having grown at 10.2 per cent a year, and remained at about 4 per cent of the world figure. Passenger revenues accounted for 71 per cent of the total. Average passenger yields were substantially above the world airlines' figure, while freight yields were well below.

Unit operating expenses grew more slowly than the world average but certain cost categories (maintenance and overhaul; depreciation and amortization; ticketing, sales and promotion; and general, administrative and others) remained well above world averages. Nevertheless, in 1987 total operating costs per tonne-kilometre available averaged 46.7 cents which was almost identical to the world figure.

The passenger-kilometres performed (PKPs) by the airlines of the Middle East on international scheduled services more than doubled between 1977 and 1987 to remain at about 5.3 per cent of the world total. During this period, the average number of seats available per aircraft increased by more than half to 233 and the average passenger trip length rose substantially. In contrast, the average passenger load factor declined slightly from 62 per cent in 1982 to 61 per cent in 1987 while the world average grew from 62 to 67 per cent. Almost one-fifth of the passenger traffic was domestic carried by Iran Air and Saudia. The non-scheduled passenger traffic of the airlines of the Middle East grew substantially and in 1987 constituted about 5 per cent of their total international and domestic passenger traffic.

The freight tonne-kilometres (FTKs) performed by the airlines of the region on international scheduled services also doubled between 1977 and 1987, but average annual growth (at 7.1 per cent) was lower than the world average (9.2 per cent), resulting in the Middle East airlines' share of world freight traffic declining from 6.8 to 5.6 per cent. Freight traffic continued to represent 38 per cent of the total tonne-kilometres performed. The over-all average weight load factor rose from 49 to 55 per cent but was still well below the world average of 64 per cent. Average aircraft capacity increased from 25.4 to 38.1 tonnes, while the amount of freight carried per departure grew from 4.8 to 7.9 tonnes.

The future demand for international air transport by the scheduled airlines based in the Middle East is influenced by external factors such as political conditions, economic growth, demographics and the price of crude oil, and by internal factors which include airline costs, yields and load factors. Although the economies of the region grew at or above the world average rate for many years, GNP has declined since 1982. The World Bank has projected economic growth for oil-exporting developing countries of 3.6 to 4.4 per cent between 1986 and 1995, while the International Monetary Fund anticipates that the price of oil will remain constant in real terms up to 1992. Taking all these factors into account, ICAO has developed forecasts for the period 1988-1998, based on the "most likely" assumptions that real economic growth will average 2.5 per cent a year, imports will grow by 4 per cent a year and passenger and freight yields will decline annually by 2 and 3 per cent respectively.

On the basis of these assumptions, ICAO forecasts that the international scheduled traffic of airlines based in the Middle East is most likely to increase at an average annual rate of 5.5 per cent for passengers and 5.0 per cent for freight during the period 1988-1998. These rates are below the 1977-1987 average annual growth rate of 7.3 per cent for PKPs and 7.1 per cent for FTKs and well below the most likely rates of increase forecast by ICAO in 1982 of 11 and 9 per cent respectively. For comparison, a 1987 study by McDonnell Douglas forecast traffic between 1987-1997 to grow at 7.2 per cent for PKPs and 5.2 per cent for FTKs, while Boeing in 1988 forecast the PKPs by Middle East airlines to grow at 5.1 per cent a year from 1986 to 2000.

Air services to, from and within the Middle East

Air services to, from and within a region reflect the interaction of many factors, including market demand, the supply as determined by choices made by airlines and governments regarding the countries and cities to be served, and the frequency, regularity and patterns of service, as well as government regulation and the prices airlines charge.

Passenger demand on all international air services to, from and within the Middle East grew by some 2.8 per cent a year between 1982 and 1987 to reach a total of 22 million in 1987. Freight demand increased by 6.6 per cent a year over the same period to an estimated 900 000 tonnes in 1987. In both cases, the most heavily travelled routes were Middle East-Europe, followed by those to and from Asia and the Pacific, intra-Middle East, to and from Africa and to and from the Americas. Passenger and freight transport markets were influenced by the sharp decline in oil prices, which curbed public spending on national development projects and either reduced personal incomes or slowed their growth, and by hostilities in parts of the region.

Since 1980, the pattern of international air service route links to and from and within the Middle East has undergone moderate changes in contrast to the dramatic growth experienced during the 1970s. Through-plane

services operated by the 13 airlines of the region and by 22 European airlines now connect the Middle East with 22 States in Europe. Although Israel and Lebanon have no through-plane scheduled passenger services to the Asia/Pacific region, the other States of the region are each linked to one or more of 18 countries in that region. An important development has been the tripling since 1980 of the number of Asia/Pacific States served by Middle East airlines, in parallel with services offered by 17 airlines of that region. Another significant development has been the expansion in the route network linking the Middle East and Africa, notably to sub-Saharan Africa. All the Middle East carriers except Iran Air operate to Africa, while services are also provided by 16 African airlines, compared to 12 in 1980. Through-plane services operated by four airlines from the Middle East, three from the United States and one from Pakistan link seven countries in the region with North America. Iraqi Airways provides the only through-plane service to Latin America. With the exceptions of the absence of any air links between Israel and the rest of the region, and the temporary discontinuance of numerous links to and from the Islamic Republic of Iran, Iraq and Lebanon, the intra-regional network is relatively well developed with nine of the thirteen States being directly linked with two-thirds or more of the other States in the region.

Most States in the region pursue a policy of controlled regulation and balanced capacity sharing. Historically, policy has been much influenced by the region's location on the southern trunk route between Europe and the Asia/Pacific region. However, changes in service networks and competition among airports to attract and hold business has resulted in several very liberal air service agreements and the adoption of an "open skies" policy by Dubai and Sharjah. Israel's non-scheduled regulations have also been liberalized in order to better compete in the European charter market. A common requirement in the Middle East is that a foreign airline operating a bilaterally agreed route pay a royalty to the non-operating national airline.

Most States of the region pursue a "dual approval" regime for tariff regulation, but delegate the actual negotiation of tariffs to airlines working within the framework of IATA. The Arab Air Carriers Organization and the African Airlines Association provide fora for airlines to co-ordinate tariff submissions to the IATA Tariff Coordinating Conferences. With the exception of the Middle East-Europe routes, pricing agreements have regularly been reached on tariffs for most routes involving the Middle East. The abuse of officially approved tariffs continues to be a problem. Since the dismantling of IATA's tariff enforcement machinery in 1987, enforcement has been confined to action taken by States and regional organizations.

Average normal economy fares within the Middle East and from the Middle East were generally lower in 1987 than the world averages except on the longer routes to Europe, shorter routes to the South Asian subcontinent and on routes to the Far East. Fares to the region were higher than the world averages on routes from Europe, from Africa (other than North Africa), on long-haul routes from the Far East and from North America. Directional fare level patterns have changed significantly since 1977, primarily due to currency changes. First class fares are generally available, and intermediate class fares are available on most routes at a level some 10-15 per cent above the normal economy fare. The only widely available special fare, the economy excursion fare, was set at between 50 and 90 per cent of the normal economy fare. The lack of special fares for the general public to, from and within the Middle East was in part mitigated by the wide range of preferential fares for those meeting certain age, occupation, family relationship or affiliation requirements.

The under-45 kg general cargo rates were generally above the world averages on most routes in 1987. Discounts of about 25 per cent are provided by the general cargo rates for larger shipments on most routes. Further discounts for shipments of over 500 kg are available at rates 40 to 85 per cent less than the under-45 kg rate. In addition, specific commodity rates are offered on most extra-regional route groups at levels 15 to 60 per cent below the under-45 kg general cargo rate.

Forecasts (made by other organizations) of passenger traffic by route group through to the mid- to late 1990s anticipate growth of 4 to 6 per cent on most routes to and from the region; passenger travel within the region, however, is expected to grow more rapidly by between 7 and 9 per cent. Freight moving between the Middle East and Europe is forecast to grow by 5 to 6 per cent each year over the same period.

Certain developments can also be envisaged which are likely to bring about changes in established services if they take place. Among such changes may be cited the reduction in the number of services transiting the region, which could possibly be offset by extra-regional airlines developing "third country hubs" in the Middle East for the interchange of their on-line traffic. Creation of directional flow "banks" of flights at home-base hubs, similar to the practice of Royal Jordanian at Amman, could also have important consequences for the region's service patterns. Opportunities exist for the use of low-capacity jet aircraft to operate scheduled services on domestic and international routes with limited traffic. Blocked-space, code-sharing arrangements with extra-regional airlines such as those entered into by Gulf Air and Royal Jordanian could prove an attractive means of expanding services to some regions in the future. Finally, the gradual resumption of services to certain cities following the end of hostilities in the Gulf will assist in ensuring continuing growth for the region's air transport.

CONCLUSIONS

The development of international air transport in the Middle East continues to be influenced in many ways by the price of oil, the existence or resolution of conflicts, and to a lesser extent by improvements in surface transport and rapid population growth.

Users of air transport have benefitted from major investments made in modernization and development of the many international airports in the region over a relatively short time.

The air transport system has benefitted from the addition by airlines based in the region of many new, highly efficient jet aircraft. This expansion resulted in the largest increase in seats available per aircraft in the fleet of any region between 1977 and 1987 and a gain in distance flown per passenger unsurpassed by the airlines of any other region.

The prevalent pattern in the region of controlled regulation and balanced capacity in bilateral air services has been modified somewhat with the development of an "open skies" policy at some airports, the conclusion of several liberal air services agreements, and the establishment of a new international airline (Emirates).

The above are the major conclusions of this regional air transport study which is intended "to assist States by providing current information on trends and developments, indicating obstacles to further development, and measures to overcome these obstacles" (Assembly Resolution A18-20). Despite generally favorable trends, there remain obstacles to further development of the air transport system in the Middle East. Described below are several such obstacles which are susceptible to remedial action, followed by suggested measures to overcome them that could be considered by airport authorities, airline managers, air transport regulators and other relevant national officials in the region in any efforts they may undertake to further improve their parts of the air transport system.

Airport planning

The volume of traffic at airports in the Middle East has fluctuated widely since the early 1970s. The virtual stagnation of passenger traffic since 1982, following a period of very high growth, and reductions in airline services transiting the region, make it difficult for airport planners to accurately gauge future demand, particularly as adequate data bases have not always been maintained. Suggested measures:

a) Ensure the regular collection of adequate airport traffic and financial statistics needed for effective long-term planning.

b) Consider the regular exchange between airport and airline planners of information on traffic trends and forecasts to ensure realistic assessments of future airport capacity requirements and awareness of likely future requirements for facilities to handle passenger and freight traffic.

Finance and management of airports and route facilities

Airports and route facilities in the Middle East do not, as a rule, generate sufficient revenues to cover their costs of operation and maintenance, much less capital costs. Airport charges remain low at most airports in the region, often for competitive reasons, and are also considerably below world averages. In contrast, route facility charges are higher than world averages. Suggested measures:

a) Determine the full economic costs (including interest on capital and depreciation) of providing airport and route facilities and maintain regular accounts in order to improve the efficiency of management.
b) Examine the possibility, in concert with neighbouring States, of raising airport charges in those cases where they are, for competitive reasons, below the levels required to recover the full costs of operation.
c) Consider increasing revenues from conventional non-aeronautical sources (concessions, rentals, duty-free shops and "free-zones") and explore the potential benefits of establishing duty-free shops for arriving passengers.
d) Consider the establishment of independent airport authorities or public corporations to manage airports and route facilities, either separately or jointly, where this has not already been done and where it might improve efficiency and management.
e) Consider creation of a regional collection agency to bill and collect route facility charges on behalf of participating States.

Facilitation at airports

For passengers and freight, airports are not destinations but places to be passed through as quickly as possible. Numerous entry and exit requirements encountered in many States of the region impede the ease of passage. Various measures to alleviate these difficulties in accordance with Annex 9 to the Chicago Convention have not yet been taken. Suggested measures:

a) Make visas unnecessary or at least easier to obtain for temporary visitors, and, when they are necessary, issue them in one of the other languages specified in Annex 9 (i.e. English, French or Spanish) in addition to Arabic .
b) Consider abolishing the requirement for the passenger manifest and limit the information required on embarkation and disembarkation cards to essential needs.
c) Implement the dual-channel baggage clearance system and ensure that unaccompanied baggage is not treated as freight for clearance purposes.
d) Reduce excessive and complicated documentation requirements for cargo clearance while using recommended sampling methods for its inspection.

Airlines of the Middle East

Airlines based in the Middle East, as a group, achieve relatively high passenger yields, relatively low load factors and relatively low profitability. The practice of paying royalties based on percentages of full economy fares severely restricts the ability to offer discount fares, which in turn contributes to lower than average load factors and decreased profitability. Unit costs are well above world averages for numerous cost elements. Suggested measures:

a) Work toward elimination of the practice of paying and collecting royalties, especially where they are based on percentages of full economy fares.
b) Propose more discount fares designed to attract new traffic at prices and levels of availability which would increase load factors more than they would lower average yields.
c) Place greater emphasis on yield management, including the possible use of one or more computerized programmes to allocate seats more effectively (by class, by flight, by segment) between higher-yield and lower-yield traffic.
d) Consider the costs and benefits of hub operations with connecting banks of flights to permit increased service frequency (by the combination of more city-pair markets on each flight) and to improve load factors.
e) Explore the expanded use of joint marketing and joint operating arrangements (such as blocked space) to permit entry into markets where load factors might otherwise be too low for economical services.
f) Improve airline financial and operational data bases to better identify areas of potential cost reduction.

Personnel training

The rapid expansion of the air transport industry in most States in the Middle East creates a continuing demand for trained personnel in all specializations associated with air transport. A need exists in virtually every field of specialization: in the operation of aircraft, airports, airlines, and government civil aviation administrations. Here, as in other regions, aviation is in competition with other necessary activities for trained manpower and financial resources. Suggested measures:

a) Determine training requirements on a national and regional basis for each area of specialization, and identify appropriate training facilities available in the region and elsewhere.
b) Improve the co-ordination and co-operation between airlines and governments to ensure the most efficient use of existing personnel and facilities.
c) Seek, through appropriate domestic, bilateral, or multilateral arrangements, the necessary funds for the construction and operation of training facilities and for the support of students in training.

Chapter 1
Background to Air Transport in the Middle East

This chapter provides background information about the larger setting in which recent Middle East air transport trends and developments have taken place. Part A introduces the region by briefly describing the geographic, demographic and economic factors which influence the air transport system; Part B concentrates on how surface transport developments in the region have affected air transport; Part C analyzes the demands that users make upon the air transport system, thus affecting its character and size; and Part D discusses certain future non-air transport factors which could affect the system's development in the Middle East.

A. INTRODUCTION TO THE REGION

Geographic factors

The Middle East region (see Map 1-1) covers 5.4 million square kilometres or about four per cent of the world's land surface. Lying on latitudes roughly comparable to those of southern China, the South Asian sub-continent, Saharan Africa, the southern United States and Mexico, it occupies a central position on major trade routes, both air and surface, between Asia and Europe.

The Middle East region encompasses 14 sovereign States, all of which are Contracting States of ICAO: Bahrain, Democratic Yemen, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates and Yemen. The United Arab Emirates is a federation of seven sheikdoms: Abu Dhabi, Ajman, Dubai, Fujairah, Ras al-Khaimah, Sharjah and Umm al-Quwain.

Determinations of the geographic boundaries separating States were in many cases made by external powers or resulted from struggles within the region. This has contributed to increased tensions between some States of the region. Resultant armed conflicts and impediments to movement in many parts of the Middle East have had an impact on the development of the region's air traffic and air route linkages, both internal and with other regions.

Demographic factors

With 112 million inhabitants, or 2.3 per cent of the world's population, the Middle East has a relatively low regional population density of 21 persons per square kilometre, comparable to those of Africa and of Latin America and the Caribbean (see Appendix 1-1). National population densities range from only 6 people per square kilometre in Democratic Yemen, Oman and Saudi Arabia in the South, to 205 in Israel and 271 in Lebanon in the North, with the greatest density (694) found on the small island State of Bahrain (Appendix 1-2).

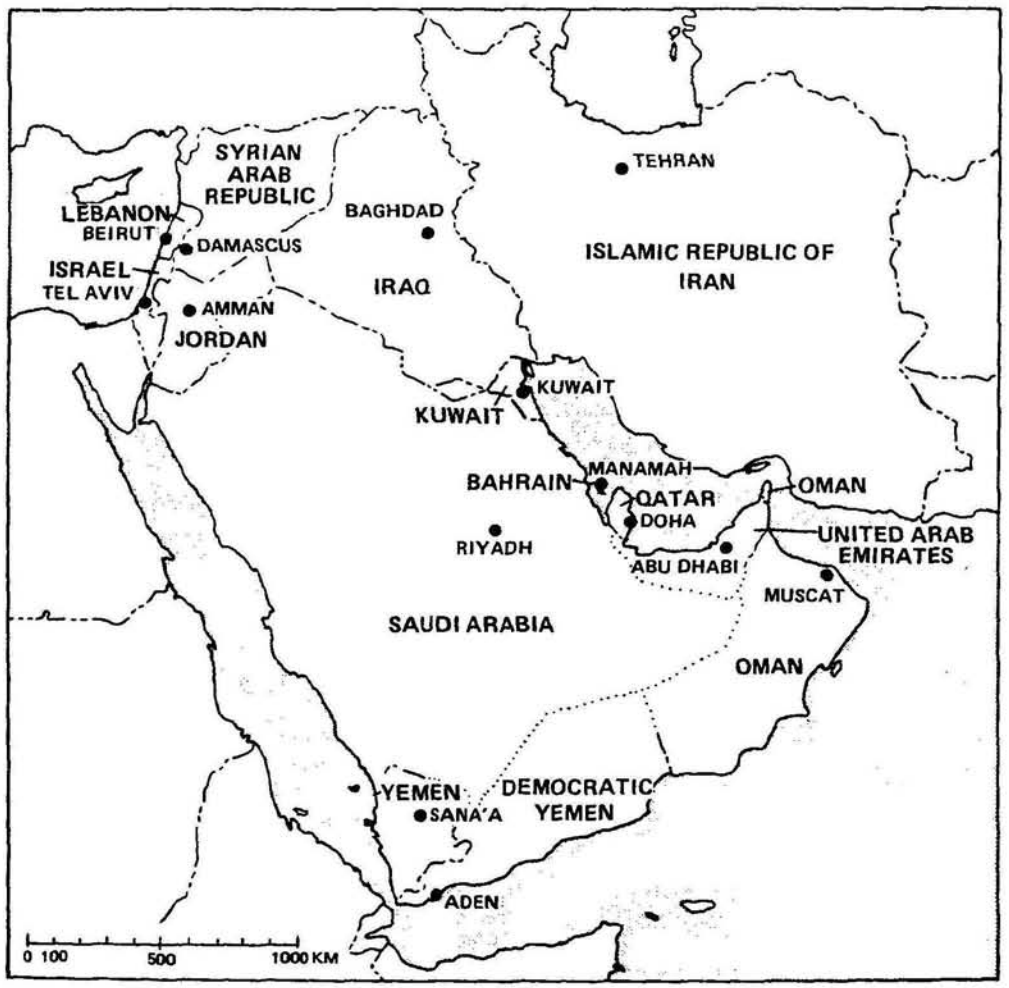
The populations of most countries are relatively small, under 5 million in nine countries, with the two largest (Islamic Republic of Iran at 46 million and Iraq at 16 million) accounting for over half of the regional population. Three out of four inhabitants live in oil-exporting States.

A large proportion of the populations of most countries is concentrated in and around urban centres. Apart from Democratic Yemen, Oman and Yemen, the urban populations of States in the Middle East range from 50 per cent of the inhabitants of the Islamic Republic of Iran and the Syrian Arab Republic to between 80 and 90 per cent in Bahrain, Israel, Kuwait, Qatar and the United Arab Emirates. Three more cities (Basra, Meshad and Mosul) now exceed one million in population in addition to the four so identified in the 1982 ICAO regional study (Baghdad, Beirut, Damascus and Tehran).

Migrant labour

The sizeable international migration of workers to this region is a significant demographic factor. Ambitious national development plans of the 1970s required a labour force of a kind and size not locally available. Foreign labour was sought and by the mid-1970s an estimated 1.6 million migrant workers were living in the Gulf States alone. By 1979, the number may have exceeded 2.5 million, constituting a substantial proportion of the total labour force, even a majority, in several Gulf States.

When oil prices began to drop in the 1980s the oil-producing States experienced falling revenues. Inflation



Map 1-1. The Middle East

resulted in declines in the real value of their cash deposits in the industrialized countries. They reacted by curtailing current expenditures and suspending, postponing or cancelling many projects. Consequently, many expatriate workers lost employment and returned home. Nevertheless, inbound labour movements continued because shifts in demand necessitated bringing in people with previously unrequired skills, or as unskilled labour. The operation and maintenance of projects already completed, as well as work on such new projects as received funding, continued to require migrant labour to the extent the work was not to be done by nationals. A higher proportion of the new migrants were unskilled service workers.

The non-oil producing States of the region, along with Egypt, having surpluses of workers, had initially provided about three-quarters of such labour. By 1980, however, this mainly Arab proportion had declined to less than two-thirds for the region as a whole, with increasing numbers of workers coming from India, Pakistan, the Philippines, the Republic of Korea or Turkey, as well as from Sri Lanka and Thailand. Nevertheless, an estimated four million expatriate Arab nationals now reside permanently in the Gulf States and Saudi Arabia, including almost two million Egyptians, one million Yemenis, and about 800 000 Palestinians, Jordanians, Syrians and Lebanese. The need to lower the costs of labour as the 1980s progressed resulted in even more replacements coming from new sources. In addition to Arab workers, there are an estimated 1.3 million Asian workers in the region.

Economic factors

The Middle East region accounts for 3.6 per cent of the world's imports and 3.7 per cent of its exports. The high percentage relative to population exists notwithstanding that all the States of the region (except Israel) are still developing countries. Despite per capita Gross National Product (GNP) in several States being among the highest in the world, they are still building up the basic social and economic infrastructure of a modern economy and creating an industrial base. Nevertheless,

only Democratic Yemen and Yemen are "least developed countries" as defined by the United Nations.

The combined GNP of the nations of the region amounted to about $218 billion in 1986 and, at two per cent of the world total, is roughly proportionate to regional population share. The high GNP of many States is due largely to their export of crude oil, thus its price level, while not the sole important factor in the economy of the region, is a highly significant one.

The large increases in the price of crude oil in 1973-1974, which had accelerated the rate of economic development and the demand for migrant labour, produced a period of economic prosperity for most States in the region. With more money available, much was invested in the rapid development of basic social and economic infrastructures (transport and communications, education, social and government services) as a prerequisite for subsequent industrial and agricultural development. By 1977-1978, most economies in the region were spending about one-third of their Gross Domestic Product (GDP) on investment, with construction receiving the largest allocation. This increased the importation of materials and machinery and further expanded the need for foreign labour, creating in both cases new markets for air transport. Although the impact was greatest in the oil-producing countries, most other economies of the Middle East benefited from increased financial aid and investment capital as well as from the remittances of their nationals working in oil-producing countries.

A second period of sharp increases in crude oil prices came in 1979-1980, peaking in 1981. Prices declined moderately thereafter until 1986. The reason for this peak and subsequent declines was that following the 1973-1974 increase the annual growth in global energy consumption had also dropped. By 1979-1981 energy consumption had actually declined in absolute terms in the developed market economies as a result of investments in energy-efficient durable goods and shifts in consumption patterns. As will be seen subsequently in this study, oil price declines were accompanied by consequent declines in GNP and declines in the growth of air traffic.

The year 1986 saw a third sharp fluctuation in oil prices, but this time downward. During the first seven months, oil prices plummeted about 64 per cent and recovered only about half this loss in the rest of the year. This produced a pronounced shift in income from oil exporting countries to oil importing countries. The year 1987 brought a somewhat more stable situation, although at price levels much lower than during the peak years, a situation which continues to dominate the economic factors underlying the economy of the region.

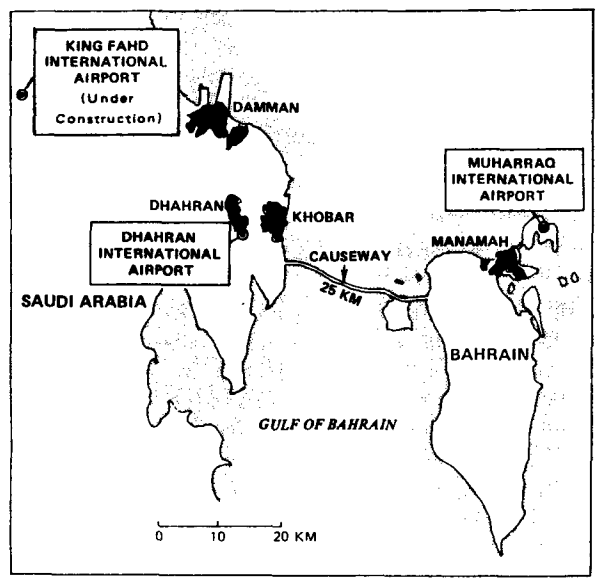
B. SURFACE TRANSPORT

As in other developing regions of the world, the air transport system of the Middle East has grown in large part to meet transport needs not served or not best served by surface modes. Railways in the region are relatively few and far between, limited to 10 500 km of track in seven countries, with recent improvements confined to a few routes. The highways infrastructure, on the other hand, has received heavy investment, so that by 1985 the region had 136 000 km of paved roads (Appendix 1-3). Highway transport now competes with air transport in some markets.

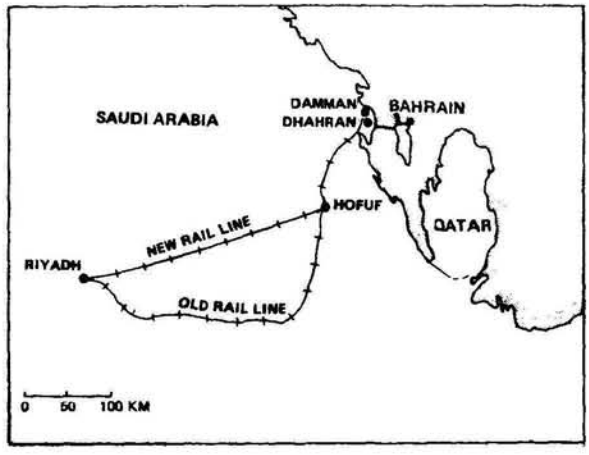
Significant intra-regional developments

The largest single road development project in the region, reportedly costing about one billion dollars, was the 25 km, four-lane divided Bahrain Causeway, opened in November 1986 to link the island country of Bahrain with Saudi Arabia and, through it, with the rest of the region (see Map 1-2). The opening of the causeway had a marked impact on the very short (10 flight minutes) Bahrain-Dhahran (Saudi Arabia) air route. In the first year of the causeway's operations, air traffic fell from about 15 000 passengers on average to about 7 700, the remaining air traffic being largely that in transit via Dhahran to and from third countries. With the opening of the causeway, Manamah (Bahrain) can now be reached by motor vehicle from Dhahran in about one hour and from Kuwait in about four and one-half hours.

A second surface transport development in the same immediate area was the reduction of travel time on the Saudi Railways line between Riyadh and Damman from seven hours to four. This was made possible by completion of a new high-speed (150 km/h) shortcut



Map 1-2. The Bahrain Causeway



Map 1-3. Saudi Railways' new line

across the desert between Riyadh and Hofuf, an intermediate point on the old line; by installation of a new signalling system; and by the introduction of new passenger trains. The direct link reduced the travel distance between Riyadh and Damman from 561 to 450 kilometres. The new service does not appear to have reduced the demand for Riyadh-Dhahran/Damman air service.

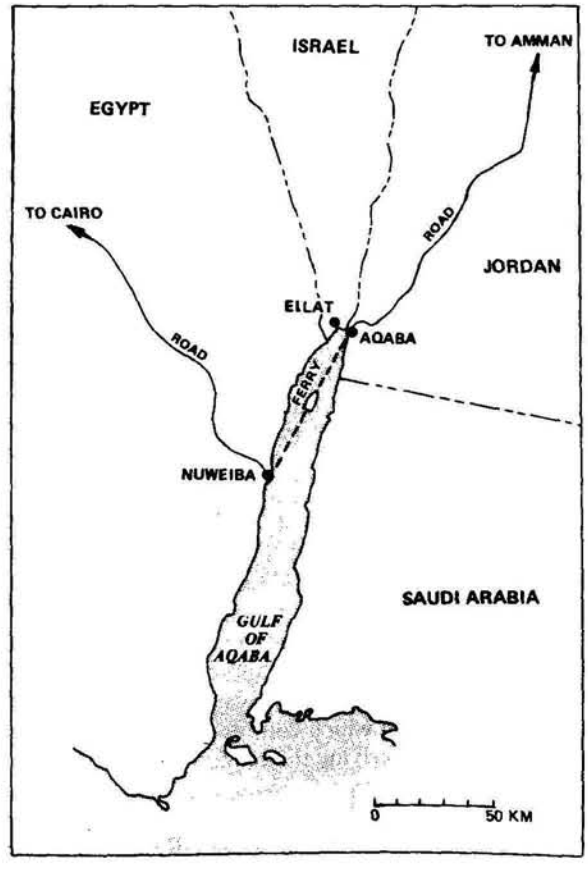
In a third significant surface transport development, to the north and west the new Nuweiba-Aqaba ferry service, which began operations on 25 April 1985, provides a price-attractive road/water/road alternative to air travel between Cairo and Amman. Two large ferry ships make the three-hour sailings on the Gulf of Aqaba to link the Sinai peninsula port of Nuweiba, Egypt with Jordan's port city of Aqaba, from which travellers can continue by road to Amman and beyond to Baghdad, Kuwait, and other points. Air traffic between Amman and Cairo dropped by about 44 per cent with the opening of the ferry service. Some Kuwait-Cairo air traffic was diverted to lower-priced surface transport which, while much more time consuming, afforded economical transportation of larger quantities of baggage.

Extra-regional surface transport

In the Europe-Middle East cargo market road haulage continues to be a price-attractive alternative to air transport. Door-to-door deliveries by road through Turkey from Atlantic coast points in Europe take about one week to Amman, two to lower Gulf points. Ferry services from Europe to the Mediterranean coast of the region also provide road/water/road alternatives.

Rail links also exist with Europe via Turkey, although this involves transshipment where the rail connexion is broken at the Bosphorus. Ferry services operate from Europe to Mediterranean ports in Lebanon and Syria. National rail lines provide some linkages from Beirut in Lebanon and Tartous and Latakia in Syria via Aleppo (Syria), then points just inside Turkey, to Mosul (Iraq) and Baghdad, and on to Basrah (Iraq) on the Gulf. From Basrah there is no link to the existing railhead at Damman, but one has been proposed from Basrah south to Kuwait and to Jubayl (Saudi Arabia) and one planned from there to Damman. Also planned is a railway continuing from the point where the existing Damman-Riyadh lines turn west at Hofuf (Saudi Arabia), via Abu Dhabi and Dubai to Muscat. Although proposals and plans have been made, no regional effort is under way to implement any of their components.

Container vessels also provide another price-attractive alternative to air transport for movements to and from the region's many ports, and beyond them by road to and from points in the region. With all countries in the region having at least one place of access to the sea, and with the development of many modern container ports in the region, this mode plays a dominant role in non-bulk transport.



Map 1-4. The Nuweiba Ferry

C. AIR TRANSPORT DEMAND

Similar kinds of air transport demand appear in all regions of the world; those of the Middle East, however, may be characterized by specific combinations of kinds of demand found in proportions which are unique to this region. This particular mixture of demand elements has an important determining effect on the relative size of an air transport system and the shape such a system takes to, from and within a region.

