



**UNITED NATIONS  
ECONOMIC AND SOCIAL COUNCIL**

**ECONOMIC COMMISSION FOR AFRICA**

**STUDY OF AIR FREIGHT POTENTIAL IN  
DEVELOPING AFRICA**

**VOLUME 1  
REGIONAL MASTER REPORT**

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The author is very grateful to all the persons with whom he had discussions, or who supplied information, listed in annex H. Much of the output of this report is merely a collation and sifting of their ideas, together with those of contributors in the individual countries surveyed. The total number of people contributing was around 350, representing 172 organizations. Some of the references listed in annex I were also heavily relied upon.

Note: All through this document, for "ton" read metric ton = 1,000 kg.

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\* C. B. Lyle, Air Freight Expert.

## MAP(S)\*

This part will be a map (or series of maps) including the following information:

- (1) Names of member States of ECA. Indication of Sahelian zone.
- (2) Surface transport infrastructure in the region (i.e. major railways, roads and navigable waterways) existing, under construction and projected.

Special reference to be made to:

Trans-African Highway (including towns of Mombasa, Nairobi, Kampala, Kasindi, Kisangani, Bangassou, Bangui, Bouar, Tibati, Ekok, Enugu, Benin City, Lagos);

Trans-West African Highway;

Trans-Saharan Highway;

Trans-East African Highway;

Feeder links to the above roads;

Tan-Zam Railway;

Planned Ilebo-Kinshasa rail link in Zaire.

- (3) Major port facilities in the region with special reference to Dar es Salaam, Kisimayo, Mombasa and Tema.

- (4) International jet airports of Boeing 707 status, existing and under construction (including Kaduna and Maiduguri in northern Nigeria and Lubumbashi in Zaire).

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\* Maps in preparation.

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## SECTION 1: INTRODUCTION

Only relatively high value, perishable or emergency goods are generally considered to be suitable for carriage by air. But, given the vast distances and lack of surface transport infrastructure in the African Region, the generation of intra-African trade using air carriage as a mode of transport has been recognized for some years as a distinct possibility. Hence Economic Commission for Africa (ECA), under the legislative authority of UNCTAD Resolution TD/III/RES/48 and Commission Resolution 244(XI), initiated in 1973 a 'Study of Air Freight Potential in Developing Africa', having recruited an air freight expert specifically to carry out a programme of work. This Study complements an earlier study of the International Civil Aviation Organization (ICAO), 'Air Freight and Air Mail-Africa, 1971' by evaluating the potential air freight carriage and associated infrastructure needs for intra-African and African originating intercontinental movements. Further details of the objectives of the Study are included as annex A. Freight in this context is considered as commercial freight in the equation:

Cargo = commercial freight + company stores + passenger baggage + mail. Mail has been briefly examined (see section 10.1) only with a view to establishing its impact on capacity, since it currently has priority over freight, and 'all-up' mail systems, if introduced, could produce significant volumes.

The approach used in the Study was to carry out a 'pilot' survey by covering a number of selected countries on the spot and in some depth. This screening process was aimed at yielding operational experience, together with policy prescriptions and feasible projects which could then form the basis for action and/or extension to other individual or groups of countries. At the end of this first phase 13 countries in the Region have been visited, with 10 surveyed in depth, and a considerable volume of information has been obtained from further countries and international organizations. Groundwork was carefully laid for each of the visits by transmitting to Governments well in advance background questionnaires for themselves and the airlines (see annexes B and C), and a proposed specific list of interviewees, including representatives of Government departments such as the Ministries of Agriculture, Finance (for Customs), Industry, Planning and Transport, as well as commodity marketing boards and chambers of commerce, air freight agents, airlines and commercial users.

Many of the recommendations made to individual countries are already in the course of implementation, and ECA hopes that this Master Report will provide sufficient justification for strategic developments which will have a significant effect on air trade in Africa. In particular, it became evident at an early stage of the Study that increased co-operation between African countries with an excess or shortage of freight capacity could lead to increased efficiency, reduced costs and stimulated air freight development. Such co-operation could take the form initially of an aircraft capacity brokerage system (or air equivalent to the 'Baltic Exchange'), but with the possibility of further development leading to the establishment of an African multinational all-freight airline. The basic concepts were discussed with various authorities, both national and multinational in Africa, and generated much interest. Thus it was felt that this possibility was worth airing to interested parties in order that comments and reactions could be included in this Master Report. Hence a paper entitled, 'Towards an African Multinational Freight Airline' was issued in January 1975 by ECA. This paper was discussed at the twelfth session of the ECA Conference of Ministers in February, 1975, and led to a Resolution (text included in annex G requesting feasibility studies for establishing an African multinational airline. The paper was also

presented to the third Plenary Session of the African Civil Aviation Commission in April, 1975, and member States of the Commission were asked to comment on the subject matter. Textual comments have already been received from several countries, and these are incorporated in this Master Report, as are the concepts included in the earlier paper.

It will have been seen from the approach above that ECA's prime interest in the aviation sector is in determining the mechanics of its relationship to the development of economies. The role that air freight, in particular, can play in developing economies has been found to be very different from the role it plays in developed economies. As a general guide, therefore, an important annex, 'Air Freight as a Development Tool', has been incorporated in this Report (annex D). This annex is referred to time and again in the main text of the Report.

## SECTION 2: SUMMARY

Section 4

The African Region (excluding South Africa) consists of 42 independent States, plus a number of dependent territories, covering about 21 per cent of the world's land area. It has a population of about 370 million, or 9 per cent of the world's total, widely distributed over the Region, and the regional share of most economic indicators lies between 1 and 3 per cent, that of GNP being  $2\frac{1}{2}$  per cent. Of the 25 least-developed countries in the world, 16 are in Africa, and no less than 10 of these are landlocked and separated by vast distances from their main trading partners.

The external trade and economic performance of countries in the African Region are influenced very greatly by the situation of the world market for a limited number of commodities which are the basis of their economic well-being. When the prices of these export commodities are good and output is satisfactory the Governments in the Region have buoyant revenues, external payments are much easier to balance and economies have good prospects for realistic growth. When the reverse applies, many problems are created. With an average annual rate of growth of GDP of 4.6 per cent between 1970 and 1973, ECA member States as a group failed to reach the target growth of 6 per cent set in the International Development Strategy, although there were wide divergencies in the growth rates within the Region.

Agricultural production per capita, partially due to rapid population growth in the Region, fell by 6 per cent between 1970 and 1973, and aggregate food demand is expected to increase at a relatively high rate due to increases in population and per capita income. Manufacturing industry in ECA member countries expanded at an annual growth rate of 7.2 per cent during the same period, and did not quite achieve the growth target of 8 per cent. Again, achievement levels varied widely between countries. Manufacturing industry in developing African countries is still basically oriented to import substitution of consumer goods and processed agricultural products rather than production for export.

There were accelerating rates of inflation in most African countries in the period 1970 to 1974. In addition, exports have been growing at a lower rate than imports and in 1973, 23 countries had balance of trade deficits. Developed market economies remain developing Africa's major trading partners, and only 5 to 6 per cent of the Region's recorded trade is intra-African. The balance of payments statistics show that the developing countries of Africa make large net payments on invisibles, that is for services provided by other countries, including shipping and aviation.

As a group the least developed countries in Africa achieved a rate of growth of only 4 per cent between 1970 and 1973, below the average achieved for all ECA member countries as a group. The problems of transit for trade to and from these countries, particularly those of a landlocked nature, are great.

In the period 1972 to 1974 several countries in the Region experienced severe drought conditions, which caused extensive disruption of economic life and the deaths of many thousands of people. Some of the countries concerned are also classified as least developed. The role of aviation in transporting emergency supplies to the drought stricken areas was substantial, but could perhaps have been even more significant.

Section 5

Progress in concluding international commodity agreements in the 1970s leaves much to be desired. Lack of progress and the inhibiting terms of sale are restricting the possibilities of exporting by air some relatively high value commodities, such as tin. Sanitary regulations and psychological barriers against African production are also inhibiting air exports from the Region. Within the Region the importance of economic co-operation and integration is widely recognized. But despite the increasing number of bilateral trade agreements being developed, lack of further formal agreements is also hindering air (and overall) trade development, as are the customs barriers imposed by existing economic groupings and traditional metropolitan linkages, as well as lack of market information. The evident potentialities of air transport have already generated some ad hoc agreements which are providing a stimulus towards the breakdown of such barriers.