Passenger travel demand

Business travel, as distinct from personal and pleasure travel, accounts for a major, if not predominant share of Middle East air passenger travel demand. The region's relatively rapid economic development provides both an impetus for the growth of business travel and a reason for its continuing importance. Much of the business travel by residents of the region is related to the trade and services industries or to government. A considerable proportion of the business travel originating outside the region is related to the petroleum industry and to major civil engineering and industrial development projects. The latter travel segment fluctuates as the abilities of countries to pursue development projects change, and for reasons related to individual projects.

Foreign worker movement is an especially important source of travel demand in this region, particularly by workers who have taken up long-term residence and from time to time wish to visit friends and relatives in their countries of origin. Skilled personnel from more developed countries often receive recurrent employer-paid travel for family visit or recreational purposes which adds to this demand base. Alternatively, where workers are engaged for a specific short- to medium-term project for a fixed period, each may make only one round-trip from the country of origin. Nevertheless, when employment is short-term there may be a greater turnover of workers, which also increases travel demand.

Travel for religious reasons is highly important, the largest single element being Haj pilgrim traffic through Jeddah airport. It is concentrated in a two-month period which, being determined by the lunar calendar, shifts by either 10 or 11 days each solar year. On a less seasonal basis "Holy Land" travel centred on Jerusalem accounts for the next largest source of pilgrim demand for air transport, some of it via Amman. Another very important movement by air of pilgrims on a continuous basis is of Iranians who visit Shiah Moslem shrines in Damascus.

Travel for educational reasons and for certain medical treatments not obtainable locally constitutes an additional source of demand for air services. This demand is proportionately larger than expected in more developed regions, but could be affected by the expansion of higher education and medical facilities in the region as its development progresses. Related to educational travel is the movement of teachers when school periods begin and end (for example, of Egyptian teachers to Kuwait), which creates a demand for many extra flights.

Pleasure travel or tourism demands for air travel to the region as a whole are of relatively limited importance for several reasons. While some countries actively encourage tourism and provide necessary accommodations others do not, or make it difficult or impossible to enter without sponsorship. In several countries the existence of hostilities has depressed tourism, most notably to the Islamic Republic of Iran, Iraq, Israel and Lebanon. In other cases there may be no particular tourist attractions such as beach resorts, historic places or religious shrines. Available data on tourist arrivals in the Middle East are very limited (Appendix 1-4).

Tourist travel by nationals of the region is significant and encompasses a wide variety of destinations. Limitations on it tend to come mainly from changing economic conditions or political relations. In a few cases travel prohibitions on nationals or high exit fees designed to preserve foreign exchange have had severe dampening effects on outbound tourism. On the other hand, some vacation travel abroad by expatriates living in the Middle East, for example to resorts in Sri Lanka and Mauritius, has supported the development of scheduled air services.

Air freight demand

The character of the demand for air freight transport experienced by many countries of the Middle East derives from the needs and consequences of the region's rapid development. The use of air freight services for urgently needed items can often expedite completion of particular development projects involving the industrial, transport and communications plant or the basic social and economic infrastructures. For example, in 1986 more than half of the value of items imported into the region from the United States by air was attributed to aircraft, telecommunications, data processing and office equipment (Appendix 1-5).

Similarly, as countries develop, they tend to experience growth in demand for consumer goods which is satisfied to a significant extent through air freight services. These goods include perishable foodstuffs not produced locally, reflecting higher incomes and changing shopping patterns in the region as well as the needs of the hotel industry and the expatriate population. For example, perfumes, meats, newspapers, periodicals and clothing were significant imports to the region from France in 1986. According to replies by various States to an ICAO questionnaire, Pakistan sent fresh fruits, vegetables, fish and garments to the region by air; Czechoslovakia provided pharmaceuticals, textiles, spare parts, foodstuffs and elec-

tronics; and Switzerland supplied foodstuffs, textiles, chemical products and derivatives, mechanical and electrical equipment, paper and paper products, medicines, office machines and precision instruments. Fresh meat, live cattle and hatching eggs come to the region by air from several continents.

In like manner, the demand for air freight services for the export of goods from the region is shaped by the fact that development is still in progress. There tend to be few locally produced goods whose characteristics (weight, value, perishability, etc.) justify shipment by air. For example, the principal exports by air to France from the Middle East by value were cut flowers, fruits and meats; to the United States they were precious stones, artworks and jewelry with Israel being the chief exporter (Appendix 1-6). Personal effects of expatriates sent as unaccompanied baggage formed a large but declining part of Pakistan's imports from the region, and an important traffic item to Manila. Machinery being sent for repair is also an important outbound item.

The demand for air freight services is also influenced to a large extent by the value of the goods to be shipped. The higher the value of the item is per unit of weight, the less important is the cost of transport to the final price, and the more likely the transport demand will be by air. This can be seen in the data from France and the United States which show that the average value of goods imported by air into the Middle East from those countries is $35 and $65 per kilo, respectively, and the average value of goods received by those countries by air from the Middle East is $25 and $156 per kilo, respectively (Appendix 1-7). A noteworthy exception to the rule is Israel which experiences a demand for exports by air both of very high value per weight items such as cut diamonds and of generally low value fresh horticultural produce (vegetables, cut flowers).

Another factor that can significantly influence demand is the extent of awareness and use of the concept of total distribution cost, i.e. the idea that a shipper, in comparing air transport with surface costs, should take into account the savings which come from a reduction in capital costs associated with goods in transit and further reductions in inventory and warehouse costs made possible by air transport. One set of responses to an ICAO questionnaire to States which involved a case study of comparable data on total air and surface transport costs for a hypothetical consignment of typewriters showed that when total costs were compared, not just amounts paid to transport companies, air costs were equal to or slightly less than sea costs in the Europe-Middle East markets cited, with air transport offering the added bonus of substantial time savings (Appendix 1-8).

A particular characteristic of air freight demand to and from the Middle East, one that is not uncommon to developing regions, is a noticeable imbalance by direction which can have a significant impact on airline operating economies and on the ability of airlines to fully meet demand in the dominant direction. The two Middle East airlines and nine airlines based outside the region which reported data indicated that in 1986 they carried fewer tonnes of freight from the Middle East than to it. Their ratios of traffic inbound to the region to traffic outbound from the region ranged from 1.2:1 to 11.5:1 and averaged 2.9:1 (Appendix 1-9).

A partial offset to this directional imbalance became possible in several Gulf States having modern ports. With co-operation among port authorities, airport managements and airlines, demand has been stimulated for sea/air movement of traffic from Asia to Europe with change of transport mode at a Gulf port such as Port Rashid or Jebel Ali (both in Dubai Emirate). By switching from sea to air transport at a Gulf port, shippers from Japan, Taipei, Hong Kong and Singapore cut the all-sea transport time to Europe of about three to five weeks by as much as half, while still benefiting from cheaper sea transport costs for the major part of the movement. The port and airport at Al Fujairah on the Indian Ocean can provide the added advantages to sea/air users of one day's saving in transit time through the narrow Straits of Hormuz and avoidance of higher insurance premiums which have been charged for movements inside the Gulf.

D. THE FUTURE ENVIRONMENT FOR AIR TRANSPORT IN THE MIDDLE EAST

Demographic factors can be expected to continue to have an important influence on the progress of economic development in the region. This, in turn, can affect the development of its air transport system. The five States which led the world in average annual population growth rates over the years 1973-1986 were all Middle East States: United Arab Emirates (7.9 per cent), Qatar (6.5 per cent), Kuwait (5.5 per cent), Oman (4.8 per cent) and Saudi Arabia (4.8 per cent). These population growth rates contrast sharply with those for industrialized countries which tend to range between 0 and 1 per cent. While population for the region as a whole has been increasing steadily at about 3 per cent per year over the 1981-1986 period, regional GNP has declined since 1983 (see Figure 1-1).

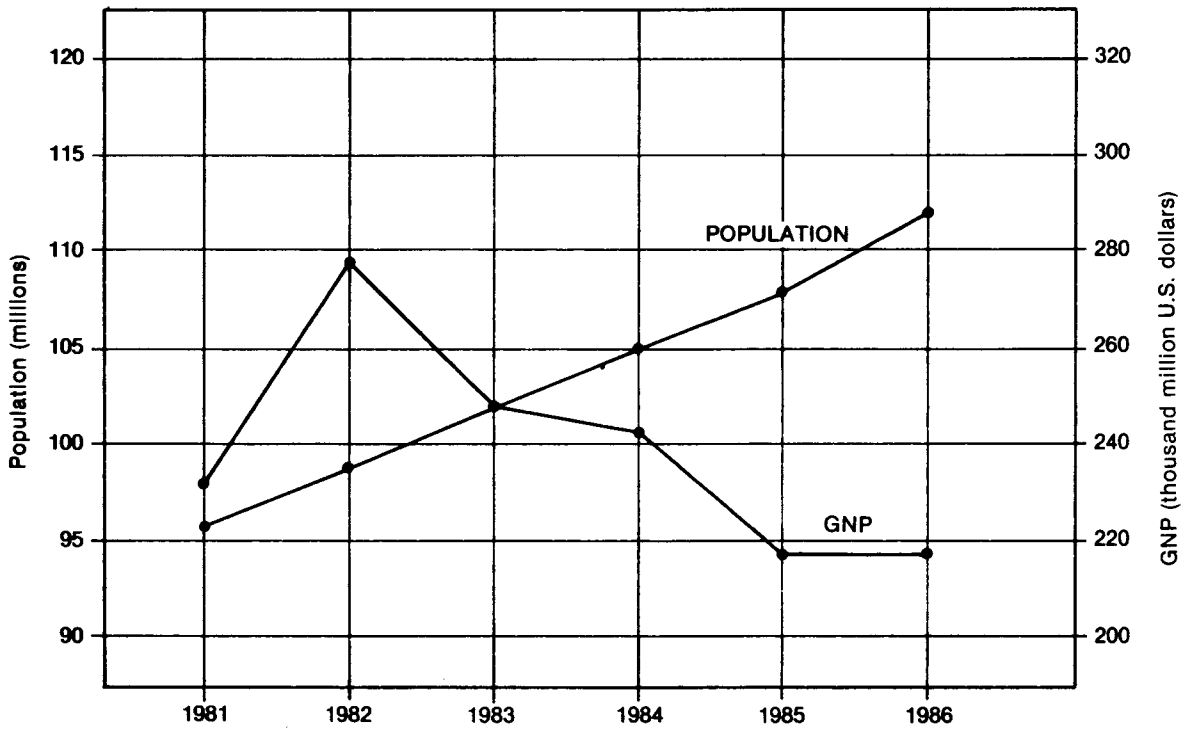
Typically, only a very small proportion of a population uses air transport, so the direct positive effects of population growth on air transport demand may not be significant. But growing populations create alternative demands (schools, hospitals, water systems, etc.) for the allocation of resources, with which air transport system development must often compete. A declining per capita GNP, should it continue as a trend, could affect the rate of investment in and development of the Middle East air transport system.

The World Bank has projected the 1986-1995 average annual percentage change in GDP per capita

for oil exporting developing countries at a high of 1.9 per cent and a low of 1.1 per cent (see Figure 1-2). If taken as applicable to the oil exporting countries in the Middle East, these projections provide more optimistic considerations than do the regionally aggregated GNP figures for recent years (which reflect oil price declines to a great extent).

Closely related to changes in aggregated GNP for the region is the significant unknown factor of future changes in the price of oil. While directly affecting the several oil exporting States of the region, it indirectly affects the oil-importing States as well. The International Monetary Fund expects world demand for oil from the Organization of Petroleum Exporting Countries (OPEC) to increase only moderately in the medium term, that is, during the period up to 1992. For the period 1989-1992, it has adopted the technical assumption that the price of oil will remain constant in real terms, implying an increase in the nominal U.S. dollar price of about 5 per cent in 1989 and 3.5 per cent a year in the 1990-1992 period.

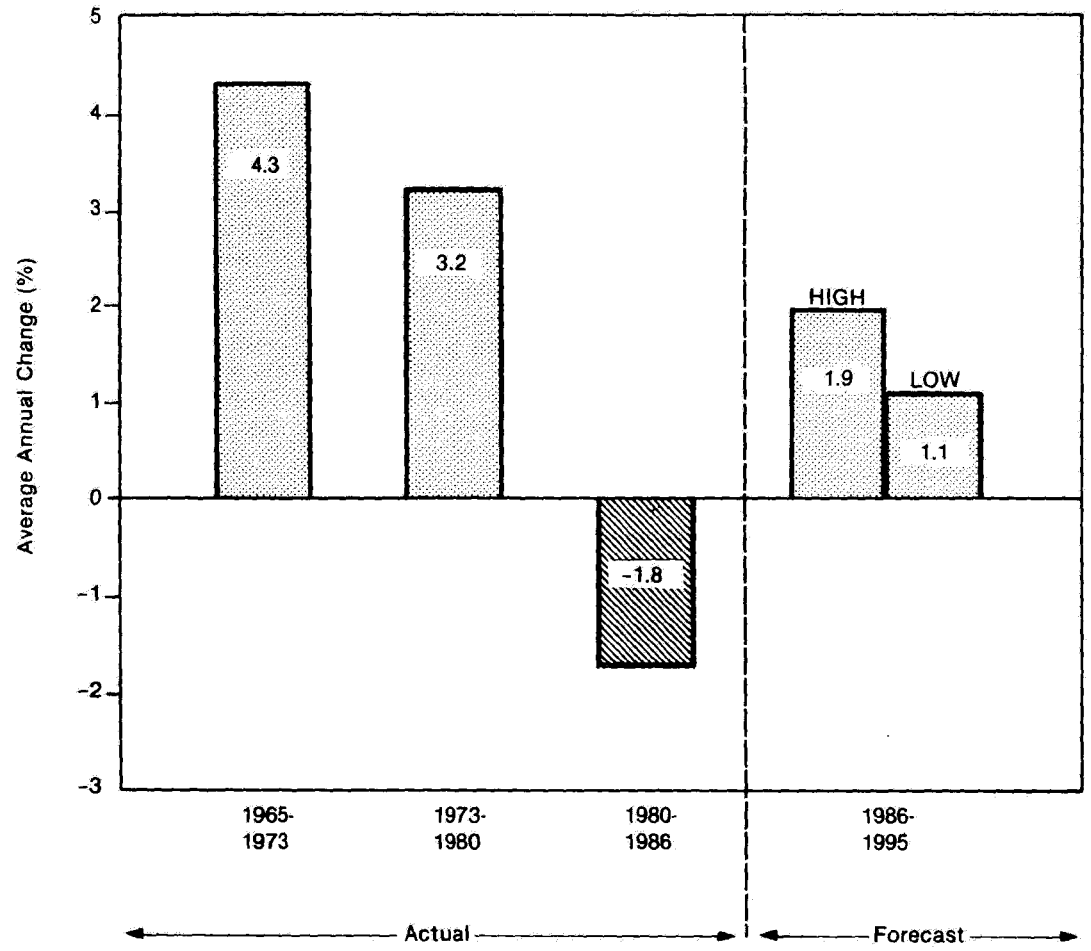
Perhaps the most significant factor affecting the future development of the region, including that of its air transport system, is the degree of exacerbation or of peaceful resolution of numerous armed conflicts in the region. Any spread or intensification of such conflicts has had immediate adverse effects on related air traffic, airlines, airports and air services. Similarly, any end to armed conflict soon benefits air transport. In any planning, projection or forward look at the various components of the air transport system this unpredictable but highly important factor must be kept in mind.



Note.— Excludes Islamic Republic of Iran, Iraq and Lebanon.

Sources:
The 1988 update of the 1987 World Bank Atlas;
The World Bank Atlas 1985;
The World Bank Atlas 1987.

Figure 1-1. Middle East population and GNP, 1981-1986



Source: World Development Report 1987, The World Bank.

Figure 1-2. Average annual percentage change in GDP per capita, 1965-1995, for oil-exporting developing countries

Chapter 2
Airports of the Middle East

One of the most striking facts about civil aviation in the Middle East is the large amount of investment that has been made in a relatively short time in the modernization and development of the region's international airports infrastructure. The background against which this expansion took place, and a country-by-country account of its scope, constitute Part A which follows. Part B examines financial and management aspects of airports in the region, and route facilities. The airport traffic changes upon which large-scale development was predicated, and which affect further planning, are described in Part C. The closely related topic of facilitating the movement of passengers and freight through these airports constitutes Part D. Part E considers anticipated future developments at international airports in the region.

A. AIRPORTS AND THEIR DEVELOPMENT

Almost all large population centres in the Middle East are now within relatively short driving times of one or more of the 28 airports receiving scheduled international air services (see Map 2-1), all of which are of recent construction or have been modernized and expanded (Appendix 2-1). All but two of these airports (Eilat in Israel and Aleppo in the Syrian Arab Republic) have at least one runway 3 000 or more metres in length, permitting long distance non-stop air services. Twenty-one are now served by wide-bodied aircraft. Fifteen are served by 10 or more international airlines, led by Dubai and Jeddah with no fewer than 45 and 41 international airlines respectively.

Background

The fact that the Middle East is now well equipped with international airports is due largely to decisions taken in the 1970s. The economic prosperity experienced by most countries of the region following major oil price increases in 1973-1974 had resulted in exceptionally high traffic growth which placed strains on all transport systems. Early on it was recognised that the successful fulfilment of the accelerated economic development plans adopted by many countries would depend upon the ability of transport systems to handle the rapid increase in demand. Consequently, during the second half of the 1970s substantial funds were allocated to the expansion of airport facilities throughout the Middle East, including those in several non-oil producing countries which received financial assistance from oil producing States such as Kuwait, Saudi Arabia and the United Arab Emirates. The States of the region thus engaged themselves in major programmes to establish a system of modern airports and navigational facilities capable of meeting anticipated requirements to the end of the century.

Added impetus to airport development programmes was given by further increases in the price of oil in 1979-1980 which helped maintain a strong growth in traffic while at the same time ensuring the availability of necessary financial resources. However, continuing declines in the price of oil after 1981 adversely affected general economic conditions. The resultant slackening in traffic growth and a decrease in funds available for the development of airports led to reviews of many construction programmes and consequent scaling down or deferral of investment.

Projects completed in each State

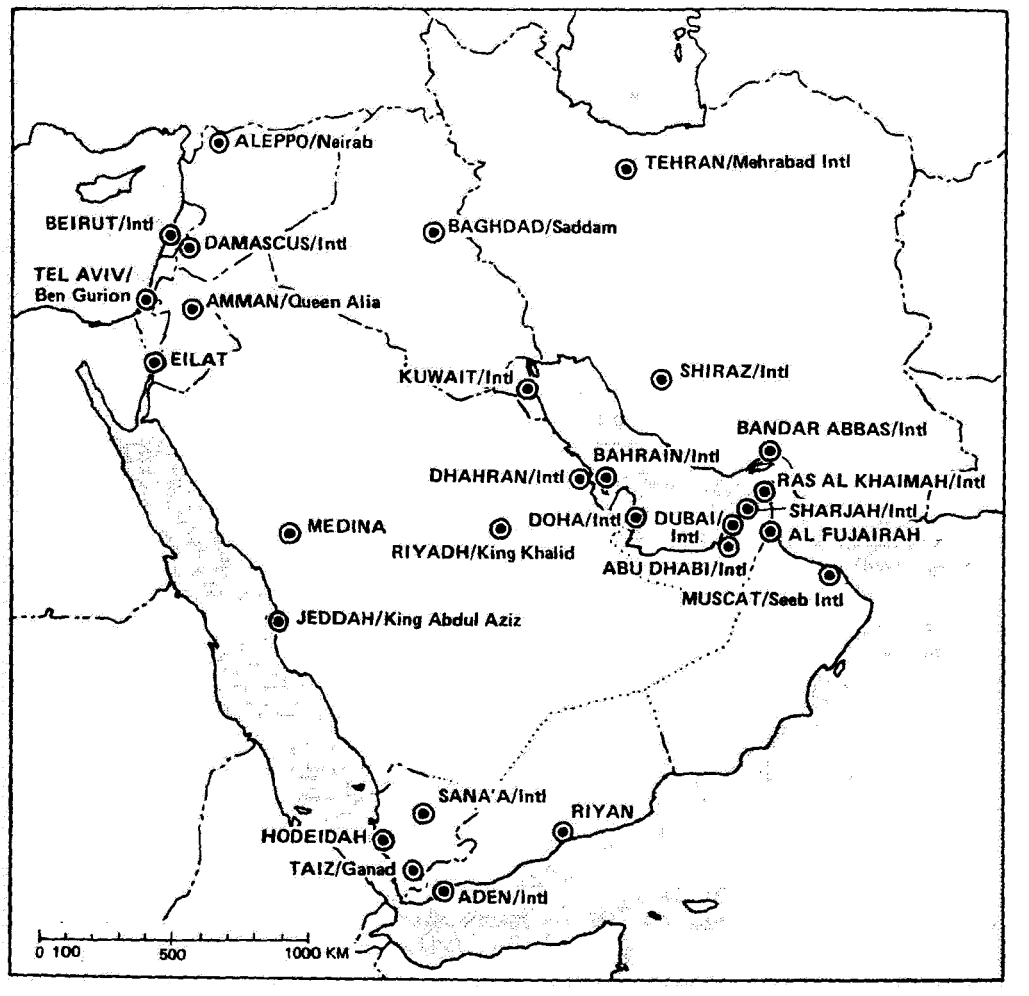
Despite the less favourable economic conditions prevailing since 1982, airport development projects were continued in most countries.

Bahrain

Extensions and improvements to the existing passenger terminal at Muharraq International Airport serving Manama were completed in 1982, but due to slow traffic growth the start of construction of a second terminal was postponed until mid-1987.

Democratic Yemen

Extensive modernization of Aden International Airport was undertaken between 1983 and 1986. The runway was extended from 2 558 metres to 3 000 metres, a new passenger terminal was constructed to expand capacity to 1.5 million passengers per year and a cargo terminal was built. New airports were also opened at Riyan in 1982 and at Al Ghaydah in 1985, but of the two only Riyan currently receives international services.



Map 2-1. Airports in the Middle East receiving scheduled international air services in 1988

Iran, Islamic Republic of

Although in 1979 the Islamic Republic of Iran postponed construction of a new airport to serve Tehran, in 1983 it began development of a site at Jadeh Saveh. A new international airport to serve Isfahan was completed in 1984 and opened in 1986 but is not yet being used for scheduled international flights. The airport at Abadan has been closed temporarily to international services.

Iraq

In November 1982, Iraq opened the Saddam Hussein International Airport to serve Baghdad. Completed in three years at a cost of some $800 million, the new airport has two parallel runways (one of 4 000 metres), three terminal buildings (opened in 1986) designed to handle 7.5 million passengers a year and a cargo terminal with a capacity of 50 000 tonnes.

Israel

Between 1982 and 1985, the annual passenger capacity of Tel Aviv's Ben Gurion International was doubled to 6 million by constructing extensions to the apron and to the arrival and departure halls. Although international charter flights to and from Eilat which require a runway longer than 1 900 metres must use the military airfield at Ouvda, a shortage of funds has precluded construction of any new airport there through 1987.

Jordan

The new Queen Alia International Airport serving Amman was opened to traffic in May 1983. Its construction took eight years and cost $300 million. Situated 25 kilometres to the south-east of Amman, the airport has two parallel runways 3 660 metres in length, a cargo terminal with a design capacity of 150 000 tonnes and two passenger terminals with a combined capacity of 3 million passengers per year. In 1988 the passenger terminals received a new duty-free facility as well as expanded restaurant and shopping areas. Passenger transit time between the two terminals was reduced from 10 minutes to 2-3 minutes and passenger check-in accelerated. An engineering base and engine-overhaul facility were built earlier at the airport at a cost of $150 million.

Kuwait

The present terminal at Kuwait International, with a design capacity of 4 million passengers per year, was opened in 1979. The old terminal was closed in the same year but could be modernized and reopened to provide additional capacity. A new cargo terminal capable of handling four B-747 freighters at a time was completed in January 1987. The airport has two 3 500 metre parallel runways, the second having been opened in 1987.

Lebanon

Due to unstable conditions, work on the expansion of Beirut International envisaged under a 1979 Master Plan has been postponed repeatedly. The airport has sustained damage on numerous occasions and has been closed for varying periods of time. Construction at the airport has been concentrated on the repair or replacement of damaged facilities.

Oman

Under its 1981-1985 Development Plan, $27 million were allocated to the continued improvement of the country's two international airports, Seeb International serving the capital of Muscat, and Salalah serving Dofar Province. Terminals were expanded at both airports and the runway at Salalah extended. In 1988 the first steps were taken to undertake a study of the further use and expansion needs of Seeb International Airport.

Qatar

Facilities at Doha International were improved and expanded in the late 1970s. Due to slower than expected growth in traffic, a major expansion of facilities envisioned under a 1979 Master Plan has not been implemented.

Saudi Arabia

During Saudi Arabia's Third Development Plan (1980-1985), work continued on an extensive airport modernization programme covering three international and 22 domestic airports. Jeddah's new King Abdul Aziz International was opened in April 1981. Its facilities include three runways (the longest 3 800 metres), two scheduled service passenger terminals with design capacities of 3 500 and 2 500 passengers per hour, a Haj or pilgrim terminal and a cargo terminal with a design capacity of 150 000 tonnes a year.

King Khaled International, serving Riyadh, was inaugurated in December 1983. The 240 square kilometre site is equipped with two parallel runways (4 200 metres), three out of four planned passenger terminals which will eventually provide a capacity of about 15 million passengers a year, and a cargo terminal capable of handling 150 000 tonnes a year.

The country's third international airport, located at Dhahran, has been extensively modernized and expanded. It will handle traffic growth in the Eastern Province pending completion of the new King Fahd International Airport.

Syrian Arab Republic

In 1983, Syria opened a new passenger terminal with a capacity of 2.5 million passengers at Damascus International. The old terminal is used for domestic passengers and cargo. Neirab Airport serving Aleppo began receiving international services by airlines other than Syrianair in 1984, Syrianair having started such operations there in 1979.

United Arab Emirates

A new international airport to serve Abu Dhabi was opened in 1982 with a design capacity of 3 million passengers per year. In 1987, the Gulf Aircraft Maintenance Company (GAMCO), owned 60 per cent by the Government of Abu Dhabi and 40 per cent by Gulf Air, commissioned there the second largest maintenance base in the region (Saudia's at Jeddah is the largest). Plans for a second runway at Abu Dhabi were cancelled, both for financial reasons and in anticipation of the completion of a new international airport serving Al Ain near the eastern border of the Abu Dhabi Emirate.

The second development phase of Dubai International, opened in 1971, was commenced in 1983. A new 4 000 metre parallel runway was completed in 1984 and a new passenger terminal to handle arriving traffic inaugurated in 1986. Work was undertaken on a modern cargo terminal with a design capacity of 120 000 tonnes. Plans for a sea/air terminal facility were scaled down.

Work commenced in 1986 on the expansion of passenger facilities at Ras al Khaimah International to increase capacity from 250 to 1 000 passengers an hour.

Passenger facilities at Sharjah International Airport, about 20 minutes driving time from Dubai, were also expanded in 1984-1985, increasing capacity there to 1 500 passengers an hour, and a new duty-free shopping centre opened in 1988. At Al Fujairah, a town of 50 000 inhabitants about one hour by car from Dubai and Sharjah, a new international airport close to the Indian Ocean with a 3 750 metre runway and a small but functional terminal was opened to traffic in late 1987. The project was undertaken to attract tourism, sea/air cargo traffic and originating international cargo traffic.

Yemen

The expansion programme at Al Rahaba International Airport serving the inland capital city of Sana'a was completed in 1984, including an extension of the main runway to 3 250 metres and construction of a new cargo terminal. A new passenger terminal was also built at the Hodeidah airport on the Red Sea.

B. FINANCES AND MANAGEMENT

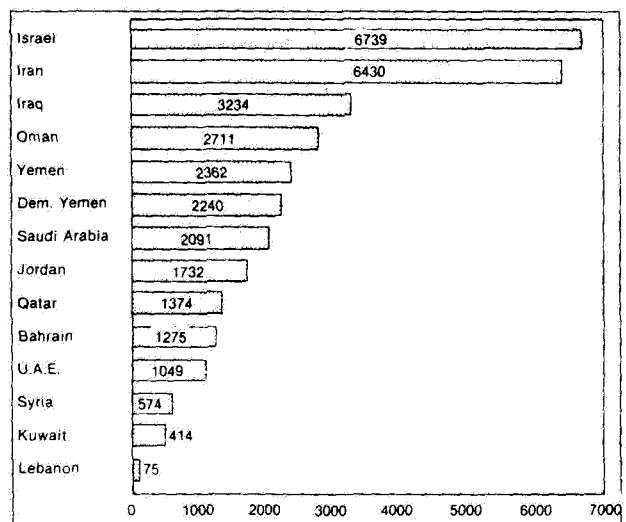
Airport finances

Few Middle East airports generate revenues sufficient to cover their costs of operation and maintenance, much less their capital costs. This is due partly to the high level of such costs relative to the traffic handled at many airports and partly to lower than anticipated revenues resulting from slower traffic growth in recent years, and, in some cases, from intense competition for traffic among airports.

The costs of operations and maintenance at airports in the region tend to be relatively high, due in part to the need to import equipment and supplies. Moreover, to the extent that countries earn foreign exchange in U.S. dollars, yet must pay for imports with European and Japanese funds, the depreciation of the U.S. dollar against the Yen and European currencies in recent years has significantly affected costs. The costs of maintaining equipment at many airports are also increased by the harsh climatic conditions frequently encountered. High-cost expatriate staff are still required at some airports to provide management and technical services, although they are gradually being replaced as local staff are trained. On the other hand, labour costs at some airports have been reduced by the use of migrant workers to provide maintenance and handling services under service contracts let to specialized companies.

Capital costs for the impressive programme of airport modernization in the region have tended to be high, especially in the south, because most of the materials, services and labour have had to be imported. Furthermore, because ample government funding was often available, high and more costly standards were set for the facilities and amenities provided at many airports. The capacity for which numerous airports were designed, sometimes deemed excessive, ensured that past constraints would not reoccur to limit future development. True capital costs for airports in the region are often difficult to establish, however, because they often have been incurred by central governments, and most airports have excluded depreciation on such investments as well as interest on capital loans from their over-all costs.

Aeronautical revenues (such as landing, parking and passenger service charges) constitute the major source of operating revenues for airports in the region. Notwithstanding this importance, charges at most airports in the region are considerably below the world average. Moreover, they vary considerably from one airport to another. For example, the combined landing and passenger charges for a B-747-100 with 225 passengers range from $75 at Beirut to $6 739 at Tel Aviv (Figure 2-1). Charges at airports which compete for transit traffic tend to be particularly low.



1 Daytime landing fees for a B747-100 with a maximum permissible take-off weight of 322 050 kg plus passenger charges for 225 persons.

Source: ICAO *Manual of Airport and Air Navigation Facility Tariffs* (Doc 7100), 1988 edition.

Figure 2-1. Comparative charges[1] at Middle East airports, 1988

Non-aeronautical revenue sources, including concessions and rentals, are increasing in importance at several airports, especially Abu Dhabi, Amman, Bahrain, Dubai and Tel Aviv and contribute towards offsetting airport operations and maintenance costs. Duty free shops can provide significant revenues in a relatively short time, as in Dubai for example. The

Dubai Duty Free Complex was opened in 1984 and by 1986 had an annual turnover of $30 million. In 1986 Dubai expanded by opening a duty free shop for arriving passengers.

Additional revenues can also be generated by the development of other activities on airport land. Maintenance bases such as those at Abu Dhabi, Amman and Jeddah can become major enterprises in their own right. At some new airports such as Amman, Bahrain, Jeddah and Riyadh, flight kitchens, some capable of preparing 10 000 to 12 000 meals a day, have become large employers. At Eilat a free-trade zone was declared and all charges were abolished to improve the airport's competitive position in the Mediterranean charter market and to attract industry.

Airport management and specialized services

Most international airports in the region are managed by the national civil aviation administration. However, separate authorities operating under over-all government control are found in some States, for example Israel (Israeli Airports Authority) and Saudi Arabia (International Airports Projects). Reduced revenues resulting from a downturn in traffic have led at least one State to postpone creation of an autonomous airport authority until such time as revenues improve.

In some instances, contractual arrangements for the operation of an airport or of specialised services exist with foreign enterprises. At Sharjah, for instance, management assistance is provided by the Frankfurt Airport Authority. At Al Fujairah and Muscat, Pan Am World Services is involved. At Abu Dhabi, Bahrain and Dubai, technical management and air traffic control services are provided by International Aeradio.

Long-term training programmes and increased experience have gradually reduced the need for contract personnel to provide technical and management expertise, although many expatriates still work in advisory capacities. Airport management training programmes are offered by Kuwait Airport and through the Saudi Arabian Airport Management Intern Program. The Gulf Civil Aviation Training College at Doha in Qatar, jointly owned by Bahrain, Oman, Qatar and the United Arab Emirates, has considered the possibility of offering such training.

At some airports services such as ground handling, and the management of specialised facilities such as cargo terminals, are provided by a semi-public or commercial agency. For example, ground handling services are provided at Dubai by the Dubai National Air Travel Agency (DNATA) and at Bahrain by Bahrain Airport Services (BAS). BAS also manages the cargo terminal at Bahrain while at Tel Aviv the cargo terminal is operated by Maman Cargo Terminals and Handling Ltd. and the produce export terminal is managed by AGREXCO, an agricultural marketing organization.

Route facilities

Closely related to airports are route facilities, the other major component of the aviation infrastructure provided on the ground by States. From the limited information available it appears that in a number of States in the region the full costs of providing route facilities have yet to be determined and a number of important cost elements (for example meteorological costs) appear frequently not to be taken into account. Although of a considerably lower magnitude than airport costs, route facility costs in the region are increasing. One contributing factor has been the establishment of a flight information region (FIR) for the Emirates and another for Muscat which extend over airspace previously covered by parts of the Bahrain FIR.

As late as 1980, many States in the region which were responsible for providing air traffic services within an FIR did not levy route facility charges; now all but one do. The charges differ substantially between States, but they display certain characteristics peculiar to the region. For example, they take either the form of a fixed charge or a weight-related charge, whereas the majority of route facility charging systems elsewhere are based primarily on distance flown and secondarily on aircraft weight, the approach generally recommended by the ICAO Council. Also, while airport charges in the region, particularly in the Gulf, have for competitive reasons been well below world averages, route facility charges are generally above world averages.

C. TRAFFIC AT MIDDLE EAST AIRPORTS

The traffic increases which prompted the immense development of international airports in the Middle East, over the past decade in particular, were substantial. Both passenger and freight demand tripled at Middle East airports in the first five to seven years of the 1970s. With continued increases three airports (Bahrain, Jeddah and Tel Aviv) now rank among the top 50 in the world as measured by international passengers embarked and disembarked in 1987. Their levels of about 3.5 million annual passengers approximates those of Helsinki, Sydney and Vienna. Kuwait and Dubai airports also handled more than two million international embarking and disembarking passengers, and six other Middle East airports more than one million. Similarly, Dubai, Jeddah and Tel Aviv were among the top 50 world airports in international air

freight tonnes loaded and unloaded that year, with over 100 000 tonnes. Tel Aviv was at roughly the level of London/Gatwick and Rome, and Dubai and Jeddah were at roughly the level of Bogota and Madrid. Four others handled fewer than 100 000 but more than 50 000 tonnes of international air freight in 1987 (Appendix 2-1).

Passenger traffic

In 1970 only 5.5 million passengers originated or terminated international trips at airports in the Middle East. By 1977 this traffic had grown to 15.7 million and by 1980 to 26.8 million at an average annual rate of increase from 1970 to 1982 of 14 per cent. However, from 1982 to 1987 growth slowed to an average annual rate of only 1 per cent, to reach an estimated total of 28.7 million passengers.

The rate of change in international passenger traffic differed widely among airports in the region (Figure 2-2). In general, international passenger traffic at airports on the Arabian Peninsula, from Kuwait south, grew faster than at the other Middle East airports. While the former accounted for only half the total international passenger traffic embarked and disembarked at Middle East airports in 1977, in 1982 and 1987 it amounted to two-thirds. If the relatively high-volume Tel Aviv airport total is excluded entirely, the Arabian peninsula airports collectively handled more than three of every four international passengers embarking and disembarking at all Middle East airports.

International passengers provide the principal traffic base for development purposes at most international airports in the region. The exceptions are those at Riyadh and Tehran where in 1987 about three-quarters of the traffic was domestic, and at Dhahran and Jeddah where about half was domestic.

Although international non-scheduled passenger traffic is not an important factor in airport development decisions for the region as a whole (where it represents only an estimated 8 per cent of total international terminal traffic), there are some airports where charter traffic is important in either relative or absolute terms. A unique situation is that faced by Jeddah airport, which in 1986 handled 1 040 000 inbound and outbound Haj passengers on 3 468 inbound plus outbound charter flights. Because pilgrim traffic movement is concentrated in a 10-week period on either side of the Haj period itself, the peaking problem at Jeddah is unique and requires careful air traffic flow control management. The peaking problem is compounded by the directional characteristics of the traffic movements, inbound only prior to the Haj, and outbound only after.

Inclusive tour charters from Europe provide the international non-scheduled passenger traffic at Eilat, the airport ranked second in the region in this category. Apart from Jeddah and Eilat the only other airports in the region where international non-scheduled passenger traffic is of some importance are Kuwait (13 per cent of its total 1987 international passenger traffic), Tel Aviv (11 per cent) and Damascus (8 per cent).

Another traffic factor which significantly influences airport development in the region is the volume of direct transit passengers relative to the volume embarked and disembarked. Several of the region's airports, particularly in the Gulf area, service many flights transiting between Europe and the Asia/Pacific region. Available data show that the volume of direct transit international passengers, i.e. those who continue their journey on a flight having the same number as that on which they arrived, was half or more than half that of embarking and disembarking passengers at several Middle East airports. For each 100 of the latter there were 50 direct transit passengers at Muscat, 59 at Bahrain, 70 at Dubai, 93 at Abu Dhabi, and 142 at Sharjah, in 1986.

Freight traffic

As with international passenger traffic, substantial long-term growth in international freight traffic contributed to the need to modernize and expand facilities at many airports. Taking the region as a whole, freight traffic grew steadily although more slowly than passenger traffic until 1982. The total increase was from about 535 000 tonnes in 1977 to about 654 000 tonnes in 1982 (Appendix 2-1). Unlike passenger traffic, which had limited growth after 1982, freight continued to grow and at an increased rate, reaching a total of about 868 000 tonnes in 1987. This over-all regional pattern of steady, then increased international freight traffic growth was reversed at Arabian peninsula airports, Kuwait and south, where traffic grew by about 23 per cent per year from 1977 to 1982, and then by only about 6 per cent per year through 1987, whereas at the other Middle East airports taken collectively it actually declined by about 5 per cent per year from 1977 to 1982, then grew by about 8 per cent per year from 1982 to 1987. Tel Aviv, which had strong steady growth in both five-year periods, was the exception. As a result of these growth trends which diverged between northern and southern airports, the proportion of the total regional air freight handled by the Arabian peninsula airports rose from less than one-third in 1977 to over two-thirds in 1987.

The relationship of freight imports to freight exports at an international airport is a factor in planning its cargo facilities. At Amman, Doha, Muscat, and Sana'a between three and seven times as much inbound air freight was handled as outbound in 1986-1987. Other airports tended to have about twice the volume of international freight unloaded as loaded except for Tel Aviv, which had balanced movements, and the relatively small volume airports at Bandar Abbas,

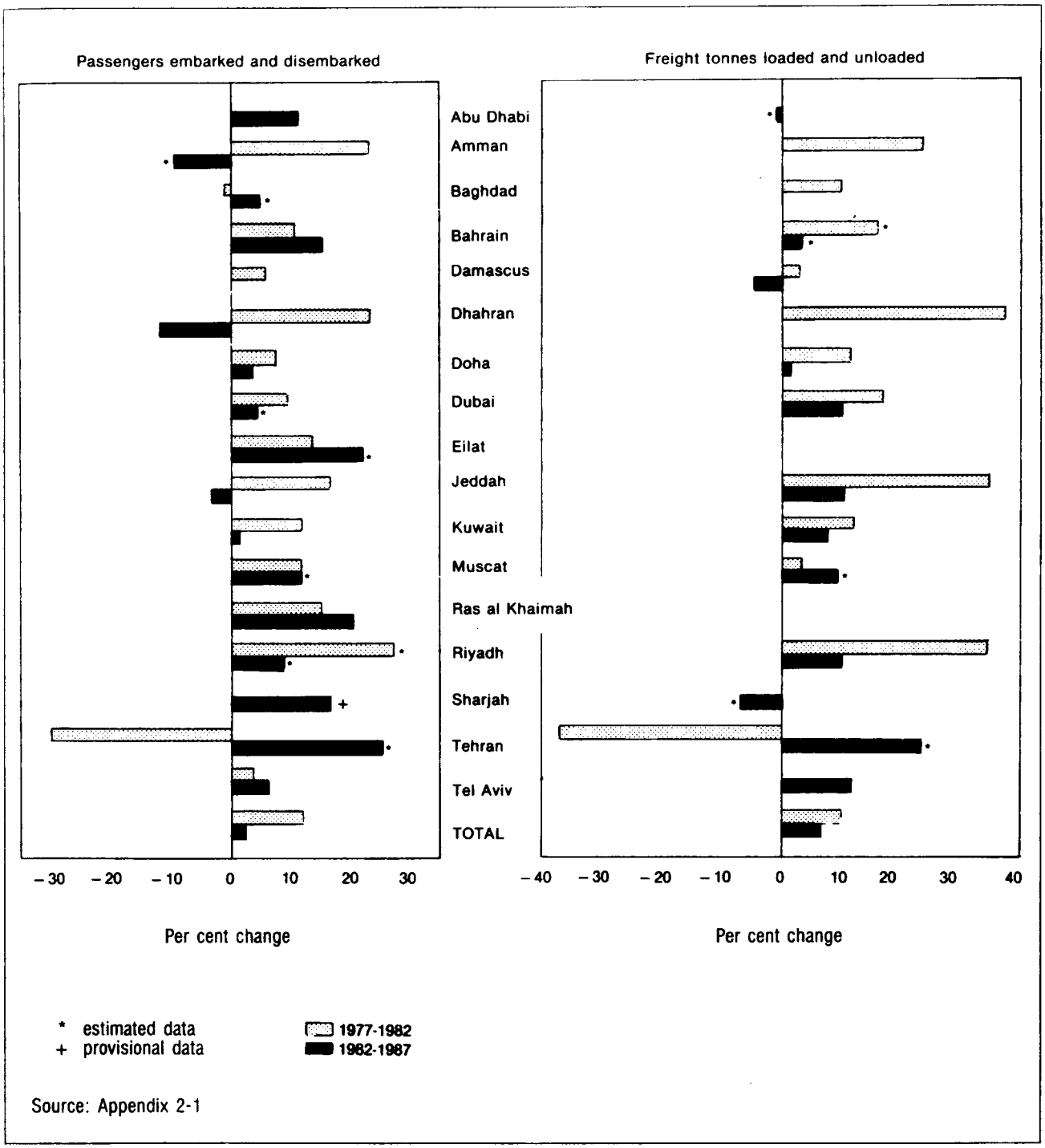


Figure 2-2. Average annual changes in international traffic at Middle East airports, 1977-1982 and 1982-1987

Damascus, Shiraz and Taiz which unloaded less international freight than was loaded.

Non-scheduled operations at several airports in the Middle East play a relatively important role in the movement of international freight. Sana'a has more than half its freight carried on chartered flights, followed by Amman and Muscat with more than a quarter. Data for Beirut, Ras al Khaimah and Sharjah are unavailable, but it is likely that non-scheduled air freight traffic accounts for half or more of their total air freight. At most airports there has been a trend for charter freight to decline in relative importance as capacity grows on scheduled services. But cargo charter flights are still important, particularly for carrying sea/air traffic transiting the United Arab Emirates between the Asia/Pacific region and Europe.

D. FACILITATION

Closely related to the growth and development of international airports in the Middle East is the topic of progress and remaining problems in the facilitation of the movement of passengers and freight through these airports. The goal of facilitation is to assist the development of air transport by ensuring that its main advantage — speed — is not reduced by the unnecessary and time-consuming formalities and ground-handling procedures at airports.

To further this goal, ICAO established a comprehensive facilitation programme on the basis of the Standards and Recommended Practices set forth in Annex 9 to the Chicago Convention. Contracting States are required to notify ICAO of any differences between Standards and their national requirements. In the Middle East only one State has officially done so, although five other States list differences in the facilitation section of their Aeronautical Information Publications (AIPs) and all indicate entry requirements elsewhere in their AIPs. Such information, together with reports from missions undertaken by ICAO personnel and from pertinent meetings held in the region, has been used as a basis for this section.

Visa requirements

Annex 9 calls on States to abolish entrance visa requirements for temporary visitors, either by bilateral agreements or unilaterally, and when this is not possible to provide them without charge with a recommended validity of at least 12 months, following simple procedures which should not require a personal appearance. Annex 9 also contains specifications for the contents, layout and language of visas as well as for liberalizing the requirements for the re-entry of nationals and resident aliens.

The obtaining of entry visas for temporary visits for business or personal reasons constitutes one of the most time-consuming preliminary preparations for international travel. This is particularly true where an embassy or consulate abroad must first obtain permission from its home authorities to issue a visa, or where a letter from a sponsor in the country to be visited is required (as is the case for several Middle East countries). When issued, the visa given by a Middle East State may be written or printed in Arabic only, making it difficult for those unable to read Arabic to understand its terms and creating problems for airline staff who must establish the validity of each passenger's travel documents at departure points. Measures taken to ease the visa formalities of some Middle East States include granting permission to hotels to act as sponsors, and the exemption by member States of the Gulf Co-operation Council (i.e. Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates) of each other's nationals from entry visa requirements when travelling as temporary visitors.

Passenger manifest

ICAO urges abolition of any requirement that a passenger manifest be prepared and submitted to entry authorities for arriving international flights. Other international organizations, including the Customs Co-operation Council, the International Criminal Police Organization and the World Health Organization, have lent support to this recommendation. The passenger manifest has been found unreliable for clearance purposes and impractical for rapidly checking individual names among large numbers of passengers. Personal information is available from other sources such as passports and embarkation and disembarkation (E/D) cards. Consequently, a large number of States throughout the world have ceased using the passenger manifest. Thirteen States in the region do, however, continue to require that arriving and departing international flights submit a passenger manifest. Five of these States require between 6 and 19 copies. Thus on high capacity aircraft in particular, manifest preparation problems do occur, delaying flights and adding to the cost of air transport.

Embarkation and disembarkation cards

Most States in the region continue to require that arriving passengers complete E/D cards, which often do not conform to the model recommended in Annex 9 but require additional information, frequently for purposes other than entry clearance. Although some Middle East States have reduced the number of items of information

sought, the remaining additional informational requirements are at the least an inconvenience to passengers, and at times a cause of entry delays.

Baggage

The number of Middle East States requiring written baggage declarations, contrary to the practice recommended in Annex 9, has declined in the 1980s, yet most States in the region continue to subject personal baggage to detailed inspection in order to curb the importation of prohibited articles. Two States have, however, implemented the dual-channel baggage clearance system which accelerates the movement of passengers through customs control points. Also, the number of Middle East States which continue to treat unaccompanied baggage as cargo, rather than as baggage, has declined. This is a significant improvement in a region where unaccompanied baggage is an important source of revenue to airlines.

Cargo

The potential contribution of international air freight services to national economic activity depends not only on sufficiently fast and frequent flights but also upon how fast the total door-to-door movement can be made. This over-all speed, in turn, greatly depends upon the time a shipment spends on the ground at points of origin and destination while in storage and being processed through export and import controls. This period of time is determined both by physical facilities and by paperwork requirements.

The construction of new cargo terminals at most international airports in the Middle East during the late 1970s and the 1980s has resulted in greatly improved facilities for the handling, storage and clearance of air cargo, including shipments requiring specialized handling and storage such as live animals, fresh produce, frozen meat, hazardous materials and high-value goods. At several airports, facilities have been designed to meet specific needs. At Tel Aviv, for example, specialized facilities are now provided to process high volume exports of horticultural produce on a seasonal basis and at Dubai, Sharjah and Bahrain, to facilitate the transfer of sea/air cargo.

Despite these improvements, the clearance of inbound and outbound cargo at many airports in the region is often a time-consuming process due to the large number of documents required where a single document would suffice. Frequently the same information is repeated in several of these documents, many copies of which may be required, often by the same clearance authorities. The problem of excessive and complicated documentation is compounded where States insist on systematic inspection of all shipments instead of using the sampling methods recommended in Annex 9.

E. THE OUTLOOK FOR MIDDLE EAST AIRPORTS

Numerous new international airports will be entering service in the Middle East in the near future because work on most airport development projects, begun when traffic was growing rapidly, has continued even if temporarily slowed down due to unfavourable economic conditions. Additionally, some existing airports will open expanded facilities and some temporarily closed airports can be expected to reopen.

Future expansion of airports

By late 1990 or 1991 work should be completed on the expansion and improvement of Bahrain's passenger terminal. This will double the passenger handling capacity at the airport on Muharraq Island to 1 000 passengers per hour in each direction. The scope of expansion will be less than originally planned, partly in reaction to reductions in services to Bahrain by a number of international airlines. For example, the number of check-in desks will only increase from the present 19 to 26, rather than to the planned 40.

In the Islamic Republic of Iran, the runway at Tehran's new airport at Jadeh Saveh is expected to be operational in 1990, with a full opening of the entire facility expected later in the decade. Abadan's airport is likely to be reopened to international service.

In Iraq, Bamerni's airport is being expanded. New airports are under construction at Basrah and Mosul. The existing airport at Basrah could be reopened to international service earlier.

In Israel, a new airport for Eilat will be built at Evrona, 11 km north of the city, at a cost of $300 million. Plans are to retain the existing Eilat Airport terminal for passenger handling and immigration purposes. The company operating the cargo terminal at Tel Aviv's Ben Gurion International Airport plans to invest $19 million there over the next five years.

In Saudi Arabia, Dhahran's new King Fahd International Airport is expected to be completed in late 1989 at an estimated cost of about $1.7 billion. It will have two 4 000 metre runways, built to allow for simultaneous take-offs and landings. A linear concept passenger terminal will have 320 000 square metres of floor space on six levels. The cargo terminal will be capable of handling 176 000 tonnes annually. It will serve the Eastern Province including Damman and Jubail as well as Dhahran from its location some 36 km north-west of Damman. At Jeddah's King Abdul Aziz International airport, another scheduled service passenger terminal will be built when traffic prospects warrant.

A summer 1990 target has been set for completion of the United Arab Emirates' sixth international airport, the second in the Emirate of Abu Dhabi, although

budgetary problems and resultant construction slowdowns may result in a later opening. Located 15 km north of the university town of Al Ain and 150 km inland from the city of Abu Dhabi its initial construction involved moving over 22.5 million cubic metres of sand fill, one of the largest earthmoving tasks ever completed for any airport. The Al Ain airport will have a 4 000 metre runway and cost almost $300 million. It will be capable of handling 700 passengers per hour at peak periods. Also, a new air cargo terminal is being planned for Dubai airport.

Traffic forecasts

The continuing development of international airports, albeit at a somewhat reduced pace, is bound to affect the future size of total regional traffic data, as well as possibly to shift traffic among airports. For example, King Fahd International Airport, which is expected to be serving about 8 million passengers by the year 2000, will take over Dhahran International's traffic and could affect Bahrain's traffic. The Al Ain airport, which is expected to be handling 410 000 passengers in 1992 and 540 000 in 1997, could divert some traffic from other United Arab Emirates airports. Accordingly, periodic revisions to existing traffic forecasts and the making of new forecasts become even more necessary to airport authorities. The endeavours of two States in the region to review and reassess the future prospects for airport traffic development exemplify this task.

In Saudi Arabia, revised traffic forecasts were prepared in 1986 for the country's three international airports considered as a system. Developments identified as influencing the distribution of traffic among airports include improved surface transport, the opening of Riyadh to service by foreign airlines, the relocation of foreign diplomatic missions from Jeddah to Riyadh, the construction of the Bahrain-Saudi Arabia causeway and the introduction of more direct service between secondary cities.

The econometric model used in Saudi Arabia produced high and low traffic projections predicated upon anticipated incremental changes in exchange rates, oil revenues, the size of the budget, the rate of inflation and non-oil GDP as a proxy for the increased propensity to travel of the Saudi population. The reasonableness of the forecasts was tested by comparing the number of trips per capita for the Saudi population against similar ratios for the United States, Canada and Australia. A growth rate for international passengers of 4 per cent a year was considered most likely between 1984 and 1990, rising to 6 per cent between 1990 and 1995 and moving to 5 per cent between 1995 and 2005.

The basis for the passenger forecast in the Master Plan prepared for Kuwait International Airport in 1987 is the historical elasticity ratio between the rate of growth in traffic and the rate of growth of the Kuwait population. A ratio of 2.2 was calculated for the years 1970 to 1980, and the long-term projection to 2015 was based on the assumption that this ratio would fall to about 1.8 (i.e. that traffic would grow on average at 1.8 times the annual rate of population growth). The Master Plan forecasts that embarking and disembarking passenger traffic will grow at an average annual rate of 5.3 per cent and freight traffic at 5.6 per cent, from 1995 to 2015 (Appendix 2-2).

In summary, it appears that the over-all capacity of international airports in the region will continue to increase in the next decade albeit at a less dramatic rate than in the past, chiefly due to the larger size of replacement facilities now under construction, the likely reopenings at points closed by hostilities and the expansion of facilities at existing locations. While the traffic forecasts given above are not necessarily indicative for the airports of the region as a whole, in addition to their value to the States concerned they can be of value as indicators in any broad forward look at air transport in the Middle East.

Chapter 3
Airlines of the Middle East

There are 13 scheduled airlines and 4 non-scheduled operators based in the Middle East region which provide international services. They are identified and their fleets of aircraft are discussed in Part A of this chapter; their aggregated financial results are presented in Part B; their collective historic traffic is set forth in Parts C (passenger) and D (freight); and their future traffic is forecast in Part E.

The majority of the international scheduled airlines of the region are wholly government-owned companies, the exceptions being El Al, partly-owned by the Government of Israel; Middle East Airlines Air Liban (MEA), of which the major shareholders are Intra Investment Co. and Air France; and Trans Mediterranean Airways, which is a limited company. Two airlines are owned by more than one government: Gulf Air is jointly owned by the Governments of Bahrain, Oman, Qatar and the Emirate of Abu Dhabi; Yemen Airways is owned by the Governments of the Yemen Arab Republic (51 per cent) and Saudi Arabia (49 per cent). Partial privatization (ranging up to 40 per cent) has been considered by the government-owners of El Al, Gulf Air, Iraqi Airways, Royal Jordanian and Syrianair.

All of the scheduled airlines based in the region are members of the International Air Transport Association (IATA) and all but Alyemda, Emirates and Gulf Air participate in tariff co-ordination. In addition, 11 are also members of the Arab Air Carriers Organization (AACO), an association formed in 1965 to foster the development of air transport and tourism in Arab countries and to increase economic and technical co-operation between Arab air carriers.

A. MIDDLE EAST AIR CARRIERS AND THEIR AIRCRAFT

The Middle East-based carriers, scheduled and non-scheduled, are identified below in two geographic groups: the Arabian peninsula carriers, which includes those of Democratic Yemen and Yemen and those of the Gulf Co-operation Council (GCC) Member States (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and United Arab Emirates); and the Northern tier States carriers (those of Islamic Republic of Iran, Iraq, Israel, Jordan, Lebanon and Syria). Appendix 3-1 lists the carriers alphabetically by State, and includes airline codes, indicators of IATA membership status, and computer reservation system (CRS) names. Appendix 3-1 also identifies their transport aircraft in service (by ICAO noise classification) and their transport aircraft on order.

The Arabian peninsula carriers

Democratic Yemen Airlines (Alyemda) provides domestic and international scheduled services utilising De Havilland Dash 7 turbo-prop aircraft and B-707 and B-737 jet aircraft on both kinds of services. Since its initial operations in 1971 with propeller aircraft, Alyemda has modernized and expanded its fleet and increased its operations so as to now serve points in Africa, Bombay and numerous Middle East destinations from its hub at Aden.

Emirates[1], based in Dubai, is the newest scheduled international airline of the region. It began flying in October 1985 with one Airbus A-300 and one Boeing B-737-300, both leased with crew from Pakistan International Airlines (PIA), the latter aircraft returned in 1988. It subsequently acquired other wide-body jet aircraft, and received a B-727 from the ruler of Dubai. The airline now serves several points in Europe and in South Asia as well as a limited number of destinations within the Middle East. Along with Gulf Air it is a national airline of the United Arab Emirates. It is the official airline of Dubai (but not of Abu Dhabi) and of Sharjah. Owned by the Government of the Emirate of Dubai, it is closely linked with the government-owned Dubai National Air Travel Agency (DNATA) which is a passenger and cargo agent for many foreign airlines, a tour operator, an airport handling company and operator of the Direct-Multi Access Reservations System (D-MARS) computer reservation system (CRS). In 1988 Emirates signed a letter of intent to be a partner in the multicarrier Amadeus CRS and plans to set up a marketing company to promote Amadeus throughout the Gulf region.

1. The airline is known solely as "Emirates", with no use of "Air" or "Airline". It is not to be confused with Emirates Air Services which flies one de Havilland Dash 7 and three Twin Otters in charter services in the United Arab Emirates.

Gulf Air, based in Bahrain and one of the world's few multinational airlines, is the national carrier of Bahrain, Oman[2] and Qatar, and the first of the now two national carriers of the United Arab Emirates. It is the owner of Gulf Helicopters which provides offshore services for Qatar and also a 40 per cent owner of Gulf Aircraft Maintenance Company (GAMCO) which opened a new, modern technical support facility at Abu Dhabi in April 1987.

With routes already extending westward as far as London and eastward as far as Manila the airline in 1988 began a new joint operation with the U.S. airline Trans World (TWA) to link its four home States with New York City. Gulf Air provides one L-1011 aircraft operated by its crews to London where TWA crews take over for the transatlantic flight segment. Gulf Air also provides an L-1011 service to Manila as a joint operation with Philippine Airlines (PAL).

Gulf Air has viewed operations between Gulf points as a problem for it due to high costs associated with relatively short distance flights and to low load factors which it believes combine to make the services consistently unprofitable. However, from the viewpoint of the GCC governments, service levels by Gulf Air have been less than desirable, so alternative ways and means are being explored to enhance them. One measure taken by Gulf Air was a 1988 pool agreement with Kuwait Airways and Saudia. In another co-operative effort Gulf Air, Kuwait Airways and Saudia established a holding company in London in 1987 to cut costs by negotiating joint catering, ground handling, insurance and fuel purchase arrangements.

Kuwait Airways Corporation (Kuwait Airways), the national airline of Kuwait, operates one of the more extensive international route networks of the airlines based in the Middle East, one which extends from Manila in the east to New York City in the west and includes numerous points in Europe, North Africa, the Middle East and South Asia. Some services are jointly operated, such as with Iberia to Madrid and PAL to Manila. Unfortunately, traffic declines in recent years, attributed to political and economic difficulties in the Gulf, have halted expansion and necessitated the offering of some of Kuwait Airways fleet of largely wide-bodied aircraft for lease, charter or sale. Kuwait Airways also operate an A-300 freighter service to Amsterdam, Doha, Frankfurt, London, Muscat and Zurich.

Saudi Arabian Airlines (Saudia), the largest airline based in the Middle East, serving 68 cities on 4 continents, operates both a sizeable domestic network and an international route system which presently extends more than half-way around the world from Seoul in the east to New York City and Washington in the west. Unlike the transatlantic services of Gulf Air and Kuwait Airways, which operate via London, Saudia's are flown non-stop between its homeland and the United States. Saudia is the only airline of a developing country anywhere in the world to rank among the top 15 IATA member airlines in international scheduled passengers carried, international scheduled freight tonnes carried, and international scheduled passenger-kilometres flown (1987 IATA data). It has by far the largest fleet of jet aircraft in the region, with 2, 3, and 4-engine wide-body aircraft from three major manufacturers which, in total, comprise 45 per cent of the wide-body aircraft flown by the region's airlines. Moreover, all aircraft in Saudia's large wide-body fleet meet the highest ICAO noise standards. Domestically, Saudia actively pursues a mandate to maximize the availability of air travel by keeping fares low as it serves 23 cities, including two very high density corridors, Jeddah-Riyadh and Riyadh-Dhahran, which compare in respects such as frequency of flights to similar corridor routes in several more highly developed countries of the world. Saudia ranks twelfth in the world among IATA member airlines in domestic scheduled passengers carried and fifteenth in domestic scheduled passenger-kilometres flown (1987 IATA data). Jointly with Gulf Air, it provides air bridge services on the very short Bahrain-Dhahran sector (where traffic volume dropped significantly after the opening of the causeway, as mentioned earlier). Saudia, which received a new B-747-200F freighter in early 1989, operates scheduled freighter flights which serve domestic and European cities and provide, in co-operation with the Flying Tiger Line, a joint all-cargo service to New York City via Brussels.

Yemenia (Yemen Airways), the national carrier of Yemen, operates from a base at Sana'a, the Republic's capital. It provides domestic services with De Havilland Dash 7s and a small fleet of B-727 and B-737 jets, also using the latter on international services to numerous points in the Middle East and Europe, and to several other points in nearby Africa and on the Indian subcontinent.

The northern tier country carriers

Arab Air Cargo, based in Amman, Jordan is a non-scheduled cargo operator presently flying one B-707 freighter. It is unique in the region in that it is a joint venture of two other air carriers, Iraqi Airways and Royal Jordanian. It was established in May 1983 following the success of a similar joint venture in surface transport, the Iraqi-Jordanian Trucking Company.

Arkia Israeli Airlines Ltd. (Arkia), a privately owned airline, operates both international and domestic charter services and a domestic scheduled network

2. Oman also has another scheduled airline, Oman Aviation Services, which provides domestic scheduled services only using propeller aircraft and, on the Muscat-Salalah route, a B-737 jointly operated with Gulf Air. Its ownership is 35 per cent government, 65 per cent private.

which extends from Haifa and Rosh Pina in the north through the principal cities in the centre to Eilat on the Gulf of Aqaba. Most domestic services are provided using De Havilland Dash 7 aircraft, although a few Tel Aviv-Eilat flights operate with B-707s leased from El Al without crews. The latter are more typically used for international charter flights (flown co-operatively with Sun D'Or — see below) and for certain El Al services flown by Arkia using El Al cabin crews.