Section 6

The opening up of countries through the expansion of transport networks has been a stimulus to economic and social change. However the African Region, despite its widely dispersed population and vast physical area, has low surface transport capacity at present. The surface transport infrastructure for the Region was largely generated during the colonial era, and most African nations have to overcome the lack of comprehensive land transport networks as well as the inherited monostructures of their economies. Substantial efforts are being made to close the intra-regional transport gaps, particularly through the expansion of railway systems and the work of the African Highways Bureau on trans-African projects. Nevertheless, the relative costs of inland transport, including transportation to the seaports, are likely to remain high. Thus, with current and anticipated port congestion, the role of air transport is of particular importance, both for intra-African and for inter-regional trade.

Section 7

Civil aviation in the Region is well-served by a number of agencies, including the executing agency for technical co-operation, the African Civil Aviation Commission (AFCAC), formed by a joint meeting of ECA and Organization of African Unity (OAU) in 1969. External support on technical matters comes from the International Civil Aviation Organization (ICAO), often supported by funds from the United Nations Development Programme (UNDP). Further external finance for aviation projects comes from bilateral aid and multinational agencies such as the World Bank (IBRD) and the European Development Fund (FED) with the European Investment Bank (BEI). Scheduled airlines in the Region are represented by the Association of African Airlines (AAFA), which is associated with the International Air Transport Association (IATA). There is, however, no regional charter carrier association, although the International Air Carrier Association (IACA) is concerned with expanding the activities of charter operations to and from Africa as part of its responsibilities.

Section 8

From the above economic and structural analysis it might be imagined that air transport is well-developed in the Region, but available statistical indicators show that the reverse is true. Even within this low-level framework of air transport operations, the position of freight is of little volumetric importance at present. For example, it is estimated that in 1974 airlines based in the Region operated some 277 transport aircrafts weighing over 9,000 kgs, on commercial operations. These



consisted of 100 jets (with a further 10 on order), 80 turbo-prop and 97 piston engined types. Of these aircrafts, only 22 normally operated in a freight configuration (3 jets, 4 turbo-props and 15 piston-engined types), and only 4 of the nominally passenger jet aircraft were wide-bodied with significant freight capacity in their bellyholds.

In 1974, 27 all-freight scheduled round trip services were operating weekly to and from the Region, only 6 of these being by regional-based carriers (and 5 by the multinational Air Afrique). The level of charter operations, almost entirely carried out by foreign carriers was, however, relatively high, and for the most part unrecorded in available international statistics. Such operations are opening up to African Governments the possibilities of air freight development, and several States are in the process of setting up freight charter operations.

#### Section 9

There is considerable unexploited air freight potential from the Region, although intera-regional variety in potential is limited, and such traffic is likely to remain dominated by meat for some time to come. ECA has, however, identified a number of multinational industrial investment opportunities which could generate significant intra-African traffic, particularly in electronic equipment, in due course. In volumetric terms the regional export potential is dominated by horticultural produce, meat, hides and skins. Other regional export products of less volumetric importance but considerable economic importance, and which travel by air by tradition, are exotic edible fish, cinchona bark and other medicinal plant products, pappaine, pyrethrum extract, dairy products, textiles and a limited range and volume of industrial output. Improved policies on capacity utilization would generate substantial additional regular and/or ad hoc potential in the form of such commodities as certain minerals, providing they are sold under suitable contract terms; tea; cashew, kola and macadamia nuts; and cloves. Only brief summaries of the potential of these and other commodities are given in the text of volume I of this report, as full details and non-aviation as well as aviation sector recommendations are recorded in the individual country reports of volume II for action by the Governments concerned and for reference by other States.

#### Section 10

In a few member States the basic aviation infrastructure is inadequate to handle current and future traffic volumes but most countries in the Region have reasonable access to an airport of international standard. Apart from the lack of stimulus to an airport of international standard. Apart from the lack of stimulus to development and currency/sanitary agreements, therefore, the main constraints on air freight development could be overcome with only marginal investment. These obstacles are aircraft capacity limitations caused by traffic imbalances, peaking, seasonality and inadequate space control systems; inadequacy of terminal equipment; poor facilitation generally, lack of bilateral agreements on traffic rights; lack of knowledge of the benefits of air freight; poor transshipment handling; shortage and high cost of packaging materials; insecure availability and high cost of fuel; and poor quality statistics. Where within the terms of reference of this Study, recommendations are made for improvement or references given to development work is already being carried out.

#### Section 11

Both charter operators and IATA airlines use the pricing policy of subsidizing northbound freight movements from Africa by the inbound higher yield traffic in order

to generate demand. An analysis of the IATA rate structure to, from and within the Region reveals that this is inconsistent and not relevant to the needs of the developing countries in Africa. The structure requires revision to align it more closely to market demand while maintaining an adequate margin of revenue over costs. A contract system between shippers and airlines with associated default penalties may help to utilize some of the currently wasted capacity on combination aircraft particularly. The costs of air freight according to total distribution cost criteria are likely to become more competitive with those of surface transport over the next few years.

## Section 12

Apart from the need to solve current problems, there are further developments which could improve efficiency and stimulate the significant air freight potential of the Region, as summarized below. The over-riding current requirement is to overcome the problem of traffic and yield imbalances to, from and within Africa, in order to generate an efficient freight network. This ECA Study has found that the negative air trade imbalances in one country are often partly compensated by the positive imbalances of a neighbouring country. Thus, at this time of fast-increasing charter operations, the time is ripe for co-operative multinational development.

Passenger-oriented operations are not seen as meeting the full requirements of air freight development in the Region (although efforts should be made to fill marginal-cost capacity as a priority), and there is a substantial need for further and more reliable all-freight operations.

Multinational co-operation in the air freight sector could be supplemental to existing operations (and not therefore over-riding national priorities), could reduce the sometimes substantial empty logs that are currently flown (and hence reduce costs) and could increase the control of and revenue from the distribution of African products by African nations.

Hence the major proposal of this Study is that an African charter capacity brokerage system be established, with a view to developing it into an African multinational freight airline. Details of this proposal and steps towards its implementation are summarized in Section 3 below and detailed in the main text of the report.

Further strategic developments for air freight in the Region could include the establishment of formal air-sea entrepot points in North Africa (to serve Europe/America and the Sahelian Zone), West Africa (to serve Europe/America and East Africa) and possibly East Africa (to serve Central/West Africa and Asia). Current traffic and possibilities are reviewed, but economic feasibility studies are required to establish the justification for such developments.

It is often argued that levying duty on a c.i.f. basis discriminates against the air freight mode since air freight rates are much higher than sea freight charges. The arguments for and against reducing the duty rates for air freight are discussed - in order to increase intra-African trade the reduction of customs duties for imports by air from countries in the Region could prove to be worth-while.

Attention is drawn to the possibilities of establishing duty-free airport distribution and/or manufacturing zones, which have elsewhere benefitted the distributor/manufacturer concerned, the economy of the host country, and air freight traffic.

Most air freight agents in the Region are traditionally tied to metropolitan countries, a fact which constrains the impetus for intra-African air trade development, and the intra-African linkages of agents could be strengthened. It has been found that where agents deal only in freight (or especially air freight) they are considered to provide a superior service to the shipper and to be concerned with air freight development rather than competitive strategy.

Interest in airship development is regenerating consideration of this form of transport, and the current activities are reviewed in order to provide a monitor for long term planning.

Apart from specific projects suggested by this Study, further research also needs to be undertaken. Some of the requirements towards further defining the role of air freight in developing Africa will be covered by an ICAO/UNDP project initiated by AFCAC, entitled 'Studies to Determine the Contribution that Civil Aviation can make to the National Economies of African States'. This project, to which ECA is contributing, covers 36 African countries for two years from April, 1975. Additional aspects of marketing research will still need to be examined, particularly in ECA member States not covered by this ECA Study and in extra-regional markets to quantify the demand for air freighted exports from Africa.

Finally, as the summary above will have shown, the main output of the report refers to a number of interdisciplinary aspects, and thus suggested machinery for implementation of the conclusions of the Study are drawn up in Section 12.11, defining areas of responsibility.