C.A.L. Cargo Air Lines Ltd., a privately owned Israeli charter all-cargo carrier formed in 1976, leases B-747 freighters from El Al and other carriers and functions with a very small staff to move agricultural produce — flowers, vegetables and fruits — from Israel to European markets, returning with traffic such as automobiles, industrial machinery, raw materials and consumer goods. Its primary charter route is from Tel Aviv to Cologne which serves as a hub from which its cargo is moved expeditiously by surface transport throughout Europe. It is owned by its Israeli shippers — various farm co-operatives — who in turn are part owners of AGREXCO, the half government-owned marketing organization for agricultural exports whose people load the aircraft at Tel Aviv. The carrier's operations peak during the growing season, November to May.

El Al Israel Airlines Ltd. (El Al), the Israeli national carrier, uses a relatively small but multi-sized jet fleet of B-707, B-737, B-747, B-757 and B-767 aircraft to service a primarily Western European-North American international route network. Although as of 1988 it was the only Middle East airline not having routes extending eastward as well as westward from its home territory, it does serve Cairo, Nairobi and Johannesburg to the south and it flies to more North American cities (seven) than any other airline based in the Middle East. Some of the latter services involve fairly long U.S. domestic sectors and a passenger operation to Miami which branches off at Montreal from the Toronto service, with the Montreal-Miami sector using a smaller Canadian aircraft leased with crew. Two of the airline's B-707s and five of its B-747s are capable of carrying cargo on their main decks (two of the latter have large nose doors) and are used on higher volume routes to Europe and North America. Following an industrial action shutdown of several months in late 1982 and early 1983, El Al management made changes which increased efficiency and reduced costs. For religious reasons the government-owned airline does not operate between sunset on Friday and sunset on Saturday or on 10 other special days. Domestic services are limited to a few Eilat-Tel Aviv flights for on-line connecting international passengers only. Some Eilat flights continue beyond Tel Aviv to Europe, El Al's non-stop scheduled services between Eilat and Europe being very limited. In 1988 El Al announced that an upgrade of its CRS, to be called CARMEL 2 and to be based on technology acquired from Swissair, is scheduled to be operational in 1990.

Iran Air, the national airline of the Islamic Republic of Iran, operates both extensive domestic services and numerous international routes, primarily to Europe, presently providing in many cases the only direct services between the Islamic Republic of Iran and those points. Cities served extend from Tokyo and Beijing in the east, through Bombay, Karachi, points in the United Arab Emirates and Damascus to European destinations as far west as London. As with numerous other airlines based in the region, intra-regional conflict produced adverse effects such as increased operating costs, for example by compelling the use of circuitous international routings in some instances. Iran Air also operates B-747 freighter services to Europe and B-707 freighter flights to the United Arab Emirates, transporting to Sharjah items such as fresh fruit, vegetables, carpets and textiles.

Iraqi Airways, the national airline of Iraq, has virtually no domestic operations but serves to link Baghdad with a large number of world capitals, particularly in Europe where it has more services to Eastern European capitals than any other airline of the region. Its international route network is extensive in scope, stretching east to Tokyo, Beijing and Bangkok, north to Moscow, south to Khartoum and west to Casablanca, Lisbon and Rio de Janiero. Its services to a majority of foreign countries were not reciprocated by airlines of those States during much of the protracted regional conflict. In 1988 it sought approval for a New York City/Detroit transatlantic service via Paris.

Middle East Airlines, more formally known as Middle East Airlines Air Liban SAL, is the national airline of Lebanon. The most seriously affected among Middle East airlines by conflict and regional turmoil, it has nevertheless survived and returned from forced periods of inactivity to operate an extensive route system linking Beirut with over 30 cities in the Middle East, North and West Africa and Europe. Its route network extends from Muscat in the east to Freetown in the west, Khartoum in the south and Copenhagen in the north. All of its services are flown with B-707 aircraft and almost all are unreciprocated by flag carriers of the destination States, although flights using MEA aircraft are jointly operated with Air Afrique to Abidjan, Nigeria Airways to Kano and Monrovia and Tunis Air to Tunis and Madrid. With solely long-haul narrow-body aircraft in use by the carrier certain diseconomies exist, particularly on relatively short-haul services such as those to Amman, Damascus and Larnaca.

Royal Jordanian, known as Alia, The Royal Jordanian Airline until December 1986, operates an extensive and lengthy international route network, primarily on an east-west axis extending more than halfway around the world from Los Angeles in the west, through numerous points in Europe and North Africa, to its Amman hub and on to destinations in the Middle East, the Indian sub-continent and Southeast Asia. It presently serves six points in North America, four more than any other Arab airline of the region.

Joint operations with dual designated flights are carried out with Interflug to Berlin, with MAS to Kuala Lumpur and with Air Canada to Montreal, and were agreed in 1988 with Garuda to Jakarta. Domestic services are very limited, both in frequency and to a single destination, Aqaba. B-707 freighter flights are operated between Amman and Amsterdam, Brussels, Larnaca and London. Royal Jordanian's subsidiaries include the charter company, Arab Wings, which flies four business jets.

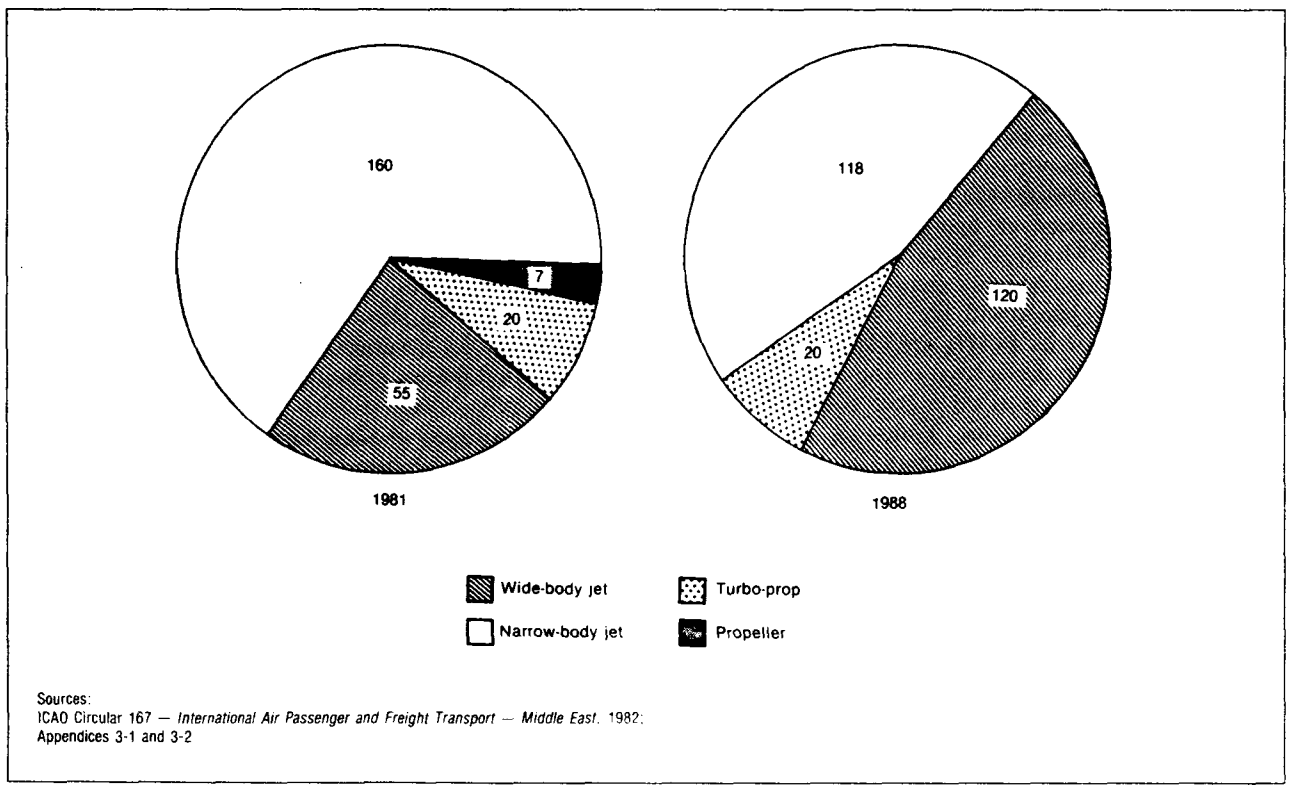
Sun D'Or International Airlines, an Israeli charter carrier known as "El Al Charters" until 1981, is an El Al subsidiary formed in 1978 to facilitate competition with deregulated foreign airlines. It utilizes B-707s leased from El Al and has a joint operating arrangement with Arkia.

Syrian Arab Airlines (Syrianair), that country's national airline, links four domestic airports to its base at Damascus and from there operates an international route network extending west to Paris, north to Copenhagen and Moscow, and east to Bombay. There is a rough balance between the number of Eastern and Western European cities served. In the Middle East most destinations are on the Gulf, although Beirut and Tehran also receive flights. Services to international destinations are flown once or twice weekly with a variety of American, French and Soviet-built aircraft.

Trans Mediterranean Airways (TMA), a privately owned Lebanese scheduled air-cargo airline, operates a fleet of B-707 freighters which link Beirut on a daily flight basis with Abu Dhabi, Amsterdam, Bahrain, Doha, Dubai and Muscat. Only somewhat less frequent freighter flights are scheduled over a network extending from London, Paris, Basel and Frankfurt through the Middle East to Bangkok, Singapore, Taipei and Tokyo. The carrier, which became a scheduled airline in 1959, pioneered a round-the-world scheduled freighter service (since discontinued).

Commercial transport fleets

At the end of 1988, the 17 international scheduled and charter carriers based in the Middle East operated 258 commercial transport aircraft. Of these, 238 were jet aircraft and 20 were turbo-prop aircraft. This is an increase of only about 7 per cent from the 242 aircraft operated as of the beginning of 1981; however, total narrow-body jet aircraft declined by more than one quarter and all piston aircraft have been retired (Figure 3-1 and Appendices 3-1 and 3-2). The number of wide-bodied aircraft operated more than doubled, from 55 in 1981 to 120 at the end of 1988. Thus over-all capacity increased far more than the modest increase in fleet size would indicate, and cargo capacity grew even more substantially considering the sizeable belly capacity of wide-body aircraft.



Sources:
ICAO Circular 167 — *International Air Passenger and Freight Transport — Middle East*, 1982; Appendices 3-1 and 3-2

Figure 3-1. Fleets operated by Middle East carriers (by aircraft type), 1981 and 1988

Of some significance is the fact that only one of every eight of the 238 jet aircraft in service in 1988 in the fleet (most of the B707/B720 aircraft) failed to meet the ICAO Chapter 2 noise standards, i.e. those found in Annex 16 to the Chicago Convention, Volume I, Part II, Chapter 2. Because most operations by such aircraft are to and from non-noise sensitive airports, only a limited number have been hushkitted, i.e. mechanically modified to reduce noise emissions. TMA, for example, hushkitted four of its seven B-707-320Cs for use on European services. On the other hand, 44 per cent of the aggregated jet fleet meet the more demanding Chapter 3 noise standards, a higher proportion than that of the fleets of any other region except Asia and the Pacific, and considerably higher than the world average of about 27 per cent. All but three of the 28 jet aircraft on order or option in the Middle East will meet Chapter 3 standards.

In mid-1988 a tentative agreement was reached among 14 Arab airlines (including Kuwait Airways and Royal Jordanian from the Middle East region) and five banks to form the Arab Aviation Finance Company (AAFC). This consortium would purchase by 1995 up to 220 new aircraft, 50 to meet growth needs and 170 as replacements, valued at as much as $10 billion.

B. FINANCIAL SITUATION OF THE MIDDLE EAST AIRLINES

Over the period 1977-1987, the Middle East airlines collectively had cumulative operating losses of $130 million. During the same period all the world's airlines taken together experienced cumulative operating profits of $27 400 million. The Middle East airlines did benefit from an upturn in the latter half of the period and experienced a combined operating profit of $100 million in 1987 (Appendix 3-3). Nevertheless, this constituted only 1.8 per cent of their collective operating revenues in 1987.

In terms of aggregated net profits or losses (i.e. the results of inclusion of non-operating outflow and income, and of taxes paid on income) the Middle East airlines collectively had cumulative losses of $110 million for 1977-1986. In 1986, however, they experienced aggregated net profits of $70 million (1987 data were unavailable for inclusion in this study).

Operating revenues

The cumulative total operating revenues of the Middle East airlines almost tripled during the period 1977-1987, from $2 100 million to $5 550 (Appendix 3-4). By this measurement their operating revenues roughly paralleled the growth of operating revenues for the world's airlines (10.2 per cent average annual growth vs. 11.3 per cent world), their share of the world figure thus remaining the same at about 4 per cent.

The sources of their operating revenues were similar to those of the world's airlines with the exceptions of their scheduled passenger revenues having constituted only about 71 per cent in 1987 versus about 77 per cent for the world's airlines and their non-scheduled revenues having been about 8 per cent of total operating revenues versus about 3.5 per cent for the world's airlines (Appendix 3-5).

Average yields of the Middle East airlines from passenger and mail traffic and from non-scheduled services as well as total transport operations remained substantially above world airlines' average yields (Appendix 3-6). Average freight yields were below world averages. Only mail and non-scheduled yields grew faster than yields for the world's airlines over the 1977-1987 period. On scheduled services very substantial growth occurred in passenger and mail yields in the first half of the period, only to be somewhat offset by negative growth rates in those same yields in the second half. Growth in non-scheduled yields continued in the second half, but at an average annual rate less than one-third that of the first half.

Even though higher yields are generally associated with shorter average lengths of passenger and freight movements on scheduled services, this was not true of the Middle East airlines over the period examined. In 1987, although their average passenger trip length, at 1 804 kilometers, exceeded the world average by 16.6 per cent, their average scheduled passenger yields also exceeded the world average by 9.7 per cent (Appendix 3-7), presumably due to their tendency to emphasize higher yield traffic. Similarly, their average freight trip distance was 11.1 per cent lower than the world average, yet their average scheduled freight yield was not higher but 21.4 per cent lower than world figures, this in large part attributable to the very sizeable increase in cargo capacity entailed with the significant expansion of the wide-body fleet.

Operating expenses

The operating expenses of the region's airlines for the period 1977-1987 grew at an average annual rate of 10.0 per cent, somewhat slower than the 11.4 per cent rate experienced by the world's airlines (Appendix 3-8). Similarly, their operating expenses per tonne-kilometres available during that period grew at an average annual rate lower than that of the world's airlines, 3.9 per cent versus 5.0 per cent (Appendix 3-9). Some unit cost categories (maintenance and overhaul; depreciation and amortization; ticketing, sales and promotion; and general, administrative and others) were well above world averages; however, all these categories are increasing at much slower rates than for the world's airlines, indicating a tendency to move closer to world figures. Unit costs of flight operations less fuel and oil were well below the world average, and barely increasing.

The estimated average unit costs for all scheduled airlines based in the region were almost identical to the estimated average unit costs for the world's airlines in 1987 (Appendix 3-9). Information by carrier on average unit costs is available for eight Middle East airlines representing over 85 per cent of the traffic of the region's scheduled airlines (Appendix 3-10). As measured in U.S. cents per tonne-kilometre available, their unit costs averaged 46.7 cents and ranged from 32.2 cents for El Al to an estimated 92.5 cents for Syrian Arab Airlines, with the airlines having North Atlantic routes showing the lowest figures.

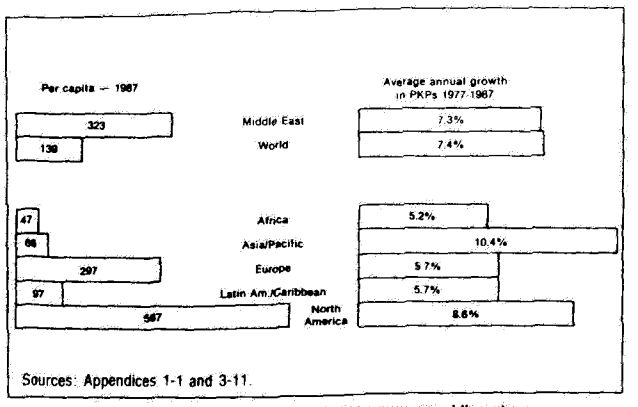


Figure 3-3. International scheduled passenger-kilometres performed by airlines of all regions

C. PASSENGER TRAFFIC

This section focuses on the 1977-1987 development of passenger traffic carried solely by airlines based in the region. It deals largely with volume and growth data for scheduled passenger traffic, both international and domestic, but touches also upon the non-scheduled passenger traffic of the Middle East airlines.

International scheduled passenger traffic

Over the 1977-1987 period the Middle East airlines as a group more than doubled their international scheduled passenger-kilometres performed (PKPs) flown and, despite rapidly rising populations in the region, significantly increased this traffic on a per capita basis, steadily maintaining their proportion of the world's traffic (see Figure 3-2).

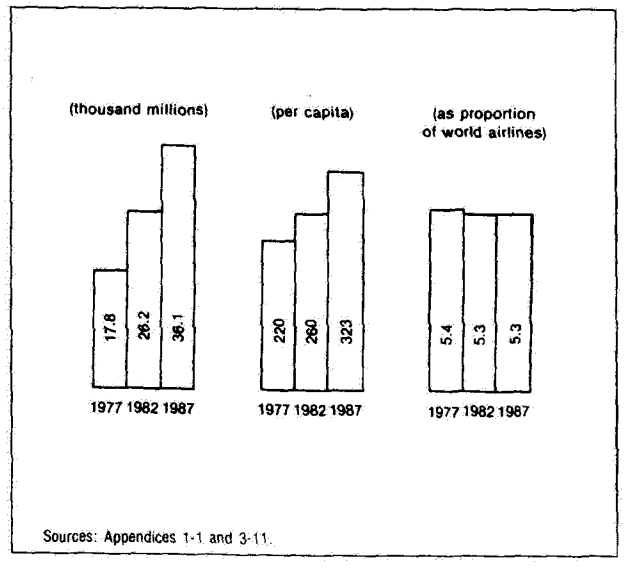


Figure 3-2. International scheduled passenger-kilometres performed by the Middle East airlines 1977, 1982 and 1987

In 1987 the Middle East airlines performed more international scheduled passenger-kilometres per person in the Middle East population than did the airlines of any other region (except North America) per person in their populations (see Figure 3-3). Although their average annual rate of growth in PKPs was exceeded by those of the airlines of the Asia/Pacific region and of North America, it approximated the average rate of increase for the world's airlines as a whole.

To produce this growth the Middle East airlines only moderately expanded their average stage length flown per aircraft but increased the seats available per aircraft by more than half and carried their average international passenger much further (see Figure 3-4). However, their composite international passenger load factor declined, and that by one percentage point from 1982 to 1987, after having increased by six points in the 1977 to 1982 period.

The sizeable increase in average seats available per aircraft of the Middle East airlines surpassed

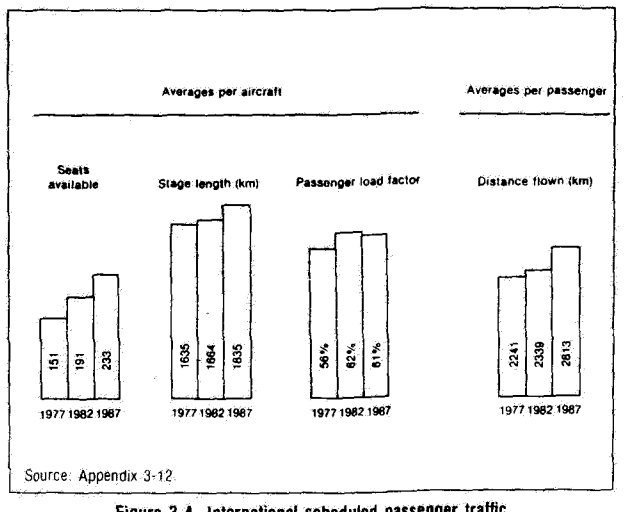


Figure 3-4. International scheduled passenger traffic coefficients of the Middle East airlines

those of the airlines of all other regions of the world (see Figure 3-5). The gain in distance flown per passenger was unsurpassed and was matched solely by the North American airlines.

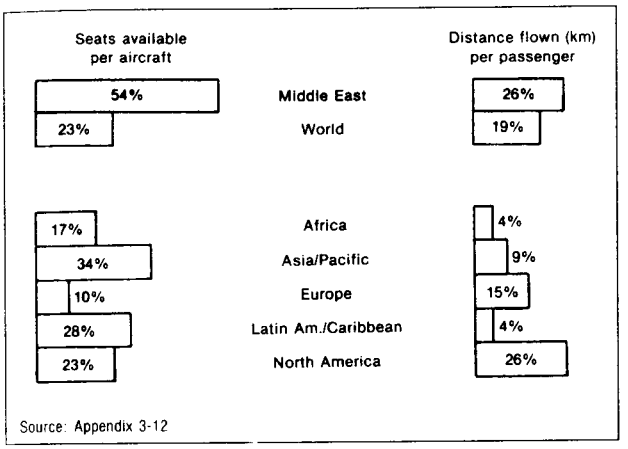


Figure 3-5. Percentage growth in selected international scheduled passenger service measurements, 1977-1987

From 1977 to 1987 the moderate percentage increase in the length of the average stage flown by the Middle East airlines was half that of the Asia/Pacific and North American airlines and only three-quarters of that recorded for the world's airlines on the whole (see Figure 3-6). Similarly, although average international scheduled passenger load factors increased world-wide, the increase achieved by the Middle East airlines was exceeded by those of all other regions except Africa.

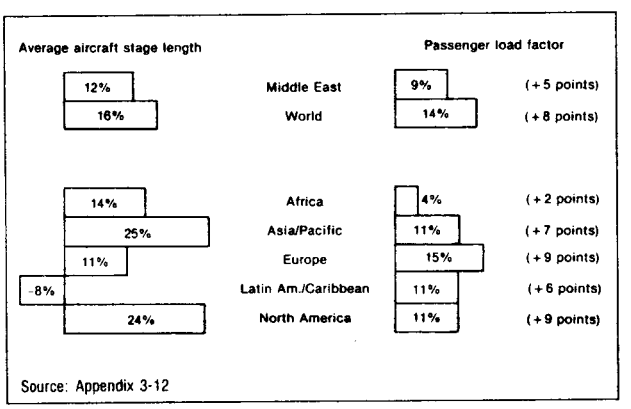


Figure 3-6. Percentage growth in selected international scheduled passenger service measurements, 1977-1987

This international scheduled passenger load factor problem was shared by all but two of the region's airlines (see Figure 3-7).

Domestic scheduled passenger traffic

Less than one per cent of the domestic scheduled passenger traffic of the world's airlines was attributed

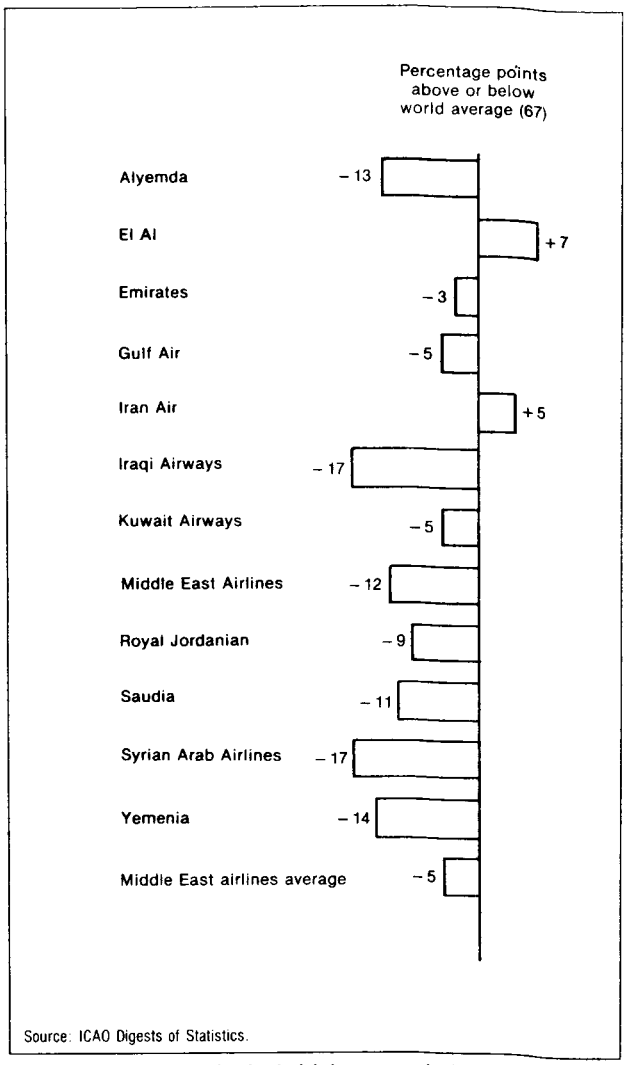


Figure 3-7. International scheduled passenger load factors, 1987

to Middle East airlines in 1987 (see Figure 3-8). With domestic traffic accounting for only 19 per cent of their total PKPs in 1987, the domestic portion of the total passenger traffic of the Middle East airlines was far below the world average proportion and well below that of the airlines of all other regions.

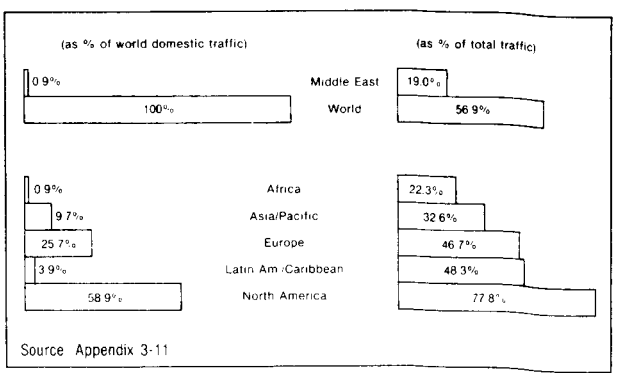


Figure 3-8. Domestic scheduled passenger-kilometres performed, 1987

Although domestic scheduled air services exist in eight States in the Middle East and are largely performed by the same airlines which are the international flag carriers of those States, Saudia alone accounted for 63 per cent of the Middle East domestic PKPs and Iran Air for 33 per cent. The domestic traffic growth patterns of these two airlines, almost identical over the 1977-1987 period, were however, markedly different for 1977-1982 and for 1982-1987 (see Figure 3-9).

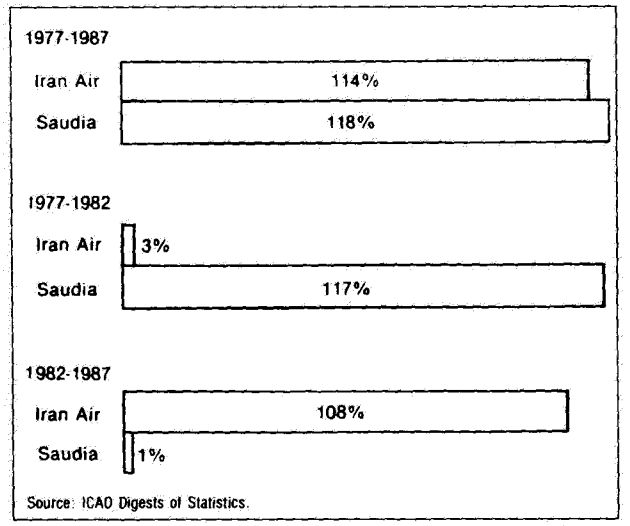


Figure 3-9. Growth in domestic scheduled passenger-kilometres performed

Non-scheduled passenger traffic (international and domestic)

The volume of non-scheduled passenger traffic carried by the Middle East airlines more than tripled from 1977 to 1987, although from a very small 1977 base, thus significantly increasing the non-scheduled proportion of their total passenger traffic (see Figure 3-10).

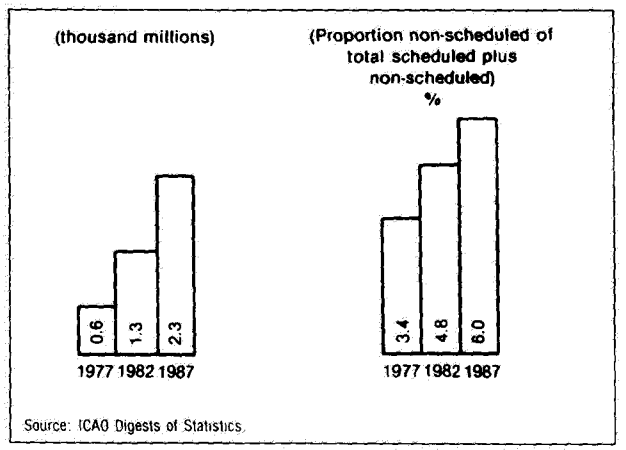


Figure 3-10. International non-scheduled passenger-kilometres performed by the Middle East airlines

The non-scheduled proportion of the international passenger traffic of the Middle East scheduled airlines was also small relative to the world airlines' proportion and that of the scheduled airlines of several other regions (see Figure 3-11).

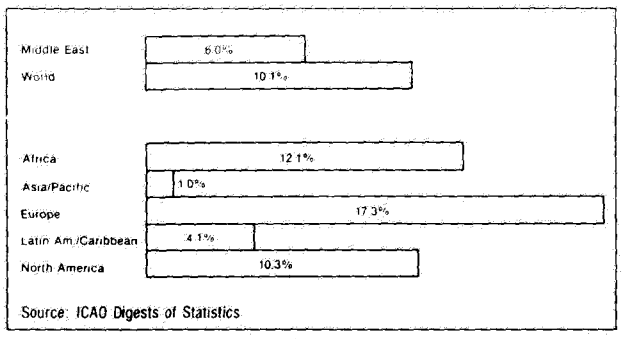


Figure 3-11. Non-scheduled proportion of total international passenger-kilometres performed by scheduled airlines, 1987

D. FREIGHT TRAFFIC

This section concentrates on the 1977-1987 development of freight traffic carried solely by airlines based in the region. It deals largely with volume and growth data for international scheduled freight traffic, but also briefly discusses the non-scheduled freight traffic of the Middle East airlines.

International scheduled freight traffic

From 1977 to 1987 the Middle East airlines collectively doubled their international scheduled freight tonne-kilometres (FTKs) performed on an absolute basis, although their figure per capita of population grew by less than half, due to a rapidly rising population (see Figure 3-12). Nevertheless, their proportion of the freight traffic of the world's airlines declined.

The collective performance of the Middle East airlines on a per capita basis nevertheless compared very

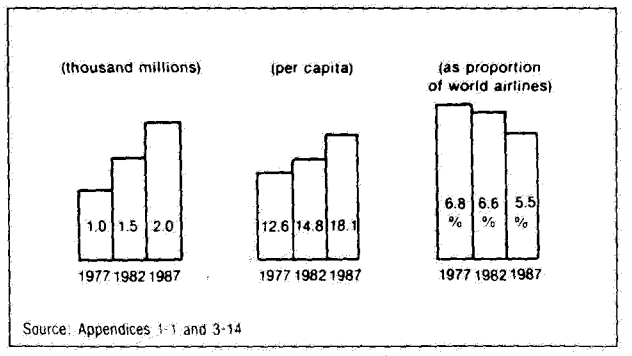


Figure 3-12. International scheduled freight tonne-kilometres performed by the Middle East airlines

favourably to world averages and to those of most other regions (see Figure 3-13). Their average annual growth rates, however, remained somewhat below world and most regional growth rates.