#### Annexes

Details of the objectives of the ECA Study and of the preparatory framework for Governments are given in annexes A to C. Annex D, 'Air Freight as a Development Tool' has been prepared to provide, in a general form, the arguments for increased use of air freight transportation in the Region. Annex E describes the 'Freedom of the Air', which are used world-wide as a basis for establishing bilateral traffic right agreements. The purpose of annex F is evident from its title, 'Guidelines for Air Freight Statistics'. Annex G is a brief history of relevant civil aviation co-operation in Africa, and annexes H, I, and J list contributors to, references used in, and tables contained in this Master Report.

### SECTION 3: RECOMMENDATIONS

The major recommendations of a multinational nature arising from the ECA Study are summarized below. A large number of recommendations for individual countries have been made in the texts of the individual country reports of volume II - in particular specific recommendations relating to non-aviation sectors (e.g., to the development of specific forms of available commodities for air export) are included there, as they are dependent on the social and economic structure of the country concerned.

The more formal recommendations directly related to air transport have been numbered. The figure(s) in brackets following the recommendation is (are) a reference to the Section(s) in the main text dealing with the recommendation in detail. The organizational reference is to the agency best equipped to carry out the proposal, as discussed in Section 12.11 on Implementation.

#### Recommendation 1:

(1) The predominant development which could arise as a result of this Study is the establishment of an African multinational freight airline. The justification would be increased efficiency of operations and increased control of and revenue from the distribution of African products by African nations. ECA proposes the following step-by-step progression. Initially, each of these would benefit only inter-regional trade, but would provide a springboard for intra-African trade development.

Step 1: Data collation by interested member States on freight charter operations (none is currently published on a regional basis and the ECA Study has so far resulted only in data from certain countries), and possibly also on all-freight scheduled operations.

#### Step 2:

(a) The establishment of a self-financing African capacity brokerage and planning agency with the function of matching supply and demand. Specific details of the operation, including recommended staffing and location are given in Section 12.3.

(b) Extension of the functions of the agency into marketing development and facilities planning for aircraft operating under the aegis of the scheme.

Step 3: The carrying out and commissioning of consultancy studies, hopefully aided by international agency funds, into the economic feasibility of establishing an African multinational all-freight airline. Some outline subjects for study are given in Section 12.4, including Constitution; Operating Plans; Costs and Revenues; Finance and Insurance; Traffic Rights; Operational Pools; etc. When the studies are completed, it should be possible for each interested country to evaluate the gains that it would achieve from the functioning of the airline (including foreign exchange savings, if any) as against the cost savings it may forego by adhering to the present form of operation. The major objective of the airline itself would be to achieve an increased African carrier share of air freight carriage to, from and within Africa, while generating a commercial net return on investment. The airline's operations would aid the development of intra- and extra-African trade. The airline could be the first 100 per cent African-owned and operated international airline, and be a training and testing ground for further developments in multinational co-operation in African civil aviation.

Step 4: If the above evaluations show a viable proposition, and sufficient support were received, the airline would be established.

A timetable would need to be settled for the programme, and could obviously be telescoped should the situation so require. Hopefully, the approach above would have a good chance of success in that it is specific, for freight only, and supplemental to existing African operations (at least initially). Participation in the programme need neither be comprehensive nor necessarily by contiguous countries, as long as the needs of interested States are complementary and generate sufficient volume. A regional rather than subregional network of countries participating is likely to prove the most viable form of operation. Development would be co-ordinated by ECA and AFCAC, in conjunction with the OAU. The proposed is discussed in detail in Sections 12.1 to 12.4.

Recommendation 2:

When planning aircraft purchases for the carriage of passengers, consideration should be given to aircraft with freight doors and strengthened floors. The increased capital cost and reduction in uplift ability may well be justified by operation in mixed or all-freight configuration. Specific recommendations for the use of semi-palletised combination aircraft on certain routes as a precursor to all-freight operations have been made in various individual country reports (12.2, airlines/Governments).

Recommendation 3:

While the opening of the Suez Canal is not likely to affect the demand for air export capacity from the Region significantly, capacity itself could be restrained by lower growth in air import volumes. A detailed study should be carried out on the long-term effect of the opening of the Suez Canal on air freight import and export requirements. This could be part of a general analysis of the effects on the economic infrastructure, to aid development planning (10.1, 6, ECA).

Recommendation 4:

It was the intention of ECA to devote a specific portion of this Study to examining and developing the role of air freight transport in the Sahelian Zone countries, in order to minimize the problems caused by the landlocked nature of the area and to be able to mobilize capacity effectively in time of urgent need. Unfortunately this work was not carried out due to a limitation in resources, and such a specific study should be made in the near future to complement the work so far accomplished (4.6, ECA - see also Recommendation 8).

Recommendation 5:

It is evident that Africa requires a more carefully thought out air freight rate structure, and a review of all international rates should be commissioned (11, AFCAC).

Recommendation 6:

Associated with rate structure developments, contract systems between shippers and airlines with associated default penalties should be introduced to increase utilization of currently wasted capacity on combination aircraft (11, Governments).

Recommendation 7:

A joint ECA/UNIDO research and development programme into packaging for air freight in Africa should be established (10.7).

Recommendation 8:

Feasibility studies should be carried out for the establishment of bonded air-sea entrepot points to serve transcontinental and landlocked country requirements (12.5, ECA).

Recommendation 9:

The Africa and International Trade Centres should launch a comprehensive survey of demand for African air freightable products (as defined in this Report) in countries in Africa not covered by this Study, and, more particularly, in countries outside the Region (12.10, 5.3).

Recommendation 10:

In order to organize a programme of implementation of the major recommendations of this Study, ECA, OAU and AFCAC should meet to discuss detailed proposals and if possible set up a work programme by the end of 1975. To monitor and co-ordinate strategic developments and establish a programme of feasible priorities a standing working group should be established, comprising representatives of ECA, OAU, AFCAC and the African Development Bank (ADB), together with two or three interested member States (one of whom would be invited to chair the group). Invited to attend the meetings of the group as Observers would be AAFRA, IACA, IBRD, ICAO, UNDP and the embryo freight charter organizations in the Region. The freight charter organizations need to get together to solve immediate problems while more permanent machinery is established. ECA will continue to work with the other international agencies concerned on the non-aviation aspects (12.11, ECA).

Less formal but nevertheless important recommendations are also made in the text of this report. For example, integration of space control systems by African airlines could increase capacity utilization and provide an improved service to the customer, particularly on combination aircraft (10.1, AAFRA). Similarly, pooling of handling and/or sales agents in countries outside the Region should give African carriers a stronger negotiating and priority position (12.4, AAFRA). There is also a need for establishing an African federation of air freight forwarders, with a view to developing an intra-African network (12.8, ECA). At present air freight forwarders often work under difficult conditions, which could be improved by the development of further bonded freight 'villages', where agents may consolidate and break down loads (12.8, Governments).

Many of the constraints on air freight development in the Region have already been recognized and relevant organizations have work programmes for improvements. In this context, ECA fully supports the work being carried out by AFCAC on facilitation (with ICAO, 10.3), bilateral agreements on traffic rights (10.4) and air freight and air mail (7).

Obviously there are further aspects indirectly related to the aviation sector which this report has been unable, and indeed not been intended, to examine in detail. For example there are the constraints of the lack of trade agreements in Africa (5.3), inhibiting terms of trade (5.1), and the existence of import tariff and sanitary barriers (see 5 and especially 12.6). Nevertheless, some discussion is made of these subjects, and it is hoped that this Report will provide a stimulus to progress in these areas by the agencies and Governments concerned.

#### SECTION 4. ECONOMIC BACKGROUND

A brief introduction to the economic characteristics of the Region is given below as it is important to assess the mechanics of development in general before evaluating the rôle which aviation can play in such development. More detailed analysis is given in the individual country reports of volume II. To avoid duplication, much of the information in this Section has been selected from ECA's 'Survey of Economic and Social Conditions in Africa, 1974,' which is listed as Reference in annex I.

The African Region (excluding South Africa) consists of 42 independent States, plus a number of dependent territories, covering about 21 per cent of the world's land area. It has a population of about 370 million, or 9 per cent of the world's total, widely distributed over the Region, and the regional share of most economic indicators lies between 1 and 3 per cent, that of GNP being  $2\frac{1}{2}$  per cent. Of the 25 least-developed countries in the world, 16 are in Africa, and no less than 10 of these are landlocked and all are separated by vast distances from their main trading partners.

The external trade and economic performance of countries in the African Region are influenced very greatly by the situation of the world market for a limited number of commodities which are the basis of their continued economic well-being. The share of the twenty most important agricultural and mineral commodities in the exports of ECA member States was 80 per cent in 1973 and the proportion was probably higher in 1974. These twenty commodities earned \$US15.2 billion in 1973 and the total GDP of the countries concerned was about \$US70 billion. When the prices of these export commodities are good and output is satisfactory, then Governments in the Region have buoyant revenues, their external payments are much easier to balance and their economies have good prospects for realistic growth. When the reverse applies, then many economic problems are created.

During the period 1970-1973, ECA member States achieved an average annual rate of growth of their GDP of 4.6 per cent. The Region thus failed to reach the target of 6 per cent set in the International Development Strategy, and the related target of 3.5 per cent per capita which allows for a population growth rate of 2.5 per cent a year. This was in contrast to the experience of all developing countries in the world which as a group managed to exceed slightly the target growth rate with a growth rate of 6.1 per cent a year. The overall growth is an average of very wide divergencies in the growth rates for individual countries. For example, between 1970 and 1973 only 11 countries managed to exceed the target growth rate, and a further 9 had annual growth rates between 4.1 and 6 per cent. By contrast 4 countries had negative growth rates in this period, and in 6 others the annual increase was 2 per cent or less. An important factor underlying these modest rates of growth is the general lag in agricultural production, despite the continent having enormous land areas and a very high land/population ratio.

Despite the low per capita income level, the average rate of gross national savings is relatively high, reaching 18.8 per cent in 1972. The rate of investment as a proportion of the GDP in Africa increased from 19.8 per cent in 1970 to 22 per cent in 1972, and probably increased further in 1973. The share of fixed capital formation in the GDP in Africa is higher than that of the developing countries as a group and it is increasing at constant prices at about 7 per cent per year.



#### 4.1 Agriculture

In Africa the poor food supply situation has in recent years been aggravated by a number of factors. In addition to bad weather, there have been certain ecological changes such as the advance of the desert into the Sahelian Zone. It has also been difficult to effect widespread adoption of technology to improve agriculture. Rapid population growth has also been upsetting the food supply/demand balance in the Region.

Available information indicates that total agricultural production in developing African countries increased by 3 per cent in 1971, by a mere 1 per cent in 1972, and declined by 2 per cent in 1973. Production per capita recorded zero growth in 1971, a 2 per cent decline in 1972, and another decline of 4 to 5 per cent in 1973.

In terms of the contribution of agriculture (including livestock, forestry and fishing) to the GDP, the average rate of growth for the Region in the period 1970-1973 was just over 1 per cent per annum, which was much below the target for the decade.

Aggregate food demand in Africa is expected to increase at a relatively high rate due to increases in population and per capita increase. This is particularly true of the livestock sector, and has already led to the development of substantial shipments within the continent of beef (some by air, see sections 9.1.2 and 9.2.2.) to complement the exports from the Region.

#### 4.2 Manufacturing Industry

Manufacturing industry in ECA member countries expanded at an average annual rate of 7.2 per cent between 1970 and 1973 and did not quite achieve the growth target of 8 per cent. Achievement levels varied widely between individual countries. In 18 countries actual growth rates exceeded the target and 6 additional countries achieved annual growth rates of 5 to 7 per cent. In a further 15 countries the results were disappointing as the rates of increase remained below 5 per cent.

There is some evidence that countries with higher increases per head were able more easily to achieve the target growth rate for manufacturing production. The impact of the poor agricultural seasons in individual countries in 1972 and 1973 is also readily seen in low growth rates in manufacturing industry. The latter point is fairly easily understood when it is realized that a significant proportion of the industry in developing Africa is involved in processing agricultural products.

The World Bank qualifies a non-industrial country as one in which manufacturing contributes less than 20 per cent of the value added of the commodity producing sectors. Against this definition 26 out of 42 ECA member countries in 1970-1973 were non-industrial countries. Of the remaining 16 countries some have begun to move into the more complicated manufacturing process with the aim of substituting imports of intermediate goods and some relatively simple capital goods with local products. There is also an important sector producing exportable manufactures in such countries. However, in general, manufacturing industry in developing African countries is still basically oriented to import substitution of consumer goods and processed agricultural products rather than production for export.

The mining sector has not experienced much growth since 1970 and the production figures of the more important minerals for ECA member countries show that crude petroleum output fell from 302.3 million tons in 1970 to 286.4 million tons in 1973, that gold production was reduced from 29.5 thousand kg. to 26.8 thousand kg. between 1970 and 1972, and that the tin content of the ore produced fell from 16,500 to 15,400 tons from 1970 to 1973. Most other minerals recorded increases, with particularly significant rises in the production of copper from 1.12 million tons to 1.26 million tons and phosphate rock from 20.2 to 26.0 million tons. However, the weight of crude petroleum in the total output of minerals would mean that the sector as a whole recorded little in the way of an overall increase between 1970 and 1973.

#### 4.3 Money supply and inflation

There were accelerating rates of inflation in most African countries in the period 1970 to 1974. Some significant part of this inflation has been imported. The level of exports of developing countries is a function of the GNP of the developed countries and since import capacity is directly linked to export earnings, developing countries are affected by the cyclical fluctuations and general price inflation in developed countries. While in OECD countries consumer prices increased by 4.7 per cent in 1972, 7.7 per cent in 1973, and significantly higher in 1974, some 60 per cent of ECA member countries had higher rates of increase of consumer prices in those years. Between March 1973 and March 1974 the rise in consumer prices was more than 15 per cent in 12 out of the 23 African countries for which there are data. Rapid expansion in money supply contributed greatly to the rise in domestic prices in many African countries, the prime cause being the expansion of bank credit to both public and private sectors.

#### 4.4 External trade and payments

During the period 1970-1973 total exports from ECA member countries in national currencies rose at an average annual rate of 12.5 per cent and imports at 13.8 per cent. These rates are higher than the average annual growth rates of 10.8 per cent for exports and 11.3 per cent for imports measured in SDRs, but lower than the growth rates of 17.6 per cent for exports and 18.2 per cent for imports measured in US dollars.

While impressive, the trade performance of developing African countries was more modest than the achievements of other developing regions. The excellent export performance of the developing world as a whole, including Africa, from 1970 to 1973 was due mainly to the upsurge in economic activity in the developed countries and the resulting boom in world commodity prices. The rapid export expansion in Africa has been offset in many countries by an equally rapid rise in import values partly because of the increased need for imports of machinery and transport equipment and partly because of inflation in developed countries. In 1973, 23 countries had balance of trade deficits, as against 25 in 1970.

Developed market economies remain developing Africa's major trading partners, partially due to maintenance of traditional metropolitan linkages, although their share in Africa's exports declined from 81.7 per cent to 77.3 during 1970-1973, while their share in Africa's imports increased from 76.6 per cent in 1970 to 78.6 per cent in 1972. Developing market economies accounted for 10.1 per cent of Africa's exports and 13.5 per cent of imports in 1972. Socialist economies increased their share of the Region's exports from 7.3 per cent to 8.6 per cent between 1970 and 1973, but their share in total imports fell to 8.9 per cent from 9.9 per cent.

Only 5 to 6 per cent of recorded trade of developing African countries is between them. Of the total recorded value of intra-African trade, 32.7 per cent was in manufactured products in 1972, and 18.7 per cent in mineral fuels, including petroleum. A significant additional amount of trade, mainly in live animals, fish products and smuggled goods, goes on between African countries but is not recorded.

While the overall external trade situation of ECA member countries taken as a group is currently improving, the position of the non-oil-producing States is worsening quite drastically. In many countries there will be a very real problem of financing their deficit.

Developing African countries as a group recorded an overall surplus of \$US1 billion in their basic balance of payments in both 1970 and 1971, largely as a result of capital inflows. Non-oil-producing countries as a group recorded a basic deficit of \$US0.2 billion in 1971, a small surplus of \$US0.3 billion in 1972 and another surplus of \$US0.2 billion in 1973. For these countries, there was a current deficit throughout the period, attributable mainly to service payments.