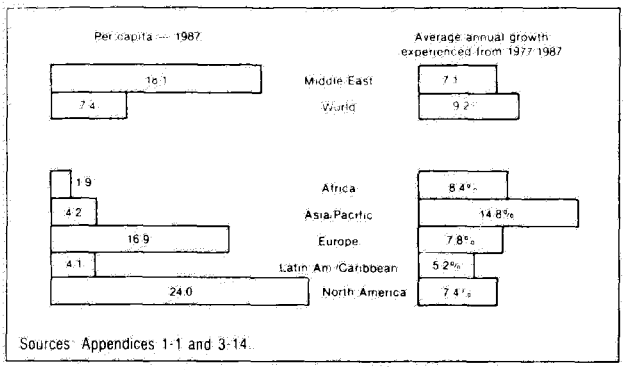


Figure 3-13. International scheduled freight tonne-kilometres performed by airlines of all regions

The 1977-1987 growth in the average freight load per aircraft of the Middle East airlines was only slightly under the average for the world's airlines, and was exceeded only by the Asia/Pacific airlines (see Figure 3-14).

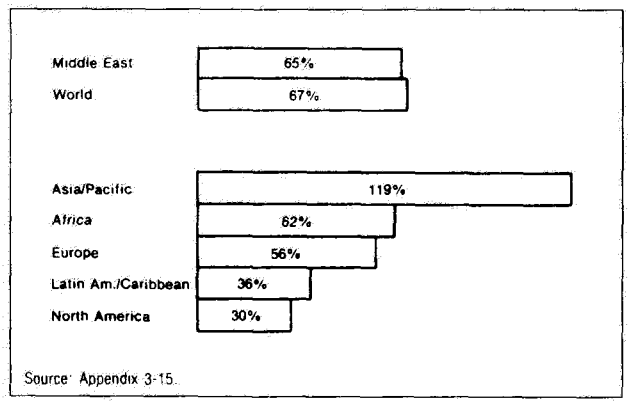


Figure 3-14. Growth in average freight load per aircraft, 1977-1987

Although the percentage contribution of freight to total scheduled tonne-kilometres remained constant, the average over-all (passenger and freight) capacity per aircraft increased by half from 1977 to 1987 as the proportion of wide-bodied aircraft in the Middle East fleets grew, and the average freight load per aircraft increased even more rapidly (see Figure 3-15). For both per aircraft indicators less growth occurred in the second half of the period than in the first, a reflection of the economic slowdown in much of the region in the 1980s. The moderate increase in the average freight load per aircraft from 1982 to 1987 was largely offset by the one point decline in the average passenger load factor, thus keeping the average over-all weight load factor per aircraft relatively low.

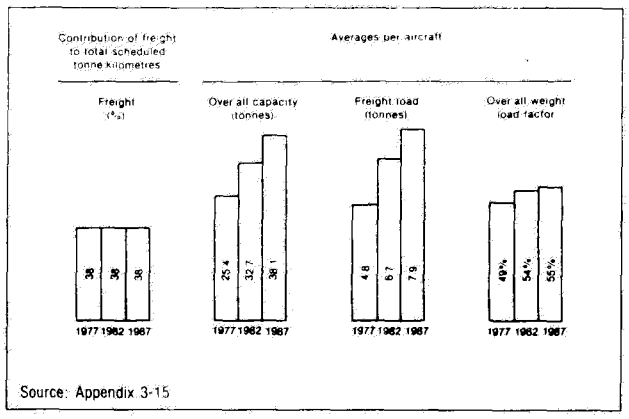


Figure 3-15. Growth in international scheduled freight traffic of the Middle East airlines

The relatively low average over-all weight load factor per aircraft of the Middle East airlines is evident in the 1987 comparison shown in Figure 3-16.

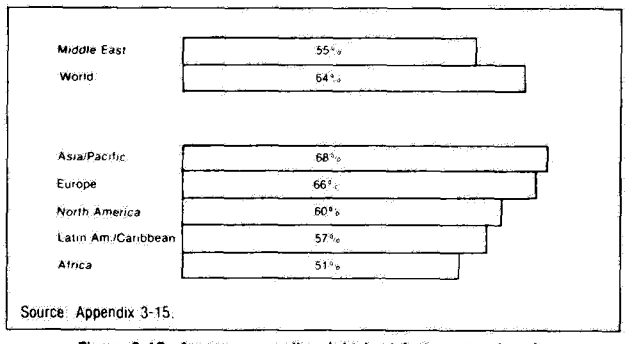


Figure 3-16. Average over-all weight load factors per aircraft, 1987 — world's airlines

International non-scheduled freight traffic

Limited data are available for international non-scheduled freight traffic carried by the scheduled airlines of the Middle East (Appendix 3-16). Due to lack of reported data for several significant airlines, including one all-cargo airline, no conclusions have been stated about the combined data for the Middle East airlines.

E. THE OUTLOOK FOR PASSENGER AND FREIGHT TRAFFIC

Many factors influence the level and structure of demand for air transport by the scheduled airlines based in the Middle East. Some of these are external to air transport, such as economic growth, demographics and the price of crude oil. Others relate directly to the airline industry and include experienced traffic demands, costs, yields and load factors. This section builds upon other parts of this study to present, explain and

compare forecasts by ICAO of the 1988-1998 international scheduled passenger and freight traffic of the airlines of the Middle East.

External factors affecting the forecasts

With five Middle East States leading the world in average annual population growth rates, this demographic factor can be expected to increase, to a degree, the demand for air transport. A second and perhaps negative demographic influence, that of population-induced rising demands for investment in infrastructure other than air transport, one which might limit the air transport supply side, has been ameliorated by the ample capacities of the large number of new or modernized airports in the region and by airline fleet expansion already in place and growing.

Given the uniquely important role of the price of crude oil to a majority of the States in this region, the International Monetary Fund assumption that the price of oil will remain constant in real terms (for the first half of the ICAO projection period, i.e. up to 1992) is of some importance. The minimal growth in the region from 1982 to 1987 in international airport passengers, although offset somewhat by a less modest increase in airport freight, paralleled the oil price declines. Although international scheduled PKPs and FTKs performed by the region's airlines continued to grow while crude oil prices declined, this is explained in part by significant increases in per passenger distances flown and by the increase in demand for air transport originated outside the region which was stimulated by oil price declines.

An important external factor that is perhaps impossible to measure in any quantitative terms is the peaceful resolution or the exacerbation of armed conflicts in the region. Significant increases in demand for transport to at least one major airport have been reported following the end of hostilities in the Gulf. However, during 1988, which saw continuing disturbances and unrest in Gaza and the West Bank, both international scheduled and charter air traffic to and from Israel reportedly dropped off markedly.

Although for many years economic growth in the Middle East had equalled or surpassed the world average, GNP for the region has declined since 1982. For 1986-1995, a period which largely overlaps the forecast period of this study, the World Bank projected a high of 4.4 per cent, and a low of 3.6 per cent, in average annual percentage change in GDP for oil exporting developing countries. Based in part on these projections, and in part on the other external factors bearing on Middle East economies (such as an expected 4.0 per cent per annum increase in imports), low, base and high projections of real GDP average growth rates for 1988-1998 of 1.5, 2.5 and 3.5 per cent per annum were developed for the purposes of this study.

Air transport system factors affecting the forecasts

With recent historic growth rates in the operating expenses of the region's airlines, as well as in the costs per tonne-kilometre available, approximating those of the world's airlines, the effects of costs on traffic projections should be neutral. With all but cargo yields substantially above world airlines averages and with the Middle East airlines having lower than world average passenger load factors and over-all weight load factors, ample latitude exists for traffic growth. Load factors, considered in relation to the present and near future ample fleet capacities, indicate no lack of supply to accommodate predictable demand.

While the minimal recent historical growth in international passenger traffic embarked and disembarked at Middle East airports reflects some over-all decline in operations by air carriers based outside the region, it also reflects an increase in traffic carried by airlines of the region. The optimism implicit in the decisions of most of the larger airlines of the region to acquire and operate the newest types of jet aircraft, and to continue to add new and typically longer routes to their systems, must be given appropriate weight in traffic forecasting.

The methodology and major assumptions of the ICAO international traffic forecasts

As a basis for the preparation of the traffic forecasts for this study, econometric analyses were performed to determine the impact of economic variables on the demand for scheduled international passenger and freight transport. Several models were developed and two chosen for use (Appendix 3-18). These models were used in conjunction with scenarios of future economic growth (in GDP) and air transport prices to estimate scheduled international passenger and freight growth potential. The estimated traffic growth rates were then reviewed in the light of prospective changes in other factors which could not be quantified in the economic analyses.

The following assumptions were made concerning the forecast period, relative to external factors, air transport yields and airline operations:

a) a "most likely" over-all economic growth rate in real terms of 2.5 per cent per annum for the region as a whole;
b) a "most likely" over-all increase in imports to the region as a whole in real terms of 4.0 per cent per annum;
c) a positive effect, on balance, of population growth on the demand for air transport;
d) increasing demands for air transport attributable to the end of hostilities in the Gulf;

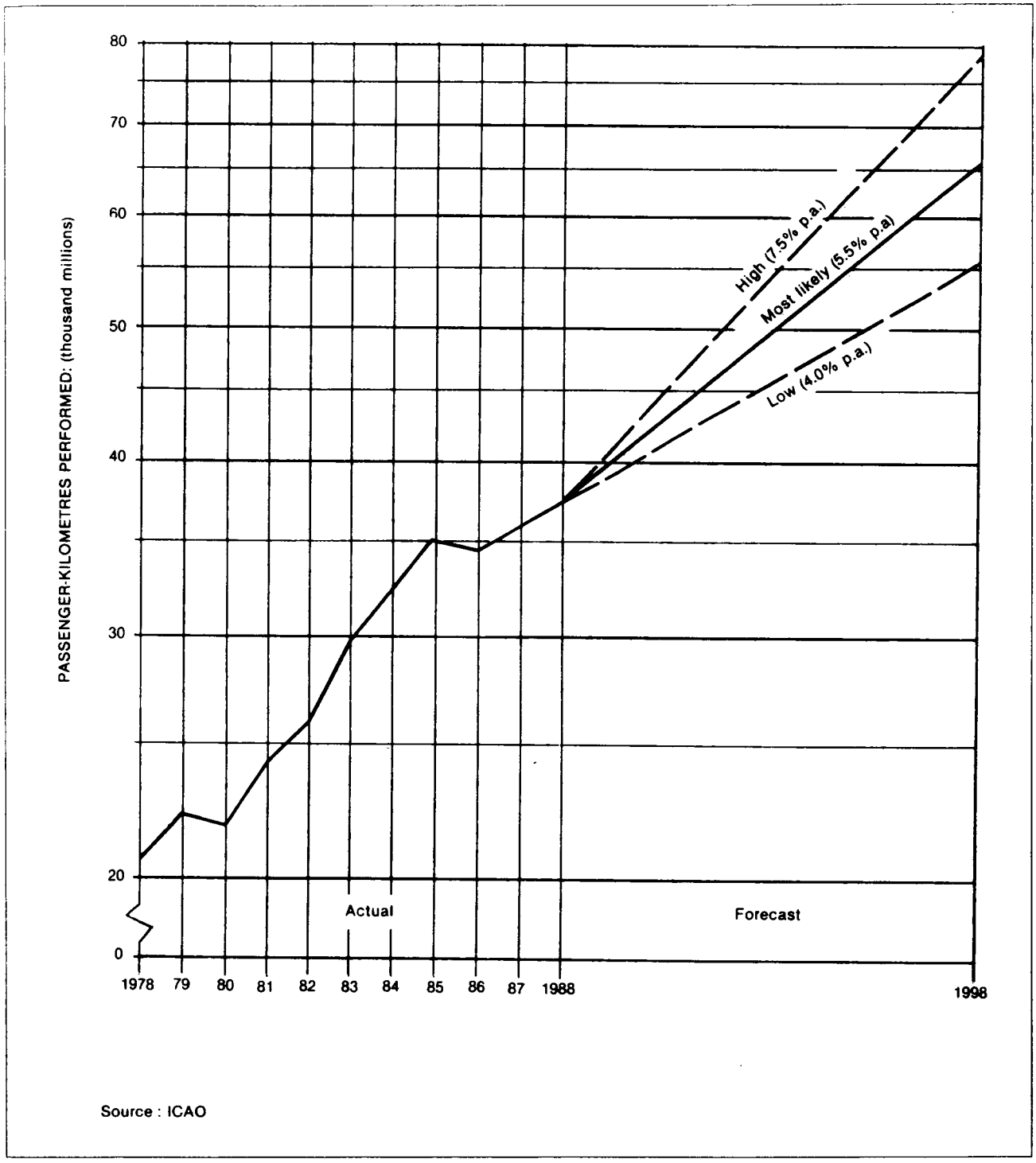


Figure 3-17. Forecasts of international scheduled passenger traffic for the Middle East airlines to 1998

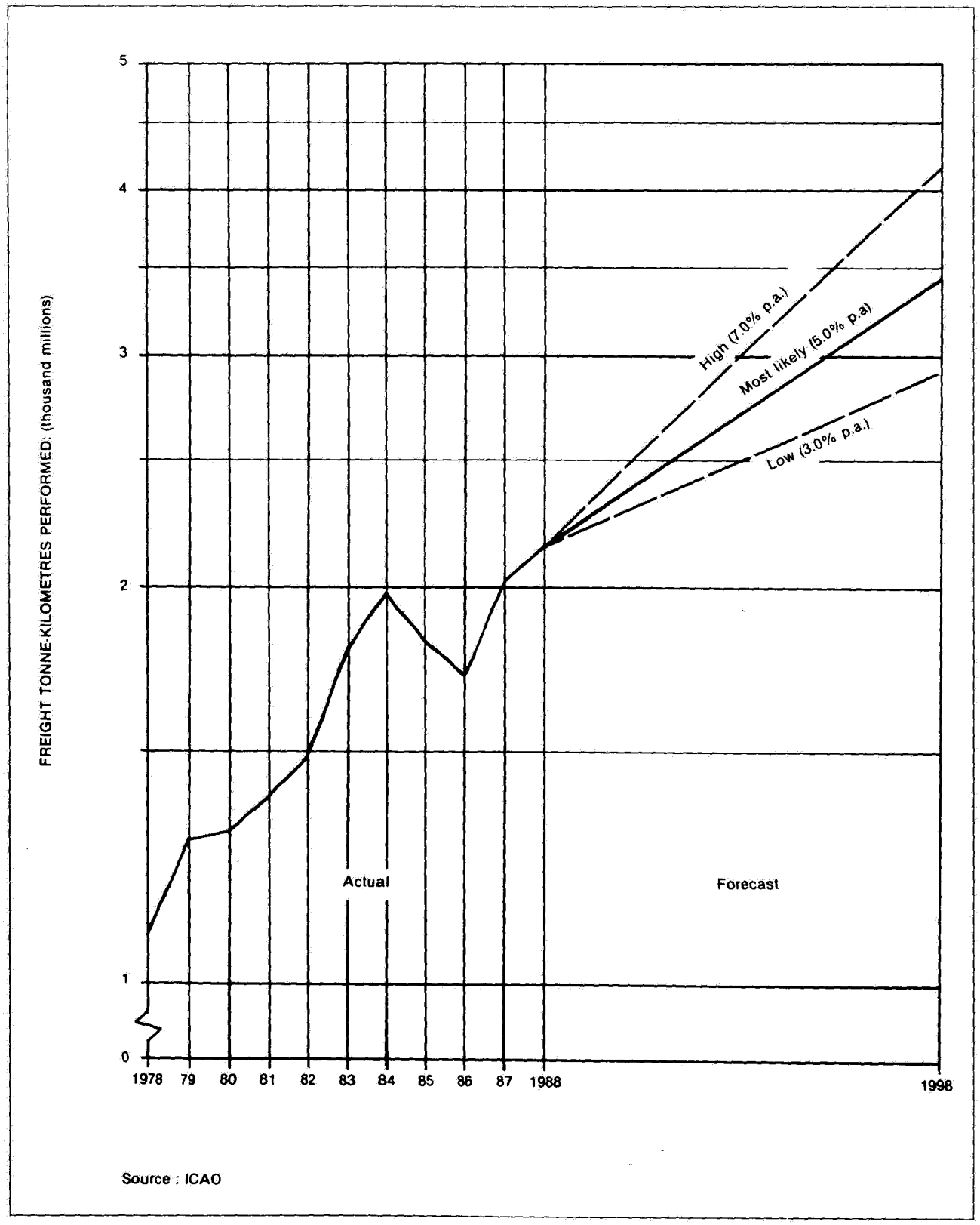


Figure 3-18. Forecasts of international scheduled freight traffic for the Middle East airlines to 1998

e) declines in average international passenger and freight yields of 2 per cent and 3 per cent per annum respectively in real terms over the forecast period for the airlines of the region;
f) continuing expansion of airline fleets and routes flown at about recent growth levels; and
g) continuing airline cost reductions, modernization of distribution systems, and co-operative endeavours.

The ICAO international passenger and freight forecasts

Having considered the external and airline industry factors previously explained and based upon the above assumptions, using the models cited, ICAO forecasts that over the period 1988-1998 the international scheduled traffic of the airlines based in the Middle East is most likely to increase at an average annual rate of 5.5 per cent for passengers (Figure 3-17) and 5 per cent for freight (Figure 3-18). These rates are below the 1977-1987 average annual PKP growth rate of 7.3 per cent and FTK growth rate of 7.1 per cent. They are below the most likely 11 per cent passenger and 9 per cent freight projections made by ICAO in its 1982 Middle East study. The lower rates now forecast reflect real, substantial changes in most factors involved in the forecast.

The passenger forecast model used indicates a GDP elasticity of 1.60 and price elasticity of 0.94. This implies that for every 1 per cent increase in GDP (real terms), PKPs will increase by 1.6 per cent; likewise, for every 1 per cent decline in the fare level (average yield) PKPs will increase by 0.94 per cent. Similarly, the freight forecast model used indicates an import elasticity of 1.06 and a yield elasticity of 0.50. This implies that for every 1 per cent increase in GDP (real terms), FTKs will increase by 1.06 per cent; likewise, for every 1 per cent decline in average freight yield, FTKs will increase by 0.50 per cent.

In addition, a high forecast of 7.5 per cent per annum in PKPs was established using the scenario of a high GDP growth rate of 3.5 per cent in real terms and a decline in average passenger yield of 2 per cent per annum in real terms during the forecast period. The low scenario of 4.0 per cent per annum included an average annual 1.5 per cent growth in real GDP and a decline in real average passenger yield of 2 per cent per annum. Similarly, the high forecast of 7.0 per cent per annum for freight (FTKs) used a projected import growth rate of 6 per cent in real terms and an average annual decline in freight yield of 3 per cent (real terms). The low scenario of 3.0 per cent per annum assumed a 2 per cent average annual growth in imports (real terms) and a 3 per cent decline in average freight yield (real terms).

The ICAO forecasts may be compared to similar projections made recently by other organizations. In a study published in July 1987, the McDonnell Douglas company estimated that, for the period 1987-1997 the Middle East airlines would experience a forecast average annual growth in PKPs of 7.4 per cent. In the September 1987 McDonnell Douglas "Outlook for Commercial Aircraft", an average annual growth rate for 1986-2001 was projected at 7.2 per cent for PKPs and 5.2 per cent for FTKs for the Middle East airlines. Similarly, in February 1988, the Boeing Company forecast a 1986-2000 average annual growth rate in PKPs by airlines based in the Middle East of 5.1 per cent. Note that all these forecasts are not precisely comparable, not only because the periods cited differ, but because they do not limit their projections to international scheduled traffic as does ICAO.

Other forecasts cited elsewhere in this study relate to all airlines' traffic at certain airports (Chapter 2) and to route group traffic by all airlines (Chapter 4). The former include passenger and freight movement growth rates of approximately 5 per cent, the latter growth rates ranging between 4.6 and 7.1 per cent for passengers and 5.0 and 5.7 per cent for freight.

No ICAO forecast was made for non-scheduled or domestic Middle East air traffic. The McDonnell Douglas study cited above does, however, project Middle East domestic PKPs to grow at an average annual rate of 7.4 per cent from 1987 to 1997. Presumably domestic air traffic in the Middle East will continue to be largely that of the Islamic Republic of Iran and Saudi Arabia.

Chapter 4
Air Services to, from and within the Middle East

Air services to, from and within a region reflect the interaction of many factors, including market demand (which is to a significant extent a product of broader economic, social and political factors), the supply as determined in choices made by airlines and governments regarding countries and cities to be served and the frequency, regularity and patterns of service, as well as government regulation and the prices airlines charge. Part A of this chapter discusses the demand for air services as indicated by recent flows of on-flight origin and destination traffic; Part B, the development of air route links between the Middle East and other regions and within that region; Part C, the role of government regulation as it has influenced the growth and direction of the region's air services; and Part D, an assessment of the pricing involved. In conclusion, Part E looks ahead at probable future air service developments, including forecasts of international air traffic flows involving the region.

A. RECENT TRAFFIC FLOWS TO, FROM AND WITHIN THE MIDDLE EAST

Passenger flows

Approximately 22 million passengers were carried in 1987 on all international air services (scheduled and non-scheduled) operated to, from and within the Middle East, an increase of about 16 per cent from the 19 million estimated for 1982 (Appendix 4-1). The Middle East-Europe routes accounted for the largest number of passengers in 1987 (30.4 per cent) followed by those to and from Asia and the Pacific (26.4 per cent), intra-Middle East (21.1 per cent), to and from Africa (18.1 per cent) and to and from the Americas (4.0 per cent).

Over-all, the number of passengers on Middle East air routes grew by an average of 2.8 per cent a year between 1982 and 1987, compared to 5.9 per cent average annual growth for world international air services during the same period. All major traffic flows showed erratic changes from year to year and, with the exception of the Asia/Pacific routes, all route groups recorded one or two years of declining traffic. The greatest change between 1982 and 1987 was recorded on routes to and from the Americas (up by an average of 6.7 per cent a year), followed by Asia/Pacific (5.9 per cent), Europe (4.1 per cent) and intra-Middle East (1.3 per cent), while traffic on the African routes fell by about 1.5 per cent a year.

An important factor influencing Middle East travel markets during this period was the sharp decline in oil prices which curbed public spending on national development projects and either reduced personal incomes or slowed their growth, with consequent negative effects on the demand for travel. A second factor was hostilities in parts of the region which closed numerous air routes and severely reduced the demand for travel on others. Although both business and pleasure travel were affected by these developments, the continuing need for migrant labour ensured that traffic on the Asia/Pacific routes was generally more buoyant than on other route groups, even though there were shifts in the importance of individual country-to-country markets. The relatively strong growth on routes between the Middle East and the Americas was in part due to the expansion in through-plane services between the region and North America which reduced the proportion of Middle East-North American travellers making connexions in Europe and thus being counted as Middle East-Europe traffic. Air travel over relatively short distances within the region was adversely affected by improvements in the regional highway network, by increased car ownership and by expanded international bus and ferry services.

Freight flows

Almost 900 000 tonnes of freight, or about 11 per cent of the world total, were carried in 1987 on international routes to, from and within the Middle East, an increase of more than a third over the estimated 1982 figure of 650 000 tonnes (Appendix 4-2). Freight flows by route group followed the same ranking as that for passenger traffic. The largest amount of traffic was carried on routes between the Middle East and Europe (48.3 per cent), followed by those to/from Asia and the Pacific (21.3 per cent), intra-Middle East (14.4 per cent), to/from Africa (12.0 per cent) and to/from the Americas (4.0 per cent). Freight traffic on the European

and American routes declined slightly in relative importance from 1982 to 1987.

Total international freight traffic on Middle East air routes grew at an average annual rate of 6.6 per cent between 1982 and 1987, compared with a world growth rate of 9.0 per cent. As with passenger traffic flows, there were sharp differences in the rate of change from one year to the next and from one route group to another. Traffic on the intra-Middle East and Middle East-Asia/Pacific routes recorded the strongest average annual growth, at 9.5 and 9.4 per cent per annum respectively. Traffic to/from Africa also increased at an above average rate of 8.0 per cent while traffic on routes to/from Europe rose by 4.7 per cent.

The development of freight traffic was subject to the same major economic and political influences as passenger traffic during this period. In addition, the completion of many major infrastructure projects in the region resulted in reduced demand for the shipment of project equipment and supplies. On the other hand, slower economic growth had little effect on the demand for consumer goods and perishables from the Asia/Pacific region, and the development of sea/air transshipment services at several airports in the region increased the flow of air freight traffic between the Middle East and Europe.

B. INTERNATIONAL AIR SERVICE ROUTE LINKS

Since 1980, the pattern of international air service route links to, from and within the Middle East has undergone moderate changes in contrast to the dramatic growth experienced during the 1970s. Nevertheless, these later changes are significant in their long-term implications for the air transport system. The following assessment of the development of international air service route links to, from and within the region is based on an analysis of through-plane scheduled services (except for all-cargo) operated in June 1988 and of the changes that have occurred in them since 1980. Links are provided with as many as several daily flights or as few as one per week.

Air route links with Europe

Relatively few changes have taken place since 1980 in the number of air route links with Europe. Through-plane services now connect the Middle East with 22 of the 29 countries in Europe (Appendix 4-4). The Middle East States with the most European links are Iraq (20), the United Arab Emirates (20), Saudi Arabia (18), Jordan (17) and Kuwait (17). The airports in Europe with service to the most countries in the Middle East are Larnaca and Paris (with services to all 14 States), Frankfurt and Istanbul (13), Athens and London (12) and Amsterdam (11).

Between 1980 and 1988, the airlines of the region expanded their network considerably, increasing their country-pair links with Europe by more than 40 per cent. The Middle East airlines serving the largest number of European countries were Iraqi Airways (19 countries), Royal Jordanian (17), El Al (15) and Syrian Arab Airlines (13) (Appendix 4-5). Yemenia's network grew the most rapidly, from one to eight countries.

Services between the Middle East and Europe were also operated by 22 European airlines (Appendix 4-6). In 1988 Lufthansa served the largest number of Middle East States (11), followed by Air France (10), Aeroflot and KLM (9 each), and British Airways, Swissair and THY (8 each). The main changes by the European airlines were reductions in services to the Islamic Republic of Iran, Iraq and Lebanon, and increases in services to Jordan and the United Arab Emirates.

Air route links with Asia and the Pacific

With the exception of Israel and Lebanon, the States of the Middle East were provided in 1988 with through-plane services to 18 countries in the Asia/Pacific region, the additions since 1980 being Maldives and Nepal (Appendix 4-4). The Middle East countries with the largest number of links were the United Arab Emirates (17), Bahrain (14), Saudi Arabia (13) and Kuwait (10). Jordan, Saudi Arabia and the United Arab Emirates experienced the most increases in service links between 1980 and 1988.

An important change was the tripling (from 5 to 14) between 1980 and 1988 in the number of destinations in the Asia/Pacific region served by airlines of the Middle East (Appendix 4-5). Services were begun to Bangladesh, Hong Kong, Indonesia, Japan, Malaysia, Maldives, Philippines, Republic of Korea and Singapore. Emirates, MEA and Yemenia commenced services to the Asia/Pacific region for the first time during this period, while Gulf Air, Iran Air, Royal Jordanian and Saudia added the largest number of new destinations.

Royal Nepal Airlines was the only new airline based in the Asia/Pacific region to begin flying to the Middle East between 1980 and 1988, bringing the total number of airlines from that region to 17 (Appendix 4-6). Most of the country-pair links served reflect either the importance of migrant labour traffic or the attractiveness of certain countries in the Middle East as transit points. In view of the close commercial and labour ties with the South Asian sub-continent, it is not surprising that the carriers serving the most Middle East countries are Pakistan International (9), Air India (6), Air Lanka (6) and Biman Bangladesh (6). With few exceptions, and for the same reasons, their services are largely limited to the GCC-member States.

Air route links with Africa

A significant expansion in the route network linking the Middle East and Africa occurred between 1980 and 1988. Services commenced to Chad, Madagascar, Mauritius, Niger, Rwanda, Senegal, Sierra Leone and Uganda. The countries in the region which are best served and have also expanded the most are Saudi Arabia (linked to 21 States) and the United Arab Emirates (12) (Appendix 4-4). Cairo remains the key African hub with services to all the Middle East States except Democratic Yemen and the Islamic Republic of Iran, followed by Khartoum (10 States) and Tunis (7). The most important developments in the route network have been the increase in services to Sudan (from 6 to 10 country-pair links) and to sub-Saharan Africa, where the number of service links rose by 75 per cent (from 16 to 28).

All the international airlines of the region except Iran Air operated services to Africa (Appendix 4-5). Among them, those providing the most links, Saudia (serving 9 States), Syrian Arab Airlines (5), Gulf Air (4) and Iraqi Airways (4), also expanded the most between 1980 and 1988. Services were also provided by 16 African airlines, compared to 12 in 1980, with the addition of Air Afrique, Air Sinai, Air Tanzania and Uganda Airways (Appendix 4-6). Of the African airlines, the most linkages were provided by Egyptair (9 countries served), Sudan Airways (6) and Tunis Air (5).

Air route links with the Americas

Seven countries in the Middle East (Iraq, Israel, Jordan, Kuwait, Saudi Arabia, Syria and United Arab Emirates) received through-plane services to North or Latin America in 1988 (Appendix 4-4). Services to Canada and/or the United States were operated by El Al, Kuwait Airways, Royal Jordanian and Saudia, while Iraqi Airways served Brazil (Appendix 4-5). Pan American, Tower Air and TWA served the region from the United States (Appendix 4-6). Other links to Canada and the United States were provided by Pakistan International.

Air route links within the Middle East

With the exceptions of the absence of any air links between Israel and the rest of the region, and the temporary discontinuance of numerous links to and from the Islamic Republic of Iran, Iraq and Lebanon, the intra-regional route network is relatively well developed (Appendix 4-3). The over-all reduction from 1980 in the numbers of air route linkages within the region was in large part due to the above-mentioned temporary discontinuances. Despite this, 9 of 13 States were directly linked in 1980 with two-thirds or more of the other States in the region. Kuwait, Qatar, Saudi Arabia and the United Arab Emirates were linked to the most countries. Democratic Yemen and Yemen experienced the greatest improvement in air linkages since 1980.

With the exceptions of El Al, Emirates, Iran Air and Iraqi Airways, each airline of the region serves half or more of the States in the Middle East (Appendix 4-5). Those serving the largest number of States as of mid-1988 were Kuwait Airways (11), Saudia (11), Middle East Airlines (10), Royal Jordanian (10), Yemenia (9) and Gulf Air (9). Since 1980, new services to States in the region were inaugurated by Gulf Air (to three additional States), Yemenia (to two States), and Alyemda, Kuwait Airways, MEA, Royal Jordanian and Syrian Arab to one State each.

C. REGULATION

Most States in the region tend to pursue a policy of controlled regulation and balanced capacity sharing with the airlines of their bilateral partners. Some exceptions exist, for example bilateral air service agreements signed between the United Arab Emirates and Singapore in 1987, between Qatar and Singapore in 1988, and between the United Arab Emirates and Malaysia in 1988. These agreements generally provide almost unlimited rights, with no restrictions on the number of carriers, frequencies, aircraft size or points to be served, nor on the number of intermediate or beyond points which may be served with full Fifth Freedom rights.

In a number of instances, airport development has also influenced regulatory policy and practices. Both Dubai and Sharjah have adopted an open skies policy in addition to commercial measures (e.g. promotion of sea/air transshipment, duty-free facilities) to attract operators to their airports.

Nonetheless, the main source of competition for Middle East airlines comes from the extra-regional air carriers whose services transit the region on the major southern trunk route between Europe and Asia/Pacific. Due to the limited demand on many routes during the early years of their operation, it was more economical for the traffic to be carried as Fifth Freedom traffic on transiting services. With market growth and the development of services by Third and Fourth Freedom carriers, many routes have periodically experienced excess capacity and yield dilution. Where such a situation persists, it can influence regulatory policy.