The balance of payments statistics show that the developing countries of Africa make large net payments on invisibles, that is for services provided by other countries. The need to make such payments offsets the surplus or increases the deficit on the visible trade account. The most effective means of moving away from such dependence on the services of other Regions of the world is for the countries of Africa to continue to build up their own services.

Until the early 1960s carrying service between tropical Africa and other parts of the world was undertaken by alien vessels, except in the case of Liberia where such vessels were registered and were therefore considered national and African. Since then many countries have made and are still making attempts to secure the shipping services which carry their principal exports and imports. UNCTAD II supported this endeavour and insisted that developing countries should attempt to carry at least 40 per cent of their freight in their national vessels. In the aviation field, African carriers have a reasonable share of scheduled capacity, but a very low share of charter capacity, a subject which is discussed in Section 8 of this Report. Insurance, re-insurance and export credit financing have a similar history to shipping.

#### 4.5 Special measures in favour of the least developed and landlocked countries

During the period 1970-1973 the 16 countries in Africa designated as least developed, as a group, achieved a rate of growth of GDP of only 4 per cent. This growth rate of 4 per cent was below the average achieved for all ECA member countries as a group (4.6 per cent) and illustrates the basic failure to move many of the least developed countries from their relative poverty in the early years of this decade.

In 1972, the amount of net loans and grants received by the least developed African countries from member countries of the Development Assistance Committee and from multinational sources reached \$US670.6 million, or \$US6.1 per head. This compares unfavourably with \$US9.8 per head for Africa as a whole for the same year. There is, however, evidence that the flow of resources to the least developed African countries from developed countries is increasing.

Probably the real difficulty in the least developed countries is the overwhelming importance of agriculture in their economies. Special measures to transform agriculture are now increasingly needed in these countries, but much more strenuous attempts need also to be made to diversify their economies.

The problems of transit, utilization of port facilities and the allocation of tax revenues are the most prominent among the difficulties facing landlocked countries. Aviation should have an increasing role in overcoming some of the former difficulties, as will be seen from the total distribution cost analysis of annex D, and the individual country reports for such countries as Burundi, Rwanda, Uganda and Zambia in volume II.

#### 4.6 Drought conditions in Africa, 1972 to 1974

In the period 1972 to 1974 the Sahelian Zone countries of West Africa and eleven provinces in Ethiopia experienced severe drought conditions which caused extensive disruption of economic life, and the deaths of many thousands of people. Most of the countries concerned are also classified as least developed.

Large-scale cumulative crop failures and livestock losses have necessitated relief operations on an immense scale. By late 1972 it became obvious that effective organization of relief work was beyond the limited resources of the most affected countries and in March 1973 the representatives of these 6 countries (Chad, Mali, Mauritania, Niger, Senegal and Upper Volta) met in Ouagadougou. A Permanent Inter-State Committee was set up and the international community was alerted. In the same year, Nigeria, with its greater domestic resources, launched its own internal relief operations, including a long term investment programme to assist its badly hit northern provinces.

The relief operations in Ethiopia were more belated and there were serious fatalities before the scale of aid operations was sufficient.

A large part of the emergency food supply for the Sahelian countries has been provided by donor countries and channelled mainly through the Food and Agriculture Organization which has set up a special office for relief operations in the Region. Relief supplies of animal feed, vaccines, seeds, and well-deepening equipment have also been forthcoming.

However, serious problems were encountered in transporting the available supplies from the coastal ports. In the period November 1973 to October 1974 1.15 million tons of food grains were made available to the Sahelian Zone countries, which was slightly less than the loss of production between 1971 and 1973. The transport services were not adequate for the carriage of this large tonnage and the problem became especially acute for less accessible regions in the land-locked countries in the centre of the area. Air transport has played a significant part in the ad hoc movement of relief materials, and in many cases this has led to an increasing recognition of the role it can play in more routine tasks. It was the intention of ECA to devote a specific portion of this Study to examining and developing this role for the Sahelian Zone countries, in order to minimize the problems caused by the landlocked nature of the area and to be able to mobilize capacity effectively in terms of need. Unfortunately this work was not carried out due to a limitation in resources, and it is recommended (4) that such a specific study be made in the near future to complement the work so far accomplished (see also Recommendation 8 and section 12.5).

## SECTION 5. THE INFRASTRUCTURE FOR EXPORTING

5.1 To developed market economies

The International Development Strategy requires that in the early years of the 1970s international agreements should be concluded on issues affecting commodities of export interest to developing countries such as prices, access to markets, diversification, research and development, and marketing. Unfortunately progress made in this area so far in the 1970s leaves much to be desired. Five formal international agreements existed separately on tin, sugar, coffee, wheat and olive oil at the time the International Development Strategy was launched. Of these only the agreement on tin remains a durable instrument of market stabilization. In addition, while the production process is coming increasingly under the control of the exporting countries the terms of sale of the commodities tend to inhibit control of the transportation sector by those countries. There are several high value commodities (including tin ore and tin) which should travel by air to give a maximum net economic benefit to the exporting country, but do not because of such terms of sale; so this is an important factor in this Study.

The obstacles that have stood in the way of progress in international commodity agreements in the recent period underline two important factors, namely the interdependence of trade, finance and monetary matters, and the potential will to negotiate realistically.

With respect to trade in manufactures, the International Development Strategy recommends that the developed market economies should facilitate the entry into their markets of manufactured and semi-manufactured products of export interest to developing countries. The developed countries are further required to establish generalized, non-discriminatory, non-reciprocal preferential treatment for exports of developing countries into their markets. Although manufactures constitute a small proportion of the export trade of African countries to the developed market economies at the present time, the implementation of these provisions would greatly benefit their export diversification efforts and provide a basis for expanded trade.

Several improvements have taken place in the General System of Preferences which represent the main instrument by which developed countries either individually or through regional economic groups are implementing the commercial provisions of the Strategy. The schemes have had a favourable impact on the export trade of several developing countries. Most of the schemes, however, need to be expanded to include more products of export interest to developing countries. They also need to be cleared of several uncertainties inherent in them which have been used to hold back trade liberalization.

Other constraints on exports to developed-market economies of critical importance to the aviation sector are psychological barriers against African products, and sanitary regulations. Aviation could be used as a tool to break down the former prejudices, by the sending of sample shipments without investment in a costly distribution network. As far as the sanitary regulations are concerned, they have a significant impact on the export of fresh or frozen meat, fruit and vegetables, these being major air exports from the Region, and are discussed in Section 9.1. Many of the regulations are justifiable, but prove costly to meet due to the agricultural infrastructure development requirements, and are likely to lead to concentration on alternative export markets, at least in the short-term.

## 5.2. To the Socialist countries of Eastern Europe

Trade between African countries and the socialist countries of Eastern Europe in the 1960s represented a small proportion of the total trade of the two groups of countries. The pattern has not changed much during the first years of the 1970s. There has in fact been a deceleration in the rate of growth of trade between the two groups of countries in the early years of this decade. The bulk of the trade is with North African countries which, because of geographical proximity and better transportation links, have established well-developed frameworks for trade and economic co-operation with the Socialist countries of Eastern Europe.

## 5.3. Within the region

The importance of economic co-operation and integration is widely recognized in the African Region. By 1973, eight formal multipurpose economic groupings were operating in the Region. In addition there were several specialized institutions that were concerned with specific economic sectors. Co-operation efforts have largely been directed at achieving greater trade liberalization. Some progress has also been made in the expansion of productive capacity and in the promotion of common marketing policies. However, recorded intra-African trade still accounts for no more than 6 per cent of the external trade of the Region.

Bilateral trade agreements are increasingly being resorted to as a means of expanding intra-African trade, while co-operation in payments and monetary matters is being fostered by the Association of African Central Banks. Nevertheless, the bilateral agreements are limited in the number of countries they cover, and are usually associated with neighbouring countries only. Several major air trade initiatives have broken down purely due to the inability to agree on financial arrangements.

The maintenance of metropolitan linkages referred to above also restricts intra-African trade, due to the import regulations and tariff barriers imposed. In fact, some of the economic groupings referred to above prove to be severely restrictive on trade with other African countries. Since government revenues in developing countries come substantially from import and export taxes, due to the administrative difficulty of collecting other forms of taxation, these barriers can be administratively complex as well as financially severe. Hence existing importers and exporters are not inclined to explore new and more difficult markets.