Non-scheduled policy

The need to compete for tourist traffic can also lead to changes in regulation as was evidenced by Israel's

modifications of its non-scheduled policy at various times. Prior to 1977, charter flights were permitted only if they originated in Scandinavia and landed at Eilat. Restrictions were gradually lifted (first to allow pilgrim charters, then to end restrictions on the origination points of flights) until by 1981 all limitations had been abolished. A new restriction was, however, introduced in 1983 on routes to Tel Aviv served by El Al: no commingling of foreign-origin and Israeli-origin tour groups on the same flight.

Royalty payments

A common requirement in the Middle East is that a foreign airline operating a bilaterally agreed route pay a royalty to the non-operating national carrier. Similarly, airlines of the region are also subjected to this requirement by some States outside the Middle East. In some cases, payments are also levied on that capacity offered by the foreign airline which is greater than the capacity provided by the national carrier. The most common basis for calculation of royalty payments is a percentage of the full economy fare, often as much as 15 to 30 per cent for Third and Fourth Freedom traffic, and higher for Fifth Freedom traffic. While the system compensates the non-operating airline and may limit the provision of excess capacity, these payments may also be considered as hidden surcharges levied on users. To the extent that payment is based on the applicable economy class fare, the practice also serves to discourage the introduction of discount fares. Some States also require payment of royalties to the national carrier in order to obtain approval of charter flights.

Pricing regulation

Under the terms of most air service agreements involving States of the region, tariffs are governed by the traditional dual approval regime. Exceptions to this practice are found in the Israel-United States and Jordan-United States agreements which have dual disapproval tariff clauses and the Syrian Arab Republic-United States agreement which has a country of origin clause. The actual negotiation of tariffs for scheduled air services is delegated to airlines working within the framework of IATA.

IATA's adoption, in recent years, of a more flexible approach to establishing tariffs by permitting carriers to file innovative fares and to respond to competitive measures taken by other airlines has enabled agreements to be reached for most routes involving the Middle East. The acceptance of more liberal routing controls on South Atlantic routes (permitting travel via certain North American gateways at the direct route fare) and separate treatment of routes to and from Israel have also fostered a conclusion of agreements. However, pricing agreements on Middle East-Europe routes have not proven possible due to basic disagreement on such issues as surcharges for intermediate class travel, the means to reduce directional fare imbalances (one-way fares from some points in Europe being up to 70 per cent higher than those to the same points in Europe), and the need to respond to fares available in the marketplace, such as certain special fares offered from the Gulf area.

The Arab Air Carriers Organisation (AACO) also provides a regional forum for tariff co-ordination between IATA and non-IATA airlines, permitting tariff proposals to be arrived at for presentation at subsequent IATA Tariff Coordinating Conferences. Several members of AACO are also members of the African Airlines Association (AFRAA) and joint AACO/AFRAA meetings are held on tariff matters of common interest prior to the relevant IATA Conferences.

Despite the increasing number of IATA agreements in force on routes to, from and within the region, the abuse of officially approved tariffs continues to be a problem as it is elsewhere. IATA itself has progressively dismantled its tariff enforcement machinery and in 1987 rescinded all its legal provisions for compliance action. As a result, tariff enforcement in the region is now confined to local actions taken by some States and to monitoring and yield improvement activity undertaken by groups of airlines serving individual countries.

D. PRICING OF AIR SERVICES

Passenger fares

As in other regions, there are two main kinds of fares offered. The first kind is normal (unrestricted) fares which are available to the general public without limitations on purchase or use. The second kind is special fares, once mainly promotional tariffs designed to attract passengers who would not otherwise travel and limited by advance purchase, minimum/maximum stay or other conditions, but now including restricted normal fares. The latter retain most of the normal fares characteristics but have restrictions on stopovers and, in some cases, on the ability to interline.

Normal economy fares are available on all routes. In September 1987 the average normal economy fares within the Middle East and from the Middle East were generally lower than the world average fares except on the longer routes to Europe (2 000 km and above), shorter routes to the South Asian sub-continent (below 2 000 km) and on routes to the Far East (Appendix 4-7). There was no relationship between fare level and distance for routes from the Middle East to North America, mainly due to the average normal economy fares from Israel to North America being some 45 per cent higher than those for the rest of the region (compensated by relatively low restricted normal fares). Normal economy fares to the region in September 1987

were higher than the world average fares on routes from Europe (2 000 km and above), on routes from the rest of Africa, i.e. other than North Africa (1 000 km and below), on long-haul routes from the Far East and on routes from North America.

Fares (in terms of U.S. dollars) for individual city-pairs may vary appreciably from their corresponding route group average. For example, normal economy fares tend to be significantly higher from Democratic Yemen and Iraq, and significantly lower from Lebanon and Yemen, than the corresponding average fare for the relevant route group.

Patterns of normal economy fare differences by directionality have changed significantly since 1977, primarily due to changes in the relative values of national currencies (particularly for fares to the region). In the cases of northwestern Europe and Japan, the weakening of the U.S. dollar between 1977 and 1987 has led to fares from these areas (expressed in U.S. dollars) being higher in 1987 than fares to them from the Middle East, reversing the situation that prevailed in 1977. For example, in 1977 the return normal economy fare from Tokyo to Abu Dhabi was $ 1 672 compared with the Abu Dhabi-Tokyo fare of $1 768; by 1987, the corresponding figures were $4 145 and $2 730, respectively. During the same period, the value of the Japanese Yen had increased by almost 90 per cent against the U.S. dollar.

First class fares are widely available on routes to and from the Middle East and in September 1987 were at levels generally ranging between 30 and 55 per cent above the normal economy fare, although on some routes (e.g. those to and from North America) they were about twice that level. Within the region they were at levels some 35 to 55 per cent above the normal economy fare.

Intermediate class fares are widely available on most routes, and in September 1987 averaged some 10 to 15 per cent more than the normal economy fare. However, few, if any, were available for westbound travel from the Middle East to Europe, for lack of agreement within IATA.

In September 1987 the only special fare generally widely available on routes to, from and within the Middle East was the economy class excursion fare, at some 50 to 90 per cent of the normal economy fare. However, excursion fares were seldom available from the South Asian sub-continent and the Far East to the Middle East.

Other types of special fares available to the general public were rare, although some economy class APEX-type fares were available on the North Atlantic at levels ranging from 35 to 50 per cent of the applicable normal economy fare) and to and from Hong Kong (75 per cent). Fares with similar conditions but without the advance purchase requirement were available from London to some States in the Gulf area at levels ranging from about 35 to 75 per cent of the applicable normal economy fare. The only restricted normal fares to and from the region were those on routes between the Middle East and North America at levels 10 to 15 per cent below the normal economy fare.

The lack of special fares for the general public to, from and within the Middle East region was in part mitigated by a higher than average availability of preferential fares for those who met certain age, occupation, family relationship or affiliation requirements. A number of preferential fares for seamen, youth, teachers, senior citizens and family and pilgrims were available at 25 to 60 per cent below the applicable normal economy fare.

Freight rates

The two main freight rate categories are general cargo and specific commodity. General cargo rates vary by weight, and typically by direction, but are normally unrelated to the contents or value of the shipments. Specific commodity rates apply solely to particular goods shipped in specified markets but offer discounts.

General cargo rates have a weight breakpoint at 45 kg, with the rates for heavier shipments generally discounted by about 25 per cent. In route groups where freight is well developed, still lower rates may be available, at breakpoints of 100, 500 or 1 000 kg. Where shipping distance is very short, the under-45 kg rate may be overridden by the minimum charge.

In September 1987 the under 45-kg general cargo rates were above the world averages at the longer distances on routes between Europe and the Middle East, for almost all the reference distances on routes between the region and the Rest of Africa (i.e. other than North Africa), on routes from the region to the South Asian sub-continent, and on routes to the Far East and to North America (Appendix 4-8). In addition to the general cargo rates for shipments of less than 45 kg, discounts of about 25 per cent are provided by the general cargo rates for larger shipments on all routes within and to/from the Middle East (except for rates from the United Kingdom and from South Africa where the first breakpoint is at 100 kg). On a number of routes to and from the region further discounts for shipments of over 500 kg are available at rates 40 to 85 per cent below the under 45-kg rate. Specific commodity rates are available on most extra-regional route groups at levels 15 to 60 per cent below the general cargo rates for under 45-kg shipments. A few specific commodity rates, discounted by 45 to 70 per cent, are offered on intra-regional routes.

E. THE OUTLOOK FOR MIDDLE EAST AIR SERVICES

This section explores several forecasts of future flows of international traffic on all air services to, from and

within the region. It also discusses certain developments which, if they become more widespread, are likely to bring about changes in established air services.

Future traffic flows

The forecasts examined were made by IATA ("Total Market Passenger Forecast", June 1986, covering the period 1985-1990), McDonnell Douglas ("Outlook for Commercial Aircraft", September 1987, for the years 1987-1997) and Boeing ("Current Market Outlook", February 1989, for the period 1986-2000). There is general concurrence among the three sources regarding the expected rate of growth in passenger travel between the Middle East and Europe. IATA anticipates an average annual increase of 4.0 per cent between 1985 and 1990, Boeing 4.6 per cent between 1986 and 2000 (on routes designated as "Europe to Africa and Middle East") and McDonnell Douglas 5.7 per cent between 1987 and 1997. The two forecast figures are somewhat higher than the recent average annual increase of 4.1 per cent which occurred between 1982 and 1987.

Travel to and from Asia and the Pacific, which rose by 5.9 per cent a year between 1982 and 1987, was forecast in 1986 by IATA to increase by 2.8 per cent a year through 1990, while Boeing predicted a rate of 5.3 per cent for 1986-2000 for the routes "Africa and the Middle East to Pacific". Passenger traffic on all routes involving the Middle East was forecast by Boeing to grow at 5.3 per cent a year for 1986-2000 and by McDonnell Douglas at 7.7 per cent a year for 1987-1997.

Over the short-term (1985-1990), IATA forecasts passenger travel within the region to grow by only 0.5 per cent a year. However, estimates of growth in the longer term suggest that traffic on routes within the region may grow more rapidly than on most other routes involving the Middle East, McDonnell Douglas estimating growth at an average of 7.1 per cent a year between 1987 and 1997, and Boeing at 9.2 per cent a year between 1986 and 2000 for routes designated as "Intra-Middle East and Africa". Such rates imply an acceleration in the growth rate during the 1990s which would be consistent with the restoration of services in the Gulf area and improved business opportunities due to reconstruction in the Islamic Republic of Iran and Iraq. By comparison, traffic on these routes grew by about 2.8 per cent a year from 1982 to 1987.

The only routes for which freight forecasts are available are those between the Middle East and Europe. Boeing anticipates that freight traffic (in terms of FTKs) will grow by 5 per cent a year between 1986 and 2000, while McDonnell Douglas foresees a rate of 5.7 per cent between 1987 and 1997. These figures represent a slight increase over the actual growth rate of 4.7 per cent from 1982 to 1987.

Route links provided by transit services

The pattern of reductions in the route linkages provided by extra-regional airlines transiting the Middle East is likely to continue for several reasons. One is that of continuing competition to reduce elapsed flight times between the Asia/Pacific region and Europe, which has already produced an end to the transit of Bahrain by Philippine Airlines, SIA and JAL, and of United Arab Emirates airports by JAL and KAL. A second is the opening of more non-stop trans-Siberian routes. A third, the entry into service beginning in 1989 of the B-747-400 long range aircraft, to be followed by other new types with similar range capabilities, should accelerate the decline in relative importance of transit services as providers of air route links between Middle East States and countries in Europe and the Asia/Pacific region.

This expected decline might, however, be offset by the possible use by airlines based outside the region of airports in the Middle East as "third country hubs" for the interchange of their on-line traffic, similar to the present use of Bangkok by Qantas, London by Air Canada and Tokyo, Frankfurt, London and Paris by various U.S. airlines. In a third country hub operation, a single airline's flights, usually non-stop from two or more points in that carrier's homeland and en route to various second country destinations, converge within a period of a few hours at an intermediate airport hub in a third country. Local traffic is discharged and through traffic is interchanged permitting each flight to carry numerous combinations of city-pair origin/destination traffic. The same convergence and interchange takes place on homeland-destined flights.

There are not multiple cities in the same European State, each with sufficient traffic to Asia, to suggest an economic third country hub operation in the Middle East for one State's airline. However, the quest for a common aviation market in the European Communities by 1992 could produce one or more multi-country megacarriers and/or close alliances between their airlines which might make such an operation very practical, with consequent increases in services through any Middle East airport used. Such services through a Middle East third country hub from multiple points in Europe could, for the European carriers or megacarrier involved, avoid any need to choose one major European airport (to the presumed detriment of others) as the principal departure point for services to those Asian points with insufficient traffic for daily or near daily trans-Asian non-stop services. For example, flights from European cities A, B and C could meet at Middle East point D and exchange travellers bound for Asian cities E, F and G. Destinations of flights could even include Indian Ocean and East African points, as may be permitted by relevant air services agreements. The passengers interchanged would, of course, be direct transit traffic not having an origin or destination in the Middle East, and the use of such services to also carry

traffic originating or terminating at the Middle East point would depend upon applicable governmental agreements.

Development of directional flow "banks" of flights at home-base hubs

At Amman, Royal Jordanian now uses the concept of a home-base hub operated with directional flow "banks" or "complexes" of interconnecting flights. Unlike most other home-base hubs, which are originating and terminating points throughout each day for flights in various directions by a national carrier, this operation involves concentrations of arrivals, mostly from the same general direction, and of corresponding departures, mainly continuing in that same general direction, so as to greatly increase the number of city-pair markets each flight can serve. At Amman, one such directional bank of flights consists of mid-morning arrivals from various Asian and Middle East points with corresponding late morning departures to numerous European and North American destinations. A second directional bank of flights consists of late afternoon arrivals from various North American and European points which interconnect with early evening departures to several Middle East and Asian destinations.

A possible development in the future may be the adoption of this type of hub operation by other Middle East airlines. Factors influencing such a development include airport capabilities for handling concentrations of arriving and departing aircraft and passengers, the relative balance between spoke routes on two sides of the hub, the effect on aircraft utilization, the significance of added ground handling costs necessitated by a concentration of flights, and whether an airline with multiple home destination international airports (e.g. Gulf Air, Saudia) could permit any one to dominate as a hub.

Should a similar international hub with directional banks be employed where strong domestic routes also exist (as in Saudi Arabia) new patterns of domestic city-pair linkages through those hubs could develop, as well as the possible introduction of highly regular patterns of service (as in many city-pairs in various highly developed States) on high volume domestic trunk routes if they were no longer extensions of international services. While the forms that wider adoption in the region of this particular hub concept might take cannot be predicted, it is possible that the Amman innovation could have important consequences for the region's air service patterns.

Intra-Gulf States regional air services

In late 1988 it was announced in Oman that the six GCC Member States are considering starting a joint intra-regional airline, presumably to seek in part to resolve current difficulties with some intra-regional services. Many of the intra-Gulf States flights now operated by the Gulf States airlines (Gulf Air, Kuwait Airways and Saudia) are extensions of international flights to and from points outside the region. While this scheduling practice provides a certain convenience to some through passengers, those travelling entirely within the region are likely to experience day-to-day irregularity in scheduled departure and arrival times, days without any service, and operational times chosen to meet needs at airports in distant time zones on other continents, rather than schedules which are suited to their requirements. The dilemma confronting the airlines appears to be that traffic volumes on many intra-regional sectors are too low to support jet services geared to local needs, yet there is much reluctance on the part of intra-regional passengers to fly on smaller, turbo-prop commuter aircraft due to turbulence. A down-sized commercial jet aircraft in the 50-seat or fewer category is not yet on the market.

In late 1988, two aircraft manufacturers publicized their consideration of the development of 40-seat and 50-seat regional jet aircraft. One proposal is that of an entirely new 40-seat twin-jet to be built in the United Kingdom. The other is of a 50-seat regional jet derivative of an existing executive jet manufactured in Canada. Either, if built, may well be of potential value in meeting the demands of some intra-Gulf States traffic. Also, some pure-jet aircraft in a 75-seat category are already somewhat available (but in substantial demand as used aircraft) and could enter the 50-seat category with a 2-cabin configuration to include an ample number of first class seats.

Another option which, if chosen, would have the potential for significant service expansion is a combination of use of small turbo-prop aircraft in the 19-36 seat range, with some amenities such as sufficient aisle height for passengers to walk erect, on thin (low demand) sectors under about 500 km and of 9-seat business jet aircraft on longer thin scheduled service sectors. The former could go some way towards meeting passenger comfort desires on short sectors, and would serve to develop future markets for larger aircraft. The latter could provide the speed, quiet and comfort of jet operations, as well as greater frequency, on the somewhat longer low demand sectors where their operation could prove to be economical. The latter kind of scheduled service (with 9-seat business jets) is successfully operated by a U.S. commuter carrier, Enterprise Airlines, over 500 to 1 100 km low demand sectors.

Separately, or in combination with the deployment of smaller aircraft on thin sectors, the existing airlines and/or some new regional carrier may choose to employ hub operations with connecting banks of flights for most or all services. This type of operation, which combines traffic in many city-pair markets on each flight, could conceivably increase load factors on intra-regional services as well as improve their frequency and regularity.

Blocked-space, code-sharing arrangements

In late 1988 two North American airlines began offering several Middle East services to their passengers entirely on aircraft of two Middle East airlines, using blocked-space, code-sharing arrangements. TWA now offers on-line services between New York and Abu Dhabi, Bahrain, Doha, Muscat and Sharjah entirely on Gulf Air aircraft (at present also leased without crew to TWA between London and New York). Similarly, Air Canada now offers its first Middle East service, twice weekly Montreal-Amman flights, entirely on Royal Jordanian aircraft which also serve that carrier's passengers on the route. As indicated elsewhere in this study, joint operations involving airlines of the region are not uncommon. Recent developments, however, may emphasize the advantages to airlines participating in such arrangements, and could expand the opportunities for increasing service links.

Service restorations

Finally, it must be considered likely that there will be a gradual resumption of services following the end of hostilities in the Gulf. Most of these services are likely to be operated by extra-regional airlines, on routes to Baghdad and Tehran. Intra-regional services which include regional cities (such as Basrah, Mosul and Shiraz) may be expected to develop as well. These service restorations, added to the entirely new services anticipated in the region at large, should ensure continuing growth in air route links to, from and within the Middle East.

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Appendix 1-1. Regional comparison of selected economic indicators[1], 1986 and 1987

Indicators and units	Middle East	Africa	Asia and Pacific	Europe[2]	Latin America/ Caribbean	North America	World	Middle East share(%)
Population (1986), in millions	112	578	2 713	825	410	267	4 905	2.3
Area, in millions of square km	5.4	30.3	30.0	30.3	20.6	19.3	135.9	4.0
Population density (1986), per square km	21	19	90	27	20	14	36–	
GNP (1986), in thousand million dollars	218 270[3]	364 840[4]	2 487 020[5]	3 156 810[6]	650 050[7]	4 262 710	11 139 700	2.0
GNP per capita (1986), in dollars	4 704	642	947	6 596	1 628	15 971	2 540	–
International trade (1986)								
Imports, in millions of dollars	80 763	75 219	391 635	1 122 059	80 612	468 180	2 218 468	3.6
Exports, in millions of dollars	78 054	59 232	468 258	1 131 675	91 395	304 029	2 132 643	3.7
Air freight — scheduled (1987),								
in millions of TKP[8]	2 105	1 211	12 621	16 863	2 308	12 920	48 027	4.4
in TKP per capita	18.8	2.1	4.7	20.4	5.6	48.3	9.8	–
International, in millions of TKP	2 025	1 091	11 344	13 937	1 669	6 413	36 479	5.6
in TKP per capita	18.1	1.9	4.2	16.9	4.1	24.0	7.4	–
Domestic, in millions of TKP	80	120	1 277	2 926	638	6 508	11 549	0.7
in TKP per capita	0.7	0.2	0.5	3.5	1.6	24.4	2.4	–
Air passengers — scheduled(1987).								
in millions of pax-km	44 600	35 306	267 746	476 134	74 676	681 395	1 579 855	2.8
in pax-km per capita	398	61	99	577	182	2 552	322	–
International, in millions of pax-km	36 138	27 436	180 361	245 420	39 816	151 368	680 539	5.3
in pax-km per capita	323	47	66	297	97	567	139	–
Domestic, in millions of pax-km	8 462	7 870	87 385	230 714	34 860	530 027	899 316	0.9
in pax-km per capita	76	14	32	280	85	1 985	183	–

1. Regional groupings are those adopted by ICAO for statistical purposes.
2. Includes U.S.S.R.
3. GNP and GNP per capita exclude data for Islamic Republic of Iran, Iraq and Lebanon.
4. GNP and GNP per capita exclude data for Angola, Djibouti, Equatorial Guinea.
5. GNP and GNP per capita exclude data for Kiribati, Democratic People's Republic of Korea, Macao, Mongolia, Pacific Islands, Vanuatu and Viet Nam.
6. GNP and GNP per capita exclude data for Albania, Bulgaria, Czechoslovakia, German Democratic Republic, Romania and Union of Soviet Socialist Republics.
7. GNP and GNP per capita exclude data for Cuba, French Guiana, Guadeloupe, Martinique and Montserrat.
8. Tonne-kilometres performed.

Sources:

— International Bank for Reconstruction and Development, the 1987 "World Bank Atlas" and 1988 update (Population and GNP);
— United Nations, "Monthly Bulletin of Statistics", November 1987 (International Trade);
— ICAO air traffic data for 1987 (Air Freight and Air Passenger).

Appendix 1-2. Selected economic indicators for States in the Middle East (data for 1986 unless otherwise indicated)

State	Population mid-year (000)	Area (thousands km²)	Population density (per km²)	Gross National Product: Total (millions of dollars)	GNP: Per capita ($)	GNP: Growth rate (per capita) 1973-86 (%)	Industrial output as % of GNP (%)	Average annual rate of inflation 1973-84 (%)	External trade: Volume: Exports (millions of dollars)	External trade: Volume: Imports (millions of dollars)	External trade: Real growth: Exports 1975-85 (%)	External trade: Real growth: Imports 1975-85 (%)
Bahrain	431	.621	694	3 670	8 530	n/a	n/a	n/a	2 863	2 597	11.0	9.7
Democratic Yemen	2 140	333	6	1 030	480	1.8*	n/a	n/a	690	1 290	19.0	17.6
Iran, Islamic Republic of	46 015	1 648	28	n/a	n/a	n/a	n/a	n/a	12 635	11 700	-5.0	1.8
Iraq	16 492	435	38	n/a	n/a	n/a	n/a	n/a	11 500	10 534	1.5	16.7
Israel	4 304	21	205	26 730	6 210	1.0	27	84.4	6 086	8 096	11.5	8.3
Jordan	3 626	98	37	4 220	1 540	4.7	30	9.6	838	2 656	18.4	14.5
Kuwait	1 775	18	99	24 650	13 890	-0.3	58	9.2	10 126	6 614	1.2	10.7
Lebanon	2 710	10	271	n/a	n/a	n/a	n/a	n/a	482	2 200	-1.6	10.1
Oman	1 291	212	6	6 440	4 990	2.1	n/a	16.4	4 900	3 000	15.7	17.9
Qatar	334	11	30	4 180	12 520	-9.0	n/a	n/a	3 541	1 200	9.0	7.8
Saudi Arabia	12 011	2 150	6	83 270	6 930	0.4	60	14.1	32 900	27 000	2.3	19.3
Syrian Arab Republic	10 870	185	59	16 980	1 560	2.0	24	11.9	1 627	3 844	7.9	8.9
United Arab Emirates	1 429	84	17	20 590	14 410	-0.3	67	8.7	14 337	7 590	8.0	10.9
Yemen Arab Republic	8 190	195	42	4 510	550	3.3	21	12.6	106	1 598	27.9	15.5

n/a Data not available.
* Data are for years other than those specified.

Sources:
The 1988 update of the 1987 "World Bank Atlas", International Bank for Reconstruction and Development (columns 1,3,4,5 and 6);
"Handbook of International Trade & Development Statistics', 1986 Supplement (columns 9, 10, 11 and 12);
The World Bank, "World Development Indicators, 1986" (columns 7 and 8).

Appendix 1-3. Selected transport development indicators in the Middle East (1985)

State	Road network length (km)	Paved network (km)	Percent paved network	Railway network (km)
Bahrain	300	300	100.0	-
Democratic Yemen	9 170	1 870	20.4	-
Iran, Islamic Republic of	n/a	40 066	n/a	4 567
Iraq	13 100	7 400	56.5	1 700
Israel	n/a	13 280	n/a	573
Jordan	6 800	4 930	72.5	600
Kuwait	500	500	100.0	-
Lebanon	6 700	2 000	29.9	400
Oman	14 848	3 521	23.7	-
Qatar	600	600	100.0	-
Saudi Arabia	71 946	42 000	58.4	561
Syrian Arab Republic	19 100	15 300	80.1	2 100
United Arab Emirates	2 300	2 300	100.0	-
Yemen Arab Republic	3 093	2 086	67.4	-
Total	148 457	136 153	64.7[1]	10 501

1. Percentage excludes data for Islamic Republic of Iran and Israel.

n/a Data not available.
- No network exists.

Sources:
— United Nations, ESCWA, "Development and Prospects of Air Transport in Western Asia", E/ESCWA/TCD/87/6, Table 2.4;
— The Europa Yearbook, 1987.

Appendix 1-4. International tourist arrivals* in the Middle East, 1982-1987

State	Tourist arrivals - by all modes 1982 (000)	1987 (000)	Annual growth rates 1982-1987 (%)	Arrivals by air 1982 (000)	1987 (000)	Air share 1987 (%)
Bahrain	207	385[1]	16.8[3]	n/a	n/a	n/a
Iran, Islamic Republic of	62	93[1]	10.7	n/a	46[1]	49
Iraq[1]	2 020	739	-18.2	n/a	n/a	n/a
Israel	998	1 380	6.7	778	1 151	83
Jordan	2 075	1 898	-1.8	560	240	13
Kuwait	902	n/a	n/a	209	1 292[1]	n/a
Qatar	126	98[1]	-6.1[3]	n/a	n/a	n/a
Saudi Arabia	854	n/a	n/a	623	3 762[2]	n/a
Syrian Arab Republic	831	1 160[1]	8.7[3]	109	265[2]	n/a
Yemen	46	44[1]	-1.1[3]	n/a	38[2]	n/a

* Tourist arrivals are defined by the World Tourism Organization as temporary visitors staying at least 24 hours in the country visited.

n/a Data not available.

1. Data for 1986.
2. Data for 1985.
3. Growth rates for 1982-1986.

Sources:

— World Tourism Organization, "Yearbook of Tourism Statistics";

— WTO reply to ICAO request for latest available data.

Appendix 1-5. Main commodities imported by air into the Middle East from the United States — 1986

Code*	Commodity description	Value (thousands of dollars)	Percentage of total imports shipped by air
792	Aircraft & associated equipment	488 947	38
764	Telecommunications equipment	307 514	72
751-759	Data processing & office equipment parts	273 012	94
875	Measuring & controlling instruments	110 668	59
667	Precious & semi-precious stones	87 042	99
771-773	Electrical power equipment & circuits	76 369	53
723	Construction & mining machinery	63 115	24
778	Electrical machinery & equipment	59 456	58
713	Piston type engines and parts	51 264	34
714	Non-piston type engines and parts	50 346	38
776	Electronic tubes and circuits	46 125	97
728	Specialized industrial machinery	39 709	54
541	Drugs and pharmaceuticals	39 551	56
871-872	Optical and medical instruments	37 194	64
774	Medical equipment	30 317	73
	Total imports by air	2 142 243	26

* Code is the "Schedule A" Commodity Grouping code used in the source publication.

Source:
U.S. Department of Commerce, "U.S. Exports — World Area and Country by Schedule E Commodity Groups", FT 455/1986 December and Annual.

Appendix 1-6. Main commodities exported by air from the Middle East to the United States — 1986

Code*	Commodity description	Value (thousands of dollars)	Percent of total exports shipped by air
667	Pearls, diamonds, precious and semi-precious stones	1 018 095	100
896-897.3	Artworks and jewelry	153 202	93
792	Aircraft, spacecraft and associated equipment	84 703	54
931	Special transactions	80 564	49
764	Telecommunications equipment	56 574	89
751-759	Data processing and office equipment and parts	50 392	95
659	Carpets	48 389	86
842.1-848.4	Textiles and garments	44 430	65
715	Parts of internal combustion engines	38 007	77
774	Electro-medical equipment	37 722	83
874.7	Electric instruments and non-medical	34 093	81
778	Electrical machinery and apparatus	25 884	33
871	Optical instruments	20 847	100
951	Military arms	15 158	50
695	Tools	11 171	70
898	Sound and musical instruments	10 940	95
	Total exports by air	1 860 228	24

* Code is the "Schedule A" Commodity Grouping code used in the source publication.

Source:
U.S. Department of Commerce, "U.S. General Imports — World Area and Country of Origin by Schedule A Commodity Groupings", FT 155/1986 December and Annual.

Appendix 1-7. Middle East trade by air with France and the United States — 1986

	Exports by air from the Middle East			Air share of total exports by value (%)[1]	Imports by air to the Middle East			Air share of total imports by value (%)
	Air value (thousands of dollars)	Air weight (thousands of kg)	Value/kg (dollars)		Air value (thousands of dollars)	Air weight (thousands of kg)	Value/kg (dollars)	
Trade by air with France[2]								
Bahrain	.629	.072	9	5	5 420	171	32	30
Democratic Yemen	.555	.234	2	–	1 116	37	30	10
Iran, Islamic Republic of	2 349	72	32	1	10 998	2 846	4	20
Iraq	2	1	2	–	78 736	1 057	74	24
Israel	49 592	1 936	26	12	43 302	1 345	32	22
Jordan	52	2	26	–	11 420	239	48	25
Kuwait	40	3	13	–	85 820	896	96	50
Lebanon	1 160	54	21	26	18 062	336	54	14
Qatar	16	2	8	–	17 605	239	74	46
Oman	25	2	13	–	5 403	178	30	10
Saudi Arabia	273	31	9	–	109 343	3 582	31	17
Syrian Arab Republic	521	46	11	1	10 988	367	30	8
United Arab Emirates								
Abu Dhabi	.089	.006	15	–	21 264	497	43	23
Dubai	16	1	16	–	15 618	458	34	23
Sharjah	.070	.006	12	1	4 248	356	12	17
Total	54 047	2 150	25	2	439 343	12 604	35	22
Trade by air with the United States								
Bahrain	1 955	6	326	3 (3)	26 522	505	53	14
Democratic Yemen	206	2	103	95	3 132	45	70	18
Iran, Islamic Republic of	61 311	1 322	46	11 (61)	12 800	189	68	38
Iraq	740	16	46	– (13)	119 992	1 329	90	23
Israel	1 706 123	9 825	174	71	980 681	10 673	92	46
Jordan	2 709	83	33	27	58 796	763	77	18
Kuwait	6 084	31	196	2 (9)	79 511	3 214	25	12
Lebanon	15 704	173	91	53	8 598	126	68	8
Qatar	134	1	134	– (1)	15 937	256	62	27
Oman	556	4	139	1 (7)	34 471	686	50	22
Saudi Arabia	52 102	201	259	1 (18)	658 408	10 818	61	19
Syrian Arab Republic	1 174	19	62	15	10 709	361	30	18
United Arab Emirates	10 719	216	50	3 (9)	120 126	3 862	31	25
Yemen Arab Republic	711	56	13	51	12 559	362	35	15
Total	1 860 228	11 955	156	24	2 142 242	33 189	65	26

1. Figures in parentheses are air share of total exports by value when petroleum products are excluded.
2. Data for January to June 1986.