Further constraints on intra-African trade development are the lack of information about other African market opportunities, and lack of impetus in marketing and export promotion. These are problems on solving which ECA is putting great emphasis. The Africa Trade Centre has established a Trade Promotion Advisory Service, which has helped to set up the Association of African Trade Promotion organizations. The Africa Trade Centre is also concerned with trade information and documentation, market research, and export credit financing. At present there is no export credit financing or guarantee scheme in the Region, but there is a substantial and urgent need for African developing countries to introduce such schemes. Preliminary positive studies have been carried out in Kenya and Nigeria, and plans are in hand for extension of these to other parts of the Region.

In the course of this ECA Study it was found that chambers of commerce were generally weak on development apart from through traditional channels of trade, having little knowledge of possible intra-African developments and unaware of the possibilities of air freight.

While some experts feel that the above barriers need to be broken down before significant intra-African air (and surface) trade can be established, the evidence of this Study is the reverse. A large number of ad hoc agreements including air transportation have already made breakthroughs, and are showing the way to the establishment of more formal relationships. In addition, air transportation, by its very nature, is able to cut across the geographic limitations and provide direct links between areas with differing production due to their differing climatic conditions.



## SECTION 6. SURFACE TRANSPORT INFRASTRUCTURE AND OBJECTIVES

The opening up of countries through the expansion of transport networks has been a stimulus to economic and social change. It may be an exaggeration to say that modern transport precedes change, but easier access to previously neglected and underdeveloped areas in individual countries has certainly facilitated the processes of change. However, at present Africa has low surface transport capacities represented by 70,000 kilometres of railway 100,000 kilometres of surfaced roads and 10,000 kilometres of navigable waterways.

The frontispiece map indicates a general view of the surface transport infrastructure in Africa, existing, under construction and projected. The major routes, particularly those of railways, were constructed during the colonial era with the strategic purpose of penetrating inland to convey the produce of the country to a specific seaport, and hence to the colonizing State. As a result of this, most of the young African nations have to overcome the lack of comprehensive land transport networks as well as the inherited monostructures of their economies. The intra-African gaps are evident from the map, and intensive efforts are being made to close them. However, the physical difficulties of the terrain, insufficient en route route multiplier effects due to current low population densities and, in the case of railways, the difference in gauges and types of equipment, are proving difficult obstacles.

Special mention should be made of the work of the African Highways Bureau in the Economic Commission for Africa. The major project of this Bureau is the co-ordination of development of the Trans-African Highway. The itinerary of this highway, as shown on the frontispiece map is Mombasa-Nairobi-Kampala-Kasindi-Kisangani-Bangassou-Bangui-Tibati-Ekok-Enugu-Benin City-Lagos. Much of the highway in East Africa and Nigeria is already of all-weather standard, for the most part bitumen-surfaced. However, improvements, mainly widening and strengthening of the road, are necessary and under way on several of these sections. Elsewhere, the highway is almost entirely a poor earth road. Pre-feasibility studies on the whole road have been made, and feasibility and engineering studies are being undertaken, the section in each country being carried out under separate bilateral aid agreements. Further studies are under way on formalities such as legal, customs, visa requirements, vehicle dimensions, currency and insurance; as well as on auxiliary services such as petrol supplies and maintenance. While the African Governments concerned are not financially committed at present, they are involved through regular co-ordinating meetings, as are donor countries and interested neighbouring countries. The main traffic flows generated by construction of the Highway are expected to be between neighbouring countries, rather than along longer distances.

The Trans-African Highway project is also concerned with establishing feeder links from nearby countries, which could prove important in establishing trade links not only along the line of the Highway, but also between the contiguous countries concerned. The experience derived from the Trans-African Highway has led to an expansion of the work programme of the African Highways Bureau to consider a Trans-West African Highway (an extension of the Trans-African Highway from Lagos to Dakar) and a Trans-East African Highway (from Gaberone via Nairobi to Cairo). Work on these projects is, however, at an early stage. ECA initiated some 10 years ago plans for a Trans-Saharan Highway in West Africa, and the road is now under construction, with work co-ordinated by a committee from the participating countries of Algeria, Mali, Niger and Tunisia, based in Algiers.



Notable railway developments include the Tan-Zam Railway between Dar es Salaam and Zambia's copperbelt. This railway, with development financed by the People's Republic of China with an interest free loan, is substantially complete, and in fact trains are operating along the full length of the Tanzanian section. In the short term, the port of Dar es Salaam will continue to be a bottleneck until its capacity and facilities are expanded to meet the need of Zambia's foreign trade. Another feature of development is the construction of a rail link and river bridge between Ilebo and Kinshasa in Zaire, to be linked with a new deep sea port. This link will reduce dramatically the transshipment problems and transit delays for the mineral-rich south eastern areas of Zaire, as much current traffic has to travel by river for part of its journey. Other major rail projects shown in the frontispiece map are at purely tentative stages.

The African share of maritime loadings, even allowing for the massive exports of the oil producing countries, is relatively high compared with other economic indicators. The main reasons for this derive from the Region's geographical location and its pattern of international trade. Statistical data on maritime trade are, however, scanty. In addition, vessel flow is uneven, and when added to the general shortcomings of ports' operation, leads to severe congestion, currently affecting almost every major port in Africa south of the Sahara. Such congestion is increasing the level of freight rates and port storage charges, and affecting the situation regarding the balance of payments of individual countries.

It will be seen from the above that the relative costs of inland transport are high. As an example, the UNDP-sponsored Eastern African Shipping Study assesses an average transportation cost of shipping products from landlocked areas of Eastern Africa to Europe as 8 per cent of the value of the product from origin to coastal port, and only 4 per cent from coastal port to European destination. In addition maritime shipping costs, partially as a result of the recent fuel crisis, are rising fast (faster than those for air transport). Thus even in a long-term, steady-state situation, the case for the use of air transport, particularly for the landlocked countries, will remain strong in Africa, as shown in the total distribution cost analysis of annex D.

As a preview to Section 9 on International Air Freight Potential, a brief analysis of the effect of the above infrastructural surface transport developments was carried out. It was found that few, if any, of the road network developments would significantly affect air freight potential, the difference in transit times remaining great, although the two railway developments mentioned could have significant impact when completed and associated with satisfactory port facilities. Planned improvements in surface distribution links for the Sahelian Zone may reduce marginally air import potential for the countries concerned, but a specific study needs to be carried out (see Recommendation 4 and Section 4.6) and consideration given to alternative sea-air transportation routes than the present ones from the South and West (see Recommendation 8 and Section 12.5). These aspects are discussed in the individual country reports (i.e., Tanzania, Zaire, Zambia). On the other hand, the increased economic and trade activity deriving from the developments could even stimulate air freight traffic. This comment applies also to the reopening of the Suez Canal, which could offset some air exports from East to North Africa, and which is discussed in Section 10.1.

Despite the considerable efforts of African countries to develop transport and communications in recent years, in many countries the funds set aside for this work

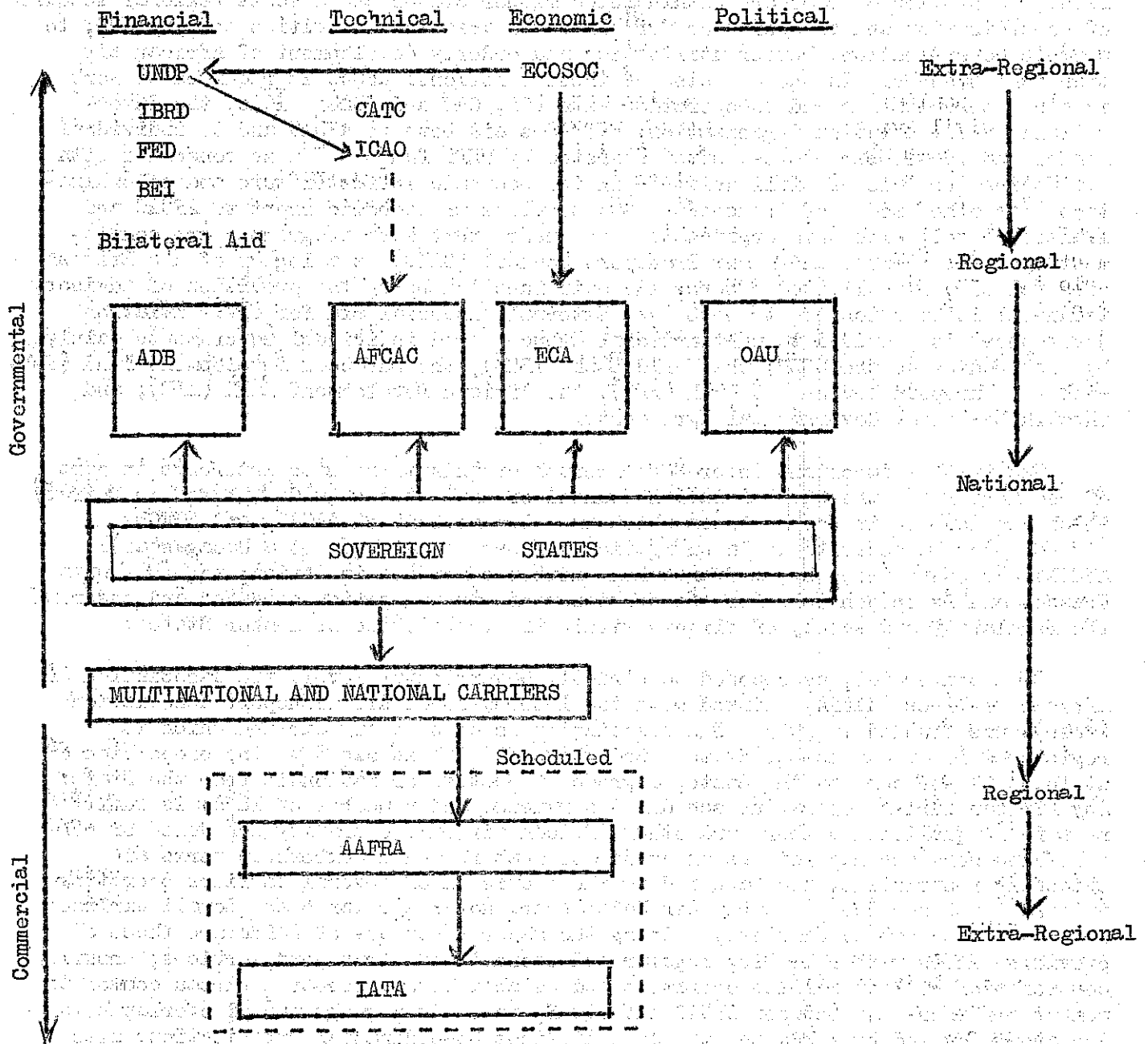
have been insufficient. During the period 1970-1973, expenditure on the development and maintenance of transport and communications in ECA member States expanded at an annual rate of about 10 per cent in real terms. There is, however, considerable disparity in the distribution of such expenditure between the subregions. Whereas in the North African subregion, with relatively large financial and skilled manpower resources, such expenditure increased at an annual rate of 14.3 per cent, in the Central African subregion the increase was only 3.6 per cent per annum, and in the East and West African subregions the annual increases were 7.1 per cent and 7.3 per cent respectively. Table 1 below indicates the growth of transport services in developing Africa between 1960 and 1972:

Table 1: Growth in transport services in developing Africa, 1960 to 1972

Transport mode	Unit of measurement	1965	1970 (1960 = 100)	1971	1972
Road	Vehicles in use:				
	All	133	173	187	203
	Commercial	129	179	201	217
Rail	Freight (ton-km)	146	178	170	176
	Passenger km	144	169	175	183
Sea	Freight loaded (tons)	318	681	634	642
	Freight unloaded (tons)	121	153	170	170
Air	Freight (ton-km)	242	487	545	570
	Passenger km	186	334	384	418

## SECTION 7. CIVIL AVIATION ORGANIZATION IN THE REGION

The chart below indicates the inputs to and organization of civil aviation in the Region.



The executing agency for technical co-operation in the Region is AFCAC, the African Civil Aviation Commission, which was founded in January 1969 as the result of a joint work programme between ECA (United Nations Economic Commission for Africa) and the OAU (Organization of African Unity). AFCAC is enjoined by its constitution, first, to provide a framework within which member States can discuss regional measures of co-ordination and co-operation for all civil aviation activities and, second, to promote co-ordination, better utilization and orderly development of African air transport systems. In the exercise of these functions, AFCAC is required to work in close consultation and co-operation with ECA, OAU and ICAO. ICAO, the International Civil Aviation Organization, provides aid both to AFCAC and to individual member and non-member States, often assisted by UNDP funds. ECA is concerned with evaluating the role of civil aviation in the economic infrastructure and co-ordination with other modes of transport. ECA provides an economic input to AFCAC and liaises closely with this organization to ensure that work programmes are complementary. The Commonwealth Air Transport Council (CATC) is a legacy of the British colonial era, with limited powers, its main function being the provision of advisory technical information to its members. External financial aid for civil aviation development is provided to multinational agencies and individual Governments mainly by such bodies as the UNDP, the World Bank (IBRD), the European Development Fund (FED) with the European Investment Bank (BEI), the African Development Bank (ADB), and through bilateral Governmental agreements.

Two further important inter-Governmental organizations with interests in part of the Region are the Civil Aviation Council of Arab States (CACAS, based in Beirut) which has members in North Africa which are also members of AFCAC, and ASECNA (Agence pour la sécurité de la navigation aérienne en Afrique et à Madagascar). ASECNA was established by 14 francophone member countries in Africa, together with France, and is responsible for the provision of air navigation services and ensuring the regularity and safety of flights within the territories of member States.

On a commercial, as opposed to strictly Governmental level, the Association of African Airlines (AAFRA), linked with the International Air Transport Association (IATA), was founded in 1968. The Association is open to any airline which is registered in an OAU member State, and whose capital is owned to the proportion of at least 51 per cent by the State, a group of States, or nationals from the State. Any African airline operating scheduled services, and a member of IATA, is admitted as a fully qualified member, and other African airlines operating scheduled or non-scheduled services may join as an associate member. Such membership terms are evidently restrictive, and have led to the exclusion of several carriers operating international services (notably Air Madagascar, Royal Air Maroc and Somali Airlines as non-IATA scheduled carriers). Among the major functions of AAFRA are those of providing users with reliable, regular and economic air transport services, ensuring co-operation between airline operators and establishing a research bureau common to member airlines. As between AFCAC and CACAS, there is a geographical overlap between the areas covered by AAFRA and the Arab Airlines Co-ordination Organization, also based in Beirut. The International Air Carriers Association (IACA) was established to represent the interests of charter carriers worldwide, but it is mainly concerned with passenger operations and has few links with Africa. There is obviously room for an agency concerned with air charter development, although this role could be played by AAFRA if it were to break away from IATA. IATA has recently opened its ranks to non-scheduled operators, but the latter have been reluctant to join, fearing that they might be swallowed up by an international cartel. The Association des Transporteurs Aériens de la Zone Franc (ATAF), based in France, has members in North and West Africa and has developed its own rate structure (see Section 11).

Many of the national carriers are aided directly by non-African carriers under management contracts. Such agreements have not always been successful, the airline from which the management staff are drawn not necessarily being suitable for the following reasons:

- (1) The foreign airline itself having an interest in routes served by the indigenous airline;
- (2) The foreign airline being domestic, staff having no experience of international operations;
- (3) The experience of large-scale operations being different from that required in developing countries;
- (4) The foreign airline staff speaking a different language from the indigenous airline staff.

There are nevertheless creditable exceptions to the management contract experience, even if drawbacks as above have existed.

ICAO has recommended that each member State establish a National Facilitation Committee. As at November, 1974, these had been established in Ethiopia, Kenya, Libya, Madagascar, Mauritius, Sudan, Tanzania and Uganda in the Eastern African zone. Further committees are planned (e.g., in Egypt) and most countries have formal or informal national committees which deal with facilitation matters, though not necessarily specifically.

In order to follow up the ICAO study on Air Freight and Air Mail, AFCAC has been urging member States to form national air freight and mail working groups, and to produce improved statistics. Thirteen States had by November 1974 responded to the AFCAC Bureau's request, and the group established by one State at least has published findings and recommendations for action by its Government. Up until now, however, air freight has not been considered specifically in terms of regional or subregional co-operation.