Sources:
— U.S. Department of Commerce, "U.S. General Imports" and "U.S. Exports", 1986 (see Appendices 1-5 and 1-6);
— Reply from France to ICAO questionnaire.

Appendix 1-8. Air vs surface door-to-door cost comparison — 1987

(Consignment of typewriters valued at $5 000 weighing 85 kg, and of a volume of 0.5 cubic metre for shipment by air and 0.8 cubic metre crated for shipment by sea)

Direct costs	Frankfurt to Amman Air ($)	Frankfurt to Amman Sea ($)	Frankfurt to Dubai Air ($)	Frankfurt to Dubai Sea ($)	Frankfurt to Jeddah Air ($)	Frankfurt to Jeddah Sea ($)	Frankfurt to Kuwait Air ($)	Frankfurt to Kuwait Sea ($)
Value of goods	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00
Packing costs	33.50	53.65	33.50	53.65	33.50	53.65	33.50	53.65
Pick-up/delivery charges (at origin)	11.90	21.55	11.90	21.55	11.90	21.55	11.90	21.55
Documentation charges	13.40	23.20	13.40	23.20	13.40	23.20	13.40	23.20
Terminal charges	8.40	14.80	8.40	14.80	8.40	14.80	8.40	14.80
Freight transport charges	178.10	75.00	123.45	83.00	123.45	67.00	123.45	83.00
Insurance	22.25	39.30	22.00	44.85	22.00	44.10	22.00	44.85
Pick-up/delivery charges (at destination)	30.50	30.50	47.50	47.50	67.05	111.75	33.50	33.50
Cost of capital (at $4.10/day)[1]	24.60	94.30	12.30	73.80	24.60	94.30	32.80	118.90
Total distribution cost	322.65	352.30	272.45	362.35	304.30	430.35	278.95	393.45
Index: sea cost = 100	92	100	75	100	71	100	71	100
Total cost of consignee	5 322.65	5 352.30	5 272.45	5 362.35	5 304.30	5 430.35	5 278.95	5 393.45
Index: sea cost = 100	99	100	98	100	98	100	98	100
Time (days)	6	23	3	18	6	23	8	29
Time savings by air (days)	17	–	15	–	17	–	21	–

Direct costs	Frankfurt to Muscat Air ($)	Frankfurt to Muscat Sea ($)	Frankfurt to Sana'a Air ($)	Frankfurt to Sana'a Sea ($)	Nicosia to Jeddah Air ($)	Nicosia to Jeddah Sea ($)
Value of goods	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00
Packing costs	33.50	53.65	33.50	53.65	26.25	36.75
Pick-up/delivery charges (at origin)	11.90	21.55	11.90	21.55	10.50	10.50
Documentation charges	13.40	23.20	13.40	23.20	6.30	18.90
Terminal charges	8.40	14.80	8.40	14.80	31.50	16.80
Freight transport charges	123.45	83.00	192.30	105.00	142.85	42.00
Insurance	22.00	44.85	22.30	45.00	130.25	130.25
Pick-up/delivery charges (at destination)	20.60	25.75	17.85	17.85	31.50	73.25
Cost of capital (at $4.10/day)[1]	16.40	94.30	20.50	114.80	4.10	36.90
Total distribution cost	249.65	361.10	320.15	395.85	383.25	365.60
Index: sea cost = 100	69	100	81	100	105	100
Total cost of consignee	5 249.65	5 361.10	5 320.15	5 395.85	5 383.25	5 365.60
Index: sea cost = 100	98	100	99	100	100	100
Time (days)	4	23	5	28	1	9
Time savings by air (days)	19	–	23	–	8	–

1. Based on a pre-tax profit margin of 30 per cent.

Source:
Responses by States to ICAO questionnaire.

Appendix 1-9. International freight traffic carried to and from the Middle East in 1986 by various airlines

Airline (Home State)	Quantity		Ratio of inbound to outbound freight
	To the Middle East (tonnes)	From the Middle East (tonnes)	
Middle East			
Kuwait Airways[1] (Kuwait)	161	137	1.2:1
Saudia (Saudi Arabia)	86 934	26 219	3.3:1
Total	87 095	26 356	3.3:1
Europe			
Cyprus Airways (Cyprus)	778	68	11.4:1
CSA (Czechoslovakia)	200	65	3.1:1
Air France (France)	207	18	11.5:1
Lufthansa (Germany, Fed. Rep. of)	15 511	13 359	1.2:1
Iberia (Spain)	934	568	1.6:1
Swissair (Switzerland)	3 424	2 058	1.7:1
THY (Turkey)	5 663	1 004	5.6:1
Total	26 717	17 140	1.6:1
Asia and Pacific			
Cathay Pacific (Hong Kong)	4 194	2 106	2.0:1
PIA (Pakistan)	22 900	2 500	9.2:1
Total	27 094	4 606	5.9:1
GRAND TOTAL	140 906	48 102	2.9:1

1. Data are for July 1985-June 1986.

Source:
States' replies to ICAO questionnaire.

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Appendix 2-1. International passenger and freight traffic and selected service indicators at Middle East airports

City/Airport	Number of passengers embarked and disembarked 1977 (000)	1982 (000)	1987 (000)	Number of freight tonnes loaded and unloaded 1977	1982	1987	International airlines 6/88	Wide-body flights
Bahrain								
Bahrain Int'l	1 030	1 747	3 732	18 986	36 454	41 929	20	X
Democratic Yemen								
Aden Int'l	n/a	n/a	n/a	n/a	n/a	n/a	9	X
Riyan	n/a	n/a	n/a	n/a	n/a	n/a	1	
Iran, Islamic Republic of								
Bandar Abbas Int'l	n/a	n/a	147[2]	n/a	n/a	2 910[2]	1	X
Shiraz Int'l	n/a	n/a	212[2]	n/a	n/a	4 520[2]	1	X
Tehran/Mehrabad Int'l	1 471	256	775*	112 536	11 115	31 500*	7	X
Iraq								
Baghdad/Saddam Int'l	808	761	975*	15 171	24 239	n/a	18	X
Israel								
Eilat	24	47	125*	n/a	n/a	n/a	1	
Tel Aviv/Ben Gurion	2 240	2 691	3 592	106 301	107 236	178 892	18	X
Jordan								
Amman/Queen Alia Int'l	905	2 533	1 470*	23 567	65 715	65 000*	23	X
Kuwait								
Kuwait Int'l	1 580	2 818	2 644	35 479	62 708	86 303	34	X
Lebanon								
Beirut Int'l	1 346+	1 480*	830*	114 500+	n/a	n/a	6	
Oman								
Muscat/Seeb Int'l	374	624	1 045*	13 283	15 495	23 900*	18	X
Qatar								
Doha Int'l	522	780	967	13 549	20 451	21 229	18	X
Saudi Arabia								
Dhahran Int'l	837	2 322	1 240	10 397	50 823	50 197	23	X
Jeddah/King Abdul Aziz	1 796	3 970	3 488	16 145	70 170	113 533	41	X
Medina	n/a	n/a	n/a	n/a	n/a	n/a	1	X
Riyadh/King Khalid	552	1 289*	1 963	9 093	39 268	59 423	23	X
Syrian Arab Republic								
Aleppo/Neirab	34	n/a	48[2]	166	n/a	48[2]	2	
Damascus Int'l	824	1 092	1 082	6 098	7 184	5 515	30	X
United Arab Emirates								
Abu Dhabi Int'l	n/a	2 041	1 141	n/a	33 632	32 600*	35	X
Al Fujairah[1]	n/a	n/a	n/a	n/a	n/a	n/a	1	
Dubai Int'l	1 140	1 825	2 341*	34 605	72 208	116 842	45	X
Ras al Khaimah Int'l	14	28	73	n/a	n/a	226	4	X
Sharjah Int'l	n/a	151+	328	n/a	28 400+	19 900	12	X
Yemen								
Hodeidah	n/a	n/a	n/a	n/a	n/a	n/a	1	
Sana'a/Al Rahaba Int'l	237[2]	348	439	5 300[2]	9 300	13 344	15	X
Taiz/Ganad	n/a	n/a	61[2]	n/a	n/a	400[2]	1	
Total	15 734	26 803	28 718	535 176	654 398	868 211		

1. Opened late 1987.
2. Previous year's data.
* Estimated data.
\+ Provisional data.
n/a Data not available.
X Receives wide-body services.

Sources:
— ABC "World Airways Guide", June 1988;
— ICAO Digests of Statistics, Series AT;
— Airport Operators Council International, Traffic Reports, 1983 and 1987;
— National statistics.

Appendix 2-2. Forecasts of passenger and freight traffic growth at Kuwait International Airport

Year	Population of Kuwait	Average annual growth	Terminal passengers	Average annual growth	Freight (tonnes)	Average annual growth
1985	1 695 128		2 572 114		75 483	
		4.0%		3.1		–
1990	2 066 995		3 000 000		80 000	
		3.0		6.0		6.0
1995	2 395 207		4 010 000		107 000	
		2.4		6.0		6.0
2005	3 049 305		7 180 000		192 000	
		2.6		5.5		5.5
2010	3 460 282		9 385 000		250 000	
		2.7		5.0		5.0
2015	3 945 935		11 980 000		320 000	
From 1985 to 2015		2.9%		5.3%		5.6%

Source:
Directorate General of Civil Aviation, Kuwait.

Appendix 3-1. International air carriers based in the Middle East Region and their fleets — 31 December 1988

State and carrier name	IATA code	IATA status	CRS	Type of international operation	Number of commercial transport aircraft operated by type[1]					Aircraft on order (option)	
					Jet (by noise classification)			Turbo-prop	Total number	Number and type	Delivery period
					None	Chapter 2	Chapter 3				
Bahrain											
Gulf Air Company G.S.C.[2] (Gulf Air)	(GF)	+	GARTH	S		8 B-737	2 B-767(2 LI) 11 L-1011(5 LI)		21	4 B-767	April-June 1989
Democratic Yemen											
Democratic Yemen Airlines (Alyemda)	DY	+	linked to RESKY	S	2 B-707	2 B-737 1 TU-154		2 AN-26(2 LI) 2 DHC-7	9		
Iran, Islamic Republic of											
The Airline of the Islamic Republic of Iran (Iran Air)	IR	*		S/MAC	4 B-707	7 B-727 3 B-737 5 B-747	5 A-300 4 B-747		28		
Iraq											
Iraqi Airways	IA	*	CORDA (KLM)	S	2 B-707	6 B-727 2 B-737 (-1 LO) 3 B-747	1 B-747	6 AN-24	19		
Israel											
Arkia Israeli Airlines Ltd. (Arkia)	IZ			NS[3]	1 B-707 (1 LI)	1 B-707(1 LI) 2 B-737(2 LI)	3 DHC-7	7			
Cargo Air Lines (C.A.L.)	CH			NS/AC		1 B-747(1 LI)[4]		1			
El Al-Israel Airlines Ltd. (El Al)	LY	*	CARMEL	S/MAC	1 B-707 (-1 LO)	1 B-707 (-1 LO) 2 B-737 (-2 LO) 8 B-747 (-1 LO)	3 B-757 4 B-767		14		
Sun D'Or Intl Airlines	ER			NS[5]							
Jordan											
Royal Jordanian	RJ	*	SITA GABRIEL II	S/MAC	2 B-707	3 B-727	3 A-310 1 B-747 7 L-1011		16	3 A-310 6 A-320 5 A-340 (3)A-340	1989-1990 1990-1991
Arab Air Cargo	5G			NS/AC	1 B-707				1		
Kuwait											
Kuwait Airways Corp.	(KU)	*	RESKU	S/MAC		4 B-727 (-1 LO) 4 B-747 (-2 LO)	3 A-300 (-2 LO) 5 A-310 3 B-767		14		
Lebanon											
Middle East Airlines Airliban (MEA)	(ME)	*		S	5 B-707 5 B-720	2 B-707 2 B-747 (-2 LO)			12		

State and carrier name	IATA code	IATA status	CRS	Type of international operation	Number of commercial transport aircraft operated by type[1]					Aircraft on order (option)	
					Jet (by noise classification)			Turbo-prop	Total number	Number and type	Delivery period
					None	Chapter 2	Chapter 3				
Trans-Mediterranean Airways S.A.R.L. (TMA)	TL	*		S/AC	3 B-707	4 B-707			7		
Oman											
Gulf Air Company, G.S.C.[2] (see Bahrain)				S							
Qatar											
Gulf Air Company G.S.C.[2] (see Bahrain)				S							
Saudi Arabia											
Saudi Arabian Airlines Corporation (Saudia)	SV	*	AL ARABI	S/MAC	1 DC-8 (1 LI)	19 B-737	11 A-300 21 B-747 17 L-1011		69		
Syrian Arab Republic											
Syrian Arab Airlines Corp. (Syrianair)	RB	*		S		3 B-727 2 Caravelle 6 TU-134 3 TU-154 7 YAK-40	2 B-747	5 AN-26	28	3 TU-154	
United Arab Emirates											
Emirates	EK	+	D-MARS	S		1 B-727	2 A-300(1 LI) 2 A-310		5	4 A-300	1989-1991
Gulf Air Company G.S.C.[2] (see Bahrain)				S							
Yemen											
Yemen Airways (Yemenia)	IY	*	CORDA (KLM)	S		5 B-727 1 B-737(-1 LO)		2 DHC-7	7		
TOTALS (13 scheduled, 4 non-scheduled)					26	107	105	20	258	25 +(3)	

1. Aircraft of more than 9 tonnes maximum take-off weight, excluding executive and VIP aircraft as well as State aircraft which are operated by airlines for government purposes.
2. Gulf Air is a multi-national airline with headquarters in Bahrain, jointly owned by Bahrain, Oman, Qatar and the Emirate of Abu Dhabi.
3. Also operates domestic scheduled services.
4. Wet-leased from El Al on a seasonal basis.
5. Aircraft not owned but leased-in as required.

S	Scheduled airline operating mixed (passenger/freight) services.
S/MAC	Scheduled airline operating both mixed (passenger/freight) services and all-cargo services.
S/AC	Scheduled airline operating all-cargo services only.
NS	Non-scheduled air transport carrier operating mixed (passenger/freight) services.
NS/MAC	Non-scheduled air transport carrier operating both mixed and all-cargo services.
NS/AC	Non-scheduled air transport carrier operating all-cargo services only.
+	IATA Member, Trade Association only.
*	IATA Member, Trade Association and Tariff Co-ordination.
(LI)	Number leased in.
(- LO)	Number leased out.

Sources:

— "Air Transport World", June 1988.
— "Asian Aviation, Asian Airline Fleet Census", July 1987;
— Aviation Data Centre, "World Airline Fleets Directory", 1987-1988;
— Aviation Data Centre, "World Airline Fleets News", various 1987-1988 editions;
— Aviation Data Service, Inc., "Air World Survey", Supplement to Volume 39, Number 2, 1987;
— "Flight International", World Airline Directory, 26 March 1988;
— "The Avmark Aviation Economist", February 1988;
— Information received by ICAO from government and airline sources in the Middle East, and from Airbus Industrie;
— Various press reports.

Appendix 3-2. Commercial transport aircraft operated or on order or option by international air carriers based in the Middle East Region, 31 December 1988

Aircraft categories and types		Aircraft in fleet	Aircraft on order (option)
JET			
Wide-body:	Airbus A-300	19	4
	Airbus A-310	10	3
	Airbus A-340	–	5 (3)
	Boeing B-747	47	–
	Boeing B-767	9	4
	Lockheed L-1011	35	–
Total wide-body		120	16 (3)
Narrow-body:			
4-engine	Boeing B-707	27	–
	Boeing B-720	5	–
	Douglas DC-8	1	–
	Total 4-engine	33	–
3-engine	Boeing B-727	28	–
	Tupolev TU-154	4	3
	Yakovlev YAK-40	7	–
	Total 3-engine	39	3
2-engine	Airbus A-320	–	6
	Boeing B-737	35	–
	Boeing B-757	3	–
	Caravelle	2	–
	Tupolev TU-134	6	–
	Total 2-engine	46	6
Total narrow-body		118	9
Total jet		238	25 (3)
TURBO-PROP			
4-engine	de Havilland DHC-7	7	–
2-engine	Anatov AN-24	6	–
	Anatov AN-26	7	–
Total turbo-prop		20	–
Total of all types		258	25 (3)

Source: Appendix 3-1.

Appendix 3-3. Financial results of Middle East scheduled airlines compared with the world's scheduled airlines (1977, 1982 and 1987)

	Middle East region			World		
	1977	1982	1987[1]	1977	1982	1987[1]
Expressed in millions of dollars:						
Total operating revenues	2 100	4 640	5 550	50 340	93 240	146 500
Total operating expenses	2 100	4 770	5 450	47 710	93 400	140 000
Operating result	0	(130)	100	2 630	(160)	6 500
Net result	(10)	(100)	n/a	1 660	(1 300)	n/a
Expressed as percentage of total operating revenues:						
Operating result	0	-2.8	1.8	5.2	-0.2	4.4
Net result	0.5	-2.2	1.8	3.3	-1.4	n/a

1. 1987 data are preliminary.
n/a not available.

Sources:
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers".

Appendix 3-4. Operating revenues of Middle East scheduled airlines and comparative average annual growth rates (1977, 1982 and 1987)

Revenue source	1977	1982	1987[1]	Average annual growth rates, per cent: Airlines of the region 1977-82	Airlines of the region 1982-87	Airlines of the region 1977-87	World 1977-82	World 1982-87	World 1977-87
	(millions of dollars)								
Scheduled services									
Passenger	1 420	3 660	3 950	20.8	1.5	10.8	13.6	8.5	11.0
Freight	340	420	670	4.3	9.8	7.0	11.9	12.3	12.1
Mail	10	50	60	38.0	3.7	19.6	9.5	6.2	7.8
Total scheduled	1 770	4 130	4 680	18.5	2.5	10.2	13.3	8.9	11.1
Non-scheduled flights	180	280	440	9.2	9.5	9.3	8.9	10.9	9.9
Incidental revenues	150	230	430	8.9	13.3	11.1	12.9	18.2	15.5
Total operating revenues	2 100	4 640	5 550	17.2	3.6	10.2	13.1	9.5	11.3

1. 1987 data are preliminary.

Sources:
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers".

Appendix 3-5. Sources of operating revenues — Percentage distribution for Middle East and world airlines 1977, 1982 and 1987

	Middle East region			World		
	1977	1982	1987[1]	1977	1982	1987[1]
Scheduled services						
Passenger	67.6	78.9	71.2	78.7	80.2	76.7
Freight	16.2	9.0	12.1	10.8	10.3	11.7
Mail	0.5	1.1	1.1	1.9	1.6	1.4
Total scheduled	84.3	89.0	84.4	91.4	92.1	89.8
Non-scheduled flights	8.6	6.0	7.9	4.0	3.3	3.5
Incidental revenues	7.1	5.0	7.7	4.6	4.6	6.7
Total operating revenues	100.0	100.0	100.0	100.0	100.0	100.0

1. 1987 data are preliminary.

Sources:
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers".

Appendix 3-6. Unit operating revenues of Middle East scheduled airlines compared with the world's scheduled airlines 1977, 1982 and 1987

	Operating revenues per tonne-kilometre performed			Average annual growth rates		
	1977 (cents)	1982 (cents)	1987[1] (cents)	1977-1982 (%)	1982-1987 (%)	1977-1987 (%)
Scheduled services						
Passenger:						
Middle East	71.9	121.0	97.6	11.0	-4.2	3.1
World	63.1	84.6	89.0	6.0	1.0	3.5
Freight:						
Middle East	32.6	27.0	31.8	-3.7	3.3	-0.2
World	25.3	32.6	37.4	5.2	2.8	4.0
Mail:						
Middle East	45.5	108.7	103.1	19.0	-1.1	8.5
World	34.5	44.0	47.4	5.0	1.5	3.2
Total scheduled:						
Middle East	58.2	89.3	75.4	8.9	-3.3	2.6
World	52.8	70.9	74.6	6.1	1.0	3.5
Non-scheduled flights						
Middle East	30.5	72.0	96.7	18.7	6.1	12.2
World	30.9	52.8	51.0	11.3	0.7	5.1
Total transport operations						
Middle East	57.8	92.5	83.3	9.9	2.1	3.7
World	53.8	73.4	78.6	6.4	1.4	3.9

1. 1987 data are preliminary.

Sources:
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers" and "Traffic — Commercial Air Carriers".

Appendix 3-7. Passenger and freight trip lengths for Middle East scheduled airlines compared with world averages 1977, 1982 and 1987

		Average trip length, kilometres		
		1977	1982	1987
Scheduled services				
Passenger	Middle East	1 538	1 564	1 804
	World	1 344	1 485	1 547
Freight	Middle East	3 822	3 521	3 017
	World	2 767	3 286	3 394
Non-scheduled flights				
Passenger	Middle East	1 318	1 434	1 685
	World	2 646	2 330	2 235
Freight	Middle East	6 933	3 107	2 747
	World	3 409	3 389	3 646

Sources:
ICAO Digests of Statistics, "Traffic — Commercial Air Carriers".

Appendix 3-8. Operating expenses of Middle East scheduled airlines and comparative average annual growth rates 1977, 1982 and 1987

Expense item	1977	1982	1987[1]	Average annual growth rates: Middle East airlines 1977-82 (%)	Middle East airlines 1982-87 (%)	Middle East airlines 1977-87 (%)	World 1977-82 (%)	World 1982-87 (%)	World 1977-87 (%)
	(millions of dollars)								
Flight operations less fuel and oil	200	300	370	8.4	4.3	6.3	9.6	13.0	11.3
Fuel and oil	250	930	690	30.0	-5.8	10.7	22.6	-4.6	8.2
Maintenance and overhaul	310	660	720	16.3	1.8	8.8	9.1	11.1	10.1
Depreciation and amortization	220	470	550	16.4	3.6	9.8	11.4	10.9	11.1
User charges and station expenses	310	650	800	16.0	4.2	9.9	11.8	11.6	11.7
Passenger services	230	470	470	15.4	0.0	7.4	13.2	12.0	12.6
Ticketing, sales and promotion	370	760	1 050	15.5	6.7	11.0	15.5	11.3	13.4
General, administrative and others	210	530	790	20.3	8.3	14.2	12.7	16.9	14.8
Total operating expenses	2 100	4 770	5 450	17.8	2.7	10.0	14.4	8.5	11.4

1. 1987 data are preliminary.

Sources:
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers".

Appendix 3-9. Unit operating expenses of Middle East scheduled airlines compared with world averages 1977, 1982 and 1987

	Operating expenses per tonne-km available, in cents			Growth rate, percentages		
	1977	1982	1987[1]	1977-82	1982-87	1977-87
Flight operations less fuel and oil						
Middle East	2.9	3.2	3.0	2.0	-1.3	0.3
World	3.3	4.1	5.4	4.4	5.7	5.0
Fuel and oil						
Middle East	3.7	10.0	5.7	22.0	-10.6	4.4
World	5.3	11.3	6.4	16.3	-10.7	1.9
Maintenance and overhaul						
Middle East	4.5	7.1	5.9	9.5	-3.6	2.7
World	3.4	4.1	4.9	3.8	3.6	3.7
Depreciation and amortization						
Middle East	3.2	5.0	4.6	9.3	-1.7	3.7
World	2.1	2.8	3.4	5.9	4.0	4.9
User charges and station expenses						
Middle East	4.5	7.0	6.6	9.2	-1.2	3.9
World	4.8	6.5	8.0	6.3	4.2	5.2
Passenger services						
Middle East	3.4	5.0	3.9	8.0	-4.8	1.4
World	2.7	3.8	4.8	7.1	4.8	5.9
Ticketing, sales and promotion						
Middle East	5.4	8.2	8.6	8.7	1.0	4.5
World	4.1	6.5	7.9	9.7	4.0	6.8
General, administrative and others						
Middle East	4.1	5.7	6.5	13.0	2.7	4.7
World	1.8	2.6	3.9	7.6	8.4	8.0
Total operating expenses						
Middle East	30.7	51.2	44.8	10.8	-2.6	3.9
World	27.5	41.7	44.7	8.7	1.4	5.0

1. 1987 data are preliminary.

Sources:
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers" and "Traffic — Commercial Air Carriers".

Appendix 3-10. Financial and traffic data for eight Middle East airlines (1987)

	Tonne-km. performed (millions)	Operating revenues per tonne-km performed, (cents)	Tonne-km. available, (millions)	Operating expenses per tonne-km available, (cents)
El Al[1]	1 116	46.6	1 525	32.2
Gulf Air[2]	577*	95.5	1 084*	53.3
Iran Air[2]	729	123.5	1 180	63.6
Kuwait Airways	609	70.0	1 114	39.6
Royal Jordanian	525	61.1	1 015	33.8
Saudia	1 965	99.1	4 272	48.1
Syrian Arab Airlines[2]	103*	193.2	201*	92.5
Yemen Airways*	61	142.8	136	60.6
Totals for eight airlines*	5 685	87.2	10 527	46.7
Totals estimated for all airlines in the region	6 665	83.3	12 155	44.8

1. 1987 data are for nine months only (April-December).
2. Data are for 1986.

* Estimated data.

Sources:
IATA "World Air Transport Statistics";
ICAO Digests of Statistics, "Financial Data — Commercial Air Carriers" and "Traffic — Commercial Air Carriers".

Appendix 3-11. Scheduled passenger-kilometres performed by international and domestic scheduled airlines, by region and world totals (1977, 1982 and 1987)

Region	Passenger-kilometres (millions)			Average annual growth rate (%)			Percentage of world		
	1977	1982	1987	1977-82	1982-87	1977-87	1977	1982	1987
Middle East									
International	17 803	26 193	36 138	8.0	6.6	7.3	5.4	5.3	5.3
Domestic	3 982	7 017	8 462	12.0	3.8	7.8	0.8	1.1	0.9
International % of total	82	79	81	–	–	–	–	–	–
Africa									
International	16 514	25 824	27 436	9.4	1.2	5.2	5.0	5.2	4.0
Domestic	4 754	7 843	7 870	10.5	0.1	5.2	1.0	1.2	0.9
International % of total	78	77	78	–	–	–	–	–	–
Asia/Pacific									
International	67 271	128 429	180 361	13.8	7.0	10.4	20.2	25.9	26.5
Domestic	41 801	58 414	87 385	6.9	8.4	7.7	8.6	9.0	9.7
International % of total	62	69	67	–	–	–	–	–	–
Europe									
International	141 481	186 918	245 420	5.7	5.6	5.7	42.6	37.6	36.1
Domestic	145 061	195 028	230 714	6.1	3.4	4.7	29.8	30.2	25.7
International % of total	49	49	52	–	–	–	–	–	–
Latin America and the Caribbean									
International	22 913	31 592	39 816	6.6	4.7	5.7	6.9	6.4	5.9
Domestic	18 480	28 744	34 860	9.2	3.9	6.6	3.8	4.5	3.9
International % of total	55	52	53	–	–	–	–	–	–
North America									
International	66 100	97 543	151 368	8.1	9.2	8.6	19.9	19.6	22.2
Domestic	272 138	348 470	530 027	5.1	8.7	6.9	56.0	54.0	58.9
International % of total	20	22	22	–	–	–	–	–	–
World totals									
International	332 082	496 500	680 539	8.4	6.5	7.4	100.0	100.0	100.0
Domestic	486 218	645 516	899 318	5.8	6.9	6.3	100.0	100.0	100.0
International % of total	41	43	43	–	–	–	–	–	–

Sources:
ICAO Digests of Statistics.

Appendix 3-12. Comparison of selected airline traffic coefficients by region of airline

International scheduled services (1977, 1982 and 1987)

Coefficients	Year	Airlines based in: Middle East	Africa	Asia and the Pacific	Europe	Latin America and the Caribbean	North America	World
Averages per aircraft								
Stage length (km)	1977	1 635	1 455	2 275	1 258	1 473	1 858	1 511
	1982	1 664	1 711	2 501	1 373	1 428	2 050	1 654
	1987	1 835	1 654	2 841	1 400	1 359	2 299	1 746
Seats available	1977	151	153	216	177	134	203	181
	1982	191	175	284	195	169	246	216
	1987	233	179	289	194	171	250	223
Passenger load factor (per cent)	1977	56	57	63	59	57	57	59
	1982	62	58	66	63	56	61	62
	1987	61	59	70	68	63	66	67
Averages per passenger								
Distance flown (km)	1977	2 241	2 425	3 755	2 243	2 407	2 838	2 583
	1982	2 339	2 563	4 016	2 539	2 424	3 260	2 924
	1987	2 813	2 525	4 086	2 574	2 513	3 567	3 073

Sources:
ICAO Digests of Statistics.

Appendix 3-13. International non-scheduled passenger traffic carried by the scheduled airlines of the Middle East Region[1] (1977, 1982 and 1987)

Airlines	Non-scheduled pass-km (millions)			Non-scheduled passenger traffic as a percentage of total international traffic		
	1977	1982	1987	1977	1982	1987
El Al	69.9	308.2	270.1	1.5	6.4	3.6
Gulf Air	-	82.5	84.5	-	2.4	1.8
Iran Air	112.3	383.9	1 091.1	3.9	43.6	18.7
Iraqi Airways	12.7	31.8	-	1.1	2.1	-
Kuwait Airways	5.7	7.3	8.6	0.4	0.2	0.2
Middle East Airlines	91.2	124.2	44.6	5.6	11.4	6.5
Royal Jordanian	49.4	47.5	89.8	4.2	1.4	2.5
Saudia	221.1	233.6	471.9	8.1	3.2	4.4
Syrian Arab Airline	62.3[2]	29.2	56.0	6.1	3.0	6.7
Yemenia	-	-	-	-	12.6	-
Total, airlines listed	624.6	1 319.1	2 116.6[3]	3.4	4.8	5.5

1. Airlines which do not report non-scheduled passenger data are not shown.
2. Data for 1978.
3. Total excludes data for Iraqi Airways and Yemenia. Estimated total for all airlines is 2320.9 or 6.0 per cent of total international traffic.

Sources:
ICAO Digests of Statistics;
IATA, "World Air Transport Statistics", 1987.

Appendix 3-14. Scheduled freight tonne-kilometres performed by international and domestic scheduled airlines by region of airline (1977, 1982 and 1987)

Region	Freight tonne-kilometres (millions)			Average annual growth rate (%)			Percentage of world		
	1977	1982	1987	1977-82	1982-87	1977-87	1977	1982	1987
Middle East									
International	1 020.3	1 492.8	2 025.0	7.9	6.3	7.1	6.8	6.6	5.5
Domestic	23.1	59.9	80.0	21.0	6.0	13.2	0.3	0.7	0.7
International % of total	97.8	96.1	96.2	–	–	–	–	–	–
Africa									
International	488.5	897.0	1 091.0	12.9	4.0	8.4	3.2	4.0	3.0
Domestic	63.0	80.2	120.0	4.9	8.4	6.7	0.7	0.9	1.0
International % of total	88.6	91.7	90.1	–	–	–	–	–	–
Asia and Pacific									
International	2 865.6	6 225.0	11 344.0	16.8	12.8	14.8	19.0	27.5	31.1
Domestic	438.3	746.8	1 277.0	11.2	11.3	11.3	5.1	8.4	11.1
International % of total	86.7	89.2	89.9	–	–	–	–	–	–
Europe									
International	6 557.9	8 671.2	13 937.0	5.7	10.0	7.8	43.5	38.3	38.2
Domestic	2 390.6	2 491.0	2 926.0	0.8	3.3	2.0	27.9	28.0	25.3
International % of total	73.3	77.6	82.6	–	–	–	–	–	–
Latin America and the Caribbean									
International	1 006.1	1 363.8	1 669.0	6.3	4.1	5.2	6.7	6.0	4.6
Domestic	304.7	492.0	638.0	10.1	5.3	7.7	3.6	5.5	5.5
International % of total	76.8	73.4	72.3	–	–	–	–	–	–
North America									
International	3 126.2	3 972.9	6 413.0	4.9	10.1	7.4	20.8	17.6	17.6
Domestic	5 346.6	5 045.1	6 508.0	-1.2	5.2	2.0	62.4	56.5	56.4
International % of total	36.9	44.0	49.6	–	–	–	–	–	–
World total									
International	15 064.6	22 622.7	36 479.0	8.5	10.7	9.2	100.0	100.0	100.0
Domestic	8 566.3	8 915.0	11 549.0	0.8	5.3	3.0	100.0	100.0	100.0
International % of total	63.7	71.7	76.0	–	–	–	–	–	–

Sources:
ICAO Digests of Statistics.

Appendix 3-15. Comparison of selected airline traffic coefficients by region of airline

International scheduled services
(1977, 1982 and 1987)

Coefficients	Year	Airlines based in: Middle East	Africa	Asia and the Pacific	Europe	Latin America and the Caribbean	North America	World
Averages per aircraft								
Over-all capacity (tonnes)	1977	25.4	21.2	31.7	25.6	18.6	33.2	27.0
	1982	32.7	25.6	42.6	28.4	25.3	37.8	32.5
	1987	38.1	27.6	46.8	30.2	25.8	37.9	35.0
Freight load (tonnes)	1977	4.8	2.6	5.8	4.8	3.3	5.4	4.8
	1982	6.7	3.5	9.1	5.7	4.1	6.1	6.2
	1987	7.9	4.2	12.7	7.5	4.5	7.0	8.0
Over-all weight load factor (per cent)	1977	49	51	59	57	56	51	55
	1982	54	51	63	61	51	54	58
	1987	55	51	68	66	57	60	64
Contribution of freight to total scheduled tonne-kilometres								
Freight percentage	1977	38	24	31	33	32	32	32
	1982	38	27	34	33	31	30	32
	1987	38	30	40	37	31	31	36

Sources:
ICAO Digests of Statistics.

Appendix 3-16. International non-scheduled freight traffic carried by the scheduled airlines of the Middle East Region[1] (1977, 1982 and 1987)

Airline	Tonne-kilometres (thousands)			Tonnes (units)	
	1977	1982	1987	1982	1987
El Al	172 391	95 551	97 298	31 296	31 488
Gulf Air	-	3 934	1 608	1 720	339
Iran Air	3 422	55 862	70 089	13 258	29 187
Iraqi Airways	1 926	5 888	-	1 661	-
Kuwait Airways	5 921	1 263	368	541	92
Middle East Airlines	316 760	313	809	50	410
Royal Jordanian	356	4 604	12 979	2 302	7 440
Saudia	12 772	51 885	36 936	10 692	11 406
Syrian Arab Airline	2 894[2]	112	806	87	38
Trans Mediterranean	9 855	20 290	-	12 680	-
Yemenia	-	350	-	124	-
Total, airlines listed	526 297	240 052	220 893[3]	74 411	80 400[3]

1. Airlines which do not report non-scheduled freight data are not shown.
2. Data for 1978.
3. Totals exclude data for Iraqi Airways and Trans Mediterranean.

Sources:
ICAO Digests of Statistics;
IATA, "World Air Transport Statistics", 1987.

Appendix 3-17. Passenger and freight traffic on international scheduled services operated by airlines of the Middle East (1977-1987)

State and airline	Year	Passengers carried	Freight tonnes carried	Pass-km performed	Seat-km available	Pass. L/F	Tonne-kilometres performed: Passengers	Freight	Total	Tonne-km available	Weight L/F
Democratic Yemen											
Alyemda	1977	82 000*	441 500*	60 000*	105 000*	57	5 400*	1 250*	6 680*	14 000*	48
	1982	100 000*	2 000*	75 000*	150 000*	50	6 750*	1 600*	8 385*	22 000*	38
	1987	116 747+	1 313+	199 509+	368 590+	54	22 171+	3 007+	25 329+	52 811+	48
Gulf States											
Gulf Air[1]	1977	1 199 244	15 224	1 641 472	3 203 984	51	154 156	32 868	187 872	415 268	45
	1982	2 279 004+	38 252+	3 380 740+	5 979 228+	57	324 604+	86 464+	413 780+	790 120+	52
	1987	2 486 000+	47 600+	4 639 440+	7 532 320+	62	439 776+	126 000+	571 560+	948 600+	60
Iran, Islamic Republic of											
Iran Air	1977	918 385	13 922	2 799 928	5 597 862	50	251 993	68 181	323 713	789 797	41
	1982	248 963	9 240	496 907	986 648	50	44 721	35 002	85 879	167 989	51
	1987	955 229+	39 759+	1 930 624+	2 674 366+	72	173 755+	117 584+	304 580+	501 565+	61
Iraq											
Iraqi Airways	1977	495 688	9 089	1 146 546	2 372 697	48	103 170	29 783	135 256	327 744	41
	1982	480 602	10 943	1 470 120	2 476 786	59	132 312	53 674	187 006	387 883	48
	1987	520 000*	12 700*	1 445 000*	2 878 000*	50	130 050*	59 450*	190 770*	511 300*	37
Israel											
El Al	1977	1 039 373	41 600	4 697 951	6 921 827	68	424 085	174 040	603 093	920 385	66
	1982	986 849	66 875	4 494 919	6 055 134	74	404 536	297 001	705 748	993 611	71
	1987	1 608 362	145 900	7 283 685	9 876 884	74	655 532	642 680	1 303 655	1 821 857	72
Jordan											
Royal Jordanian	1977	535 916	14 701	1 125 722	2 100 984	54	101 335	40 082	141 960	306 119	46
	1982	1 586 294+	38 214+	3 263 909+	5 499 897+	59	293 751+	129 493+	425 171+	797 171+	53
	1987	1 119 736+	46 407+	3 484 944+	5 984 159+	58	313 642+	186 285+	503 093+	964 258+	52
Kuwait											
Kuwait Airways	1977	812 348	14 092	1 269 611	2 253 273	56	114 265	31 997	148 477	318 040	47
	1982	1 460 708	35 235	3 595 762	5 475 233	66	335 618	111 315	451 247	843 799	53
	1987	1 511 057	70 969	3 770 887	6 074 519	62	347 921	243 957	596 604	1 077 783	55
Lebanon											
MEA	1977	928 488	16 693	1 543 691	2 712 669	57	143 194	33 620	179 600	359 614	50
	1982	571 006+	13 664+	967 545+	1 925 749+	50	89 632+	24 614+	117 541+	255 396+	46
	1987	353 271+	9 122+	642 157+	1 160 590+	55	58 821+	18 135+	77 608+	151 493+	51
TMA	1977		95 795					506 607	506 607	874 343	58
	1982		82 440+					437 258+	437 258+	663 080+	66
	1987		32 730+					176 618+	176 618+	275 966+	64
Saudi Arabia											
Saudia	1977	1 327 470	25 502	2 497 621	4 465 283	56	224 655	92 071	319 181	818 914	39
	1982	2 795 209	92 203	7 024 254	11 339 232	62	632 185	300 553	948 428	2 019 614	47
	1987	3 044 577	112 446	10 342 158	18 494 173	56	930 794	393 934	1 341 496	2 867 156	47

State and airline	Year	Passengers carried	Freight tonnes carried	Pass-km performed	Seat-km available	Pass. L/F	Tonne-kilometres performed: Passengers	Freight	Total	Tonne-km available	Weight L/F
Syrian Arab Republic											
Syrianair	1977	376 480+	3 340+	780 780+	1 676 120+	47	74 250+	9 400+	83 650+	194 000+	43
	1982	420 345	5 105	930 499	1 672 510	56	83 745	12 847	96 592	191 865	50
	1987	344 609	4 278	776 320	1 547 025	50	69 869	13 500	83 369	182 089	46
United Arab Emirates											
Emirates	1977	.									
	1982										
	1987	471 491+	15 001+	1 049 287+	1 643 370+	64	94 436+	36 600+	131 764+	230 752+	57
Yemen											
Yemen Airways	1977	230 000*	300*	240 000*	650 000*	37	21 600*	450*	22 055*	74 000*	30
	1982	268 347	1 987	493 752	835 346	59	44 440	3 000	49 700	117 981	42
	1987	315 952+	3 745+	574 037+	1 091 891+	53	52 076+	7 274+	59 792+	133 451+	45
Totals	1977	7 945 392	251 758	17 803 322	32 059 699	56	436 122	1 020 349	2 658 144	5 412 224	49
	1982	11 197 327	396 158	26 193 407	42 395 763	62	2 392 294	1 492 821	3 926 735	7 250 509	54
	1987	12 847 031	541 970	36 138 048	59 325 887	61	3 288 843	2 025 024	5 366 238	9 719 081	55

1. Gulf Air is a multinational airline with headquarters in Bahrain, jointly owned by Bahrain, Oman, Qatar and the Emirate of Abu Dhabi.

* Estimated data
\+ *Provisional data*

Sources:
ICAO Digests of Statistics.

Appendix 3-18. Econometric models of demand for international passenger and freight air transport on airlines based in the Middle East

Separate passenger and freight models were developed for the Middle East region as a whole. The estimation technique was least squares multiple regression, using annual time series data covering the period 1968 to 1986.

Passenger model:

$$\ln PKP = 6.94 + \underset{(7.5)}{1.60}\ \ln GDP - \underset{(5.3)}{0.94}\ \ln PYIELD \qquad R^2 = 0.979$$

Freight model:

$$\ln FTK = 2.54 + \underset{(5.3)}{1.06}\ \ln IMP - \underset{(2.1)}{0.50}\ \ln FYIELD \qquad R^2 = 0.943$$

Where:

PKP	= passenger-kilometres performed
GDP	= gross domestic product measured in real terms
PYIELD	= passenger revenue per passenger-kilometre in real terms
FTK	= freight tonne-kilometres
IMP	= imports in real terms
FYIELD	= freight revenue per freight tonne-kilometre in real terms

Note.— The figures in brackets are the "t" statistics of the corresponding coefficient estimates.

Data for the GDP variable were obtained from the International Monetary Fund for individual countries of the Middle East region. The YIELD variables were based on year-to-year average rates of change in passenger and freight yields of individual Middle East airlines, measured in national currencies and deflated by local consumer price indices.

Appendix 4-1. Passenger traffic flows to, from and within the Middle East

International on-flight origin and destination traffic carried on all services in 1982 and 1987

Routes	Number of passengers 1982 (thousands)	1987 (thousands)	Average annual growth rate 1982-1987 (%)	Percentage distribution 1982	1987
Intra-Middle East	4 320	4 600	+1.3	22.8	21.1
Middle East:					
to and from Europe	5 410	6 600	4.1	28.6	30.4
to and from Africa	4 320	3 940	-1.5	22.4	18.1
to and from Asia/Pacific	4 240	5 750	5.9	22.9	26.4
to and from the Americas	630	870	6.7	3.3	4.0
Sub-total	14 600	17 160	3.3	77.2	78.9
Total	18 910	21 760	2.8	100.0	100.0

Sources:
Derived from IATA, "World Air Transport Statistics" and carrier reports for ICAO Digests of On-Flight Origin and Destination Statistics.

Appendix 4-2. Freight traffic flows to, from and within the Middle East

International on-flight origin and destination traffic carried on all services in 1982 and 1987

Routes	Freight tonnes 1982 (thousands)	Freight tonnes 1987 (thousands)	Average annual growth rate 1982-1987 (%)	Percentage distribution 1982	Percentage distribution 1987
Intra-Middle East	82	128	9.5	12.6	14.4
Middle East:					
to and from Europe	342	430	4.7	52.9	48.3
to and from Africa	72	107	8.0	11.2	12.0
to and from Asia/Pacific	121	190	9.4	18.8	21.3
to and from the Americas	30	36	4.1	4.5	4.0
Sub-total	565	763	6.2	87.4	85.6
Total	647	891	6.6	100.0	100.0

Sources:
Derived from IATA, "World Air Transport Statistics" and carrier reports for ICAO Digests of On-Flight Origin and Destination Statistics.

Appendix 4-3. Air service links between States in the Middle East
(one or more weekly through-plane scheduled passenger services by any airline — June 1988)

and	Between Bahrain	Democratic Yemen	Iran, Islamic Rep. of	Iraq	Israel	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syrian Arab Republic	United Arab Emirates	Yemen	Totals
Bahrain						x	x	x	x	x	x	x	x	x	9
Democratic Yemen							x	x		x	x	x	x	x	7
Iran, Islamic Republic of										x		x	x		3
Iraq						x	x				x				3
Israel															0
Jordan	x			x			x	x	x	x	x	x	x	x	10
Kuwait	x	x		x		x		x	x	x	x	x	x	x	11
Lebanon	x	x				x	x		x	x	x	x	x		9
Oman	x					x	x	x		x	x		x		7
Qatar	x	x	x			x	x	x	x		x	x	x	x	11
Saudi Arabia	x	x		x		x	x	x	x	x		x	x	x	11
Syrian Arab Republic	x	x	x			x	x	x		x	x		x	x	10
United Arab Emirates	x	x	x			x	x	x	x	x	x	x		x	11
Yemen	x	x				x	x			x	x	x	x		8
Totals	9	7	3	3	0	10	11	9	7	11	11	10	11	8	110

Source:
"ABC World Airways Guide", June 1988.

Appendix 4-4. Air service links between States in the Middle East and States in other regions (one or more weekly through-plane scheduled passenger services by any airline — June 1988)

and	Between Bahrain	Democratic Yemen	Iran, Islamic Rep. of	Iraq	Israel	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syrian Arab Republic	United Arab Emirates	Yemen	Totals
AFRICA															
Algeria											x	x			2
Chad											x				1
Cote d'Ivoire								x							1
Djibouti		x							x		x		x	x	5
Egypt	x			x	x	x	x	x	x	x	x	x	x	x	12
Ethiopia		x											x	x	4
Kenya					x				x		x		x	x	5
Liberia								x							1
Libyan Arab Jamahiriya						x	x				x	x			4
Madagascar											x				1
Mauritania											x				1
Mauritius													x		1
Morocco				x		x	x				x				4
Niger											x				1
Nigeria								x			x				2
Réunion											x		x		2
Rwanda											x				1
Senegal											x				1
Seychelles	x										x		x		3
Sierra Leone								x							1
Somalia		x								x	x		x	x	5
South Africa					x										1
Sudan	x			x			x	x	x	x	x	x	x	x	10
Tunisia				x		x	x	x			x	x	x		7
Uganda											x		x		2
United Rep. of Tanzania									x		x		x		3
Sub-totals	3	3	0	4	3	4	5	7	5	3	21	5	12	6	81
ASIA AND THE PACIFIC															
Afghanistan													x		1
Australia	x												x		2
Bangladesh	x			x			x		x	x	x		x		7
China	x		x	x			x				x		x		6
Hong Kong	x								x		x		x		4
India	x	x	x	x		x	x		x	x	x	x	x	x	12
Indonesia	x						x				x		x		4
Japan			x	x			x				x				4
Malaysia	x					x					x		x		4
Maldives													x		1
Nepal													x		1
New Zealand	x												x		2
Pakistan	x		x	x		x	x		x	x	x	x	x	x	11
Philippines	x						x				x		x		4
Republic of Korea	x										x		x		3
Singapore	x					x	x		x		x		x		6
Sri Lanka	x						x		x	x	x		x		6
Thailand	x			x		x	x		x		x		x		7
Sub-totals	14	1	4	6	0	5	10	0	7	4	13	2	17	2	85

Between

and	Bahrain	Democratic Yemen	Iran, Islamic Rep. of	Iraq	Israel	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syrian Arab Republic	United Arab Emirates	Yemen	Totals
EUROPE															
Austria			x	x	x	x	x				x	x	x		8
Belgium					x	x		x			x		x		5
Bulgaria				x			x	x		x		x	x		6
Cyprus	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
Czechoslovakia				x			x	x				x	x		5
Denmark				x	x	x		x			x	x	x		7
France	x	x	x	x	x	x	x	x	x	x	x	x	x	x	14
German Dem. Rep.						x						x	x		3
Germany, Federal Rep. of	x		x	x	x	x	x	x	x	x	x	x	x	x	13
Greece	x		x	x	x	x	x	x	x	x	x	x	x		12
Hungary		x		x			x	x				x	x		6
Italy	x		x	x	x	x	x	x			x	x		x	10
Netherlands, Kingdom of the	x			x	x	x	x		x	x	x	x	x	x	11
Poland				x	x							x	x		4
Portugal				x	x										2
Romania				x	x	x	x	x				x	x		7
Spain				x	x	x	x	x			x		x		7
Switzerland	x		x	x	x	x	x	x			x	x	x		10
Turkey	x		x	x	x	x	x	x	x	x	x	x	x	x	13
USSR		x	x	x		x	x	x				x	x	x	9
United Kingdom	x		x	x	x	x	x	x	x	x	x		x	x	12
Yugoslavia				x		x	x					x	x		5
Sub-totals	9	4	10	20	16	17	17	16	7	8	13	18	20	8	183
LATIN AMERICA AND THE CARIBBEAN															
Brazil				x											1
Sub-totals	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
NORTH AMERICA															
Canada					x	x									2
United States					x	x	x				x	x	x		6
Sub-totals	0	0	0	0	2	2	1	0	0	0	1	1	1	0	8
TOTALS	26	8	14	31	21	28	33	23	19	15	48	26	50	16	358

Source:
"ABC World Airways Guide", June 1988.

Appendix 4-5. States served by scheduled passenger airlines based in the Middle East
June 1988

States	Middle East Airlines												
	Alyemda	El Al	Emirates	Gulf Air	Iran Air	Iraqi Airways	Kuwait Airways	MEA	Royal Jordanian	Saudia	Syrian Arab Airlines	Yemenia	Totals
MIDDLE EAST													
Bahrain				x			x	x	x	x	x	x	7
Democratic Yemen	x						x	x		x		x	5
Iran, Islamic Republic of					x						x		2
Iraq						x	x		x	x			4
Israel		x											1
Jordan			x	x		x	x	x	x	x		x	8
Kuwait	x			x		x	x	x	x	x	x	x	9
Lebanon								x			x		2
Oman				x			x	x	x	x			5
Qatar	x			x	x		x	x	x	x	x	x	9
Saudi Arabia	x			x		x	x	x	x	x	x	x	9
Syrian Arab Republic	x			x	x		x	x	x	x	x	x	9
United Arab Emirates	x		x	x	x		x	x	x	x	x	x	10
Yemen	x			x			x		x	x		x	6
Sub-totals	7	1	2	9	4	4	11	10	10	11	8	9	86
AFRICA													
Algeria											x		1
Cote d'Ivoire								x					1
Djibouti	x											x	2
Egypt		x	x	x		x	x		x	x		x	8
Ethiopia	x											x	2
Kenya		x		x						x			3
Libyan Arab Jamahiriya							x		x	x	x		4
Morocco						x	x		x	x			4
Nigeria								x		x			2
Senegal										x			1
Somalia	x									x			2
Sudan				x		x	x	x		x		x	6
Tunisia						x	x	x	x	x	x		6
United Rep. of Tanzania				x									1
Sub-totals	3	2	1	4	0	4	5	4	4	9	3	4	43
ASIA AND THE PACIFIC													
Bangladesh			x	x		x	x			x			5
China					x	x							2
Hong Kong				x									1
India	x		x	x	x	x	x		x	x	x	x	10
Indonesia										x			1
Japan					x	x							2
Malaysia									x	x			2
Maldives			x										1
Pakistan			x	x	x	x	x		x	x	x	x	9
Philippines				x			x			x			3
Republic of Korea										x			1
Singapore					x				x	x			3
Sri Lanka			x	x			x	x		x			5
Thailand				x		x	x		x	x			5
Sub-totals	1	0	5	7	5	6	6	1	5	10	2	2	50

States	Alyemda	El Al	Emirates	Gulf Air	Iran Air	Iraqi Airways	Kuwait Airways	MEA	Royal Jordanian	Saudia	Syrian Arab Airlines	Yemenia	Totals
						Middle East Airlines							
EUROPE													
Austria		x			x	x			x				4
Belgium		x						x	x				3
Bulgaria						x					x		2
Cyprus	x			x	x	x	x	x	x		x	x	9
Czechoslovakia						x					x		2
Denmark		x				x		x	x	x	x		6
France		x		x	x	x	x	x	x	x	x	x	10
German Dem. Rep.									x		x		2
Germany, Federal Rep. of		x	x	x	x	x	x	x	x	x	x	x	11
Greece		x		x	x	x	x	x	x	x	x		9
Hungary	x										x		2
Italy		x			x	x	x	x	x	x	x	x	9
Netherlands, Kingdom of the		x				x	x		x	x		x	6
Poland		x				x							2
Portugal		x				x							2
Romania		x				x			x		x		4
Spain		x				x	x	x	x	x			6
Switzerland		x			x	x	x	x	x	x			7
Turkey		x	x	x	x	x	x	x	x	x	x	x	11
USSR						x			x		x	x	4
United Kingdom		x	x	x	x	x	x	x	x	x		x	10
Yugoslavia						x			x				2
Sub-totals	2	15	3	6	9	19	10	11	17	10	13	8	123
LATIN AMERICA AND THE CARIBBEAN													
Brazil						x							1
Sub-totals	0	0	0	0	0	1	0	0	0	0	0	0	1
NORTH AMERICA													
Canada		x							x				2
United States		x					x		x	x			4
Sub-totals	0	2	0	0	0	0	1	0	2	1	0	0	6
TOTALS	13	20	11	26	18	34	33	26	38	41	26	23	309

Source:
"ABC World Airways Guide", June 1988.

Appendix 4-6. Air service links between States in the Middle East and States in other regions
(one or more weekly through-plane scheduled passenger services by airlines based outside the Middle East — June 1988)

and	Between Bahrain	Democratic Yemen	Iran, Islamic Rep. of	Iraq	Israel	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syrian Arab Republic	United Arab Emirates	Yemen	Totals
AFRICA															
Air Afrique											x				1
Air Algérie											x	x			2
Air Djibouti		x									x			x	3
Air Sinai					x										1
Air Tanzania									x				x		2
Egyptair	x			x		x	x		x	x	x		x	x	9
Ethopian Airlines		x									x		x	x	4
Jamahiriya Libyan Arab Airlines						x	x				x				3
Kenya Airways									x		x		x		3
Nigeria Airways											x				1
Royal Air Maroc							x				x				2
Somali Airlines										x	x		x	x	4
South African Airways					x										1
Sudan Airways				x			x				x	x	x	x	6
Tunis Air						x	x				x	x	x		5
Uganda Airlines											x		x		2
Sub-totals	1	2	0	2	2	3	5	0	3	2	13	3	8	5	49
ASIA AND THE PACIFIC															
Air India	x						x		x	x	x		x		6
Airlanka	x						x		x		x	x	x		6
Ariana Afghan Airlines													x		1
Biman Bangladesh	x			x			x		x		x		x		6
CAAC				x			x						x		3
Cathay Pacific Airways	x										x		x		3
China Airlines											x				1
Garuda											x				1
Japan Air Lines							x				x				2
Korean Air	x										x				2
Malaysia Airline System											x		x		2
Pakistan International Airlines	x					x	x		x	x	x	x	x	x	9
Philippine Airlines											x		x		2
Qantas Airways	x														1
Royal Nepal Airlines													x		1
Singapore Airlines											x		x		2
Thai Airways International									x		x				2
Sub-totals	7	0	0	2	0	1	6	0	5	2	13	2	11	1	50
EUROPE															
Aeroflot		x	x	x		x	x	x				x	x	x	9
Air France		x		x	x	x	x			x	x	x	x	x	10
Alitalia					x	x					x	x	x		5
Austrian Airlines			x	x	x		x				x	x			6
British Airways	x				x	x	x		x	x	x		x		8

Between

and	Bahrain	Democratic Yemen	Iran, Islamic Rep. of	Iraq	Israel	Jordan	Kuwait	Lebanon	Oman	Qatar	Saudi Arabia	Syrian Arab Republic	United Arab Emirates	Yemen	Totals
Bulgarian Airlines				x			x	x		x		x	x		6
CSA							x	x				x	x		4
Cyprus Airways	x				x		x				x	x	x		6
Iberia					x										1
Interflug												x	x		2
JAT				x		x	x					x	x		5
KLM	x				x	x	x		x	x	x	x	x		9
LOT				x								x	x		3
Lufthansa	x		x	x	x	x	x		x		x	x	x	x	11
Malev				x			x					x	x		4
Olympic Airways					x	x	x				x	x	x		6
Sabena					x						x		x		3
SAS					x						x				2
Swissair			x	x	x	x	x				x	x	x		8
Tarom				x	x	x	x	x				x			6
THY	x		x	x		x	x				x	x	x		8
UTA	x								x						2
Sub-totals	6	2	5	11	13	11	15	4	4	4	12	17	17	3	124
NORTH AMERICA															
Pan American					x						x				2
Tower Air					x										1
TWA					x										1
Sub-totals	0	0	0	0	3	0	0	0	0	0	1	0	0	0	4
TOTALS	14	4	5	15	18	15	26	4	12	8	39	22	36	9	227

Source:
"ABC World Airways Guide", June 1988.

Appendix 4-7. Comparison of average economy class normal fares per passenger-kilometre by route groups, direction and distance

Route group	Cents per passenger-kilometre by distance (km), September 1987								
	250	500	1 000	2 000	4 000	6 000	9 000	12 000	15 000
World	36.6	29.4	23.6	19.0	15.2	13.4	11.8	10.8	10.0
Local Middle East	30.6	24.5	19.6	15.7	–	–	–	–	–
Middle East to Europe	27.6	24.5	21.8	19.4	17.2	16.0	–	–	–
Europe to Middle East	24.6	23.9	23.2	22.5	21.8	21.4	–	–	–
Middle East to North Africa[1]	24.1	21.4	19.0	16.9	15.1	14.1	–	–	–
North Africa to Middle East	20.3	18.1	16.1	14.4	12.8	11.9	–	–	–
Middle East to Rest of Africa	30.7	25.9	21.8	18.4	15.5	14.0	–	–	–
Rest of Africa to Middle East	41.4	31.3	23.7	18.0	13.6	11.6	–	–	–
Middle East to South Asian sub-continent[2]	–	–	27.3	18.7	12.9	10.3	–	–	–
South Asian sub-continent to Middle East	–	–	18.5	12.7	8.7	7.0	–	–	–
Middle East to Far East/Pacific	–	–	–	–	16.1	14.1	12.4	11.3	10.5
Far East/Pacific to Middle East	–	–	–	–	13.5	12.9	12.4	12.0	11.7
Middle East to North America[3]									
North America to Middle East	–	–	–	–	–	–	12.7	11.6	
	Average annual change 1977 to 1987 (%)								
World	8.1	7.4	6.8	6.2	5.6	5.3	4.9	4.7	4.5
Local Middle East	5.8	5.3	4.8	4.2	–	–	–	–	–
Middle East to Europe	3.3	3.5	3.6	3.8	4.0	4.1	–	–	–
Europe to Middle East	2.6	3.7	4.7	5.8	6.9	7.5	–	–	–
Middle East to North Africa[1]	5.0	4.7	4.5	4.3	4.0	3.9	–	–	–
North Africa to Middle East	-0.4	0.1	0.7	1.3	1.9	2.3	–	–	–
Middle East to Rest of Africa	10.4	8.2	6.1	4.0	1.9	0.7	–	–	–
Rest of Africa to Middle East	13.2	10.2	7.3	4.4	1.6	–	–	–	–
Middle East to South Asian sub-continent[2]	–	–	7.3	4.8	2.4	1.0	–	–	–
South Asian sub-continent to Middle East	–	–	13.8	11.7	9.6	8.4	–	–	–
Middle East to Far East/Pacific	–	–	–	–	3.7	3.8	3.8	3.8	3.8
Far East/Pacific to Middle East	–	–	–	–	0.8	2.6	4.5	5.8	6.9
Middle East to North America[3]									
North America to Middle East	–	–	–	–	–	–	5.5	4.9	–

1. North Africa defined as: Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia and Sudan.
2. South Asian sub-continent defined as: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.
3. There is no statistical relationship between normal economy fare levels and distance on routes from the Middle East to North America.

Source:
ICAO Survey of International Air Transport Fares and Rates, September 1987 (Circular 208-AT/82).

Appendix 4-8. Comparison of average general cargo rates per tonne-kilometre for shipments of less than 45 kg by route group, direction and distance

Route group	Cents per tonne-kilometre by distance, September 1987								
	250	500	1 000	2 000	4 000	6 000	9 000	12 000	15 000
World	277	225	183	149	121	107	95	87	82
Local Middle East	271	205	155	118	–	–	–	–	–
Middle East to Europe	163	155	148	141	134	130	–	–	–
Europe to Middle East	113	125	139	155	172	183	–	–	–
Middle East to North Africa[1]	198	173	151	131	114	105	–	–	–
North Africa to Middle East	217	174	139	111	89	78	–	–	–
Middle East to Rest of Africa	280	234	196	163	136	123	–	–	–
Rest of Africa to Middle East	384	281	206	151	111	92	–	–	–
Middle East to South Asian sub-continent[2]	–	–	248	175	124	101	–	–	–
South Asian sub-continent to Middle East	–	–	168	112	75	59	–	–	–
Middle East to Far East/Pacific	–	–	–	–	209	167	134	115	102
Far East/Pacific to Middle East	–	–	–	–	121	108	97	89	84
Middle East to North America	–	–	–	–	–	–	124	110	–
North America to Middle East	–	–	–	–	–	–	93	81	
	Average annual change 1977 to 1987 (%)								
World	7.0	6.5	6.0	5.5	5.0	4.7	4.4	4.2	4.1
Local Middle East	6.2	6.1	5.9	5.8	–	–	–	–	–
Middle East to Europe	–1.2	0.5	2.2	4.0	5.8	6.8	–	–	–
Europe to Middle East	0.5	1.6	2.8	4.0	5.2	5.9	–	–	–
Middle East to North Africa[1]	5.1	5.1	5.1	5.1	5.1	5.1	–	–	–
North Africa to Middle East	2.7	2.4	2.1	1.8	1.5	1.4	–	–	–
Middle East to Rest of Africa	10.2	8.7	7.2	5.7	4.2	3.4	–	–	–
Rest of Africa to Middle East	12.9	10.2	7.5	5.0	2.5	1.0	–	–	–
Middle East to South Asian sub-continent[2]	–	–	6.4	4.9	3.4	2.5	–	–	–
South Asian sub-continent to Middle East	–	–	1.2	0.3	–0.6	–1.1	–	–	–
Middle East to Far East/Pacific	–	–	–	–	5.6	5.0	4.5	4.1	3.8
Far East/Pacific to Middle East	–	–	–	–	– 0.3	1.6	3.5	4.9	6.0
Middle East to North America	–	–	–	–	–	–	7.4	6.1	–
North America to Middle East	–	–	–	–	–	–	4.6	3.7	–

1. North Africa defined as: Algeria, Egypt, Libyan Arab Jamahiriya, Morocco, Tunisia and Sudan.
2. South Asian sub-continent defined as: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka.

Source:
ICAO Survey of International Air Transport Fares and Rates, September 1987 (Circular 208-AT/82).

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The following summary gives the status and also describes in general terms the contents of the various series of publications in the air transport field issued by the International Civil Aviation Organization:

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