Table 2 shows the membership by ECA States of directly relevant multinational civil aviation organizations:

Table 2: Membership of multinational civil aviation organizations as at October, 1974

ECA member State	ICAO?	AFCAC?	CATC?	National IATA?	Carrier	Member AAFA?
Central African Republic	Yes	Yes	}	Yes	(Air Afrique)	Yes
Chad	Yes	Yes				
Congo	Yes	Yes				
Dahomey	Yes	Yes				
Gabon	Yes	Yes				
Ivory Coast	Yes	Yes				
Mauritania	Yes	Yes*				
Niger	Yes	Yes				

\* Yet to deposit instruments of ratification with OAU.

Table 2: (Cont'd)

ECA member State	ICAO?	AFCAC?	CATC?	National Carrier IATA?	Member AAFRA?
Senegal	Yes	Yes	}	Yes (East African Airways)	Yes
Togo	Yes	Yes			
Upper Volta	Yes	Yes			
Kenya	Yes	Yes	Yes		
Tanzania	Yes	Yes	Yes		
Uganda	Yes	Yes	Yes		
Algeria	Yes	Yes		Yes	Yes
Botswana	No	No	Yes	No	No
Burundi	Yes	Yes		No	No
Cameroon	Yes	Yes		Yes	No
Egypt	Yes	Yes		Yes	Yes
Equatorial Guinea	Yes	No		No	No
Ethiopia	Yes	Yes		Yes	Yes
Gambia	No	No		Not International	
Ghana	Yes	Yes	Yes	Yes	Yes
Guinea	Yes	Yes*		Yes	Yes
Lesotho	No	Yes	Yes	No	No
Liberia	Yes	Yes		Not International	
Libya	Yes	Yes		Yes	Yes
Madagascar	Yes	No	No	No	No
Malawi	Yes	Yes	Yes	Yes	Yes
Mali	Yes	Yes		Yes	Yes
Mauritius	Yes	No	Yes	Not International	
Morocco	Yes	Yes		No	No
Nigeria	Yes	Yes	Yes	Yes	Yes
Rwanda	Yes	Yes		No National Carrier	
Sierra Leone	Yes	Yes	Yes	No	No
Somalia	Yes	Yes		No	No
Sudan	Yes	Yes		Yes	Yes
Swaziland	No	Yes	Yes	Not International	
Tunisia	Yes	Yes		Yes	Yes
Zaire	Yes	Yes		Yes	Yes
Zambia	Yes	Yes	Yes	Yes	Yes

## SECTION 8: SOME CURRENT AIR FREIGHT OPERATIONS IN THE REGION.

From the economic indicators introducing Section 4 and from the observations on surface transport infrastructure made in Section 6, it might be imagined that air transport is well-developed in the Region. And yet the 29 member States reporting to ICAO for 1972, providing the bulk of air transport movements in the Region, contributed only 6.7 per cent of aircraft movements, 5.0 per cent of loaded freight, 5.4 per cent of unloaded freight and 6 per cent of mail, compared with the total data produced by 95 reporting countries. In terms of traffic carried by IATA airlines in 1972, African traffic (which includes South Africa) represented 7.4 per cent, 7.6 per cent and 4.9 per cent of passengers, freight and mail respectively, in terms of ton-kilometres performed for inter-regional traffic and only 2.2 per cent, 2.2 per cent and 1.9 per cent respectively for intra-regional operations.

It is evident, therefore, that air transport in Africa, particularly internally, remains undeveloped relative to other Regions. It is also undeveloped relative to other modes of transport. For example, the regional share of loaded seaborne goods is 11 per cent and of unloaded seaborne goods is 3 per cent, and over 95 per cent of all the freight ton-kilometres generated by regional international trade are handled by maritime transport, less than 0.1 per cent being handled by air transport.

In 1974, it is estimated that airlines based in the Region operated some 277 transport aircraft weighing over 9,000 kg., on commercial operations. These consisted of 100 jets (with a further 10 on order), 80 turbo-props and 97 piston-engined types. Of these only 22 normally operated in a freight configuration (3 jets, 4 turbo-props and 15 piston-engined types), although a few further aircraft operated in mixed configuration, and some aircraft predominantly used in passenger configuration are occasionally converted to mixed or all-freight configuration (especially in the horticultural export season). There are 25 convertible jet aircraft in the Region, with a further 4 on order. Also, 4 of the nominally passenger jet aircraft are wide-bodied with significant freight capacity in their bellyholds. It will be seen from the above, however, that freight operations by African carriers are few (with the exception of Air Afrique, as will be shown below). The real need for the carriage of African air exports is for all-freight semi-scheduled operations, as will be discussed in Section 12.2, and for this reason and for simplicity, the capacity available from narrow-bodied aircraft in passenger configurations (limited particularly by the 'hot and high' conditions prevailing in much of Africa) is excluded from the analysis below. As will be reiterated in Section 12.2, it goes without saying that such capacity, being of marginal cost, should be filled before the use of all-freight or mixed aircraft is invoked.

### 8.1. Scheduled operations

The following all-freight scheduled international operations touching the Region existed in mid-1974. Asterisks indicate regional-based carriers.

\*Air Afrique: Operating Douglas DC8F aircraft weekly as follows (origins/destinations given as Paris for convenience):

- (1) Paris-Bordeaux-Niamey-Abidjan-Bamako-Ouagadougou-Paris.
- (2) Paris-Ndjamena-Bangui-Brazzaville-Douala-Ndjamena-Mulhouse-Paris.

(3) Paris-Niamey-Abidjan-Ouagadougou-Niamey-Lyon-Paris.

(4) Paris-Ndjamena-Douala-Libreville-Dakar-Paris.

(5) Paris-Bordeaux-Ndjamena-Bangui-Brazzaville-Libreville-Douala-Bangui-Ndjamena-Marseille-Paris.

A further service operates Ndjamena-Kinshasa-Douala.

Air France: Operating Boeing 707-328C aircraft weekly as follows:

(1) Paris-Djibouti-Réunion-Tananarive-Djibouti-Paris.

(2) Paris-Marseille-Djibouti-Réunion-Mauritius-Djibouti-Paris.

(3) Paris-Jeddah-Djibouti-Paris.

The first two services sometimes divert on the northbound route to pick up fruit and vegetables from Nairobi during the horticultural export season.

Alitalia: Operating Douglas DC8-62F aircraft once-weekly on the route Rome-Addis Ababa-Lusaka-Nairobi-Tripoli-Rome, and Douglas DC9-30F aircraft twice-weekly on the route Rome-Tripoli-Tunis-Rome.

British Caledonian: Operating Boeing 707-320C aircraft once-weekly on the route London-Tripoli-Entebbe-Nairobi-Lusaka-Nairobi-Benghazi-Frankfurt (on demand) - London.

Lufthansa: Operating Boeing 707-330C aircraft once-weekly on the route Frankfurt-Nairobi-Johannesburg-Nairobi-Cairo-Frankfurt. Lufthansa proposed to introduce a further 707-330C once-weekly on the route Frankfurt-Dakar-Sao Paulo and return from April 1975.

Pan American: Operating Boeing 707-320C aircraft once-weekly on the route New York-Monrovia-Kinshasa-Johannesburg and return.

Trans Mediterranean: Operating Boeing 707-320C aircraft once-weekly on the route Beirut-Ndjamena-Lagos and return (suspended temporarily in 1975), twice-weekly Beirut-Khartoum and return, once-weekly Beirut-Tripoli and return, and once-weekly Beirut-Benghazi and return.

UTA: Operating Douglas DC8-55F aircraft weekly as follows: (origins/destinations given as Paris for convenience):

(1) Paris-Marseille-Libreville-Johannesburg-Libreville-Paris.

(2) Paris-Lagos-Libreville-Douala-Bangui-Tripoli-Paris.

(3) Paris-Libreville-Douala-Ndjamena-Marseille-Paris.

(4) Paris-Ndjamena-Bangui-Brazzaville-Douala-Ndjamena-Niamey-Tripoli-Paris.

(5) Paris-Niamey-Libreville-Brazzaville-Paris.

(6) Paris-Niamey-Ouagadougou-Abidjan-Bamako-Paris.

(7) Paris-Douala-Lusaka; Douala-Libreville-Brazzaville-Douala; Douala-Ndjamena-Tripoli-Paris.



A further DC8-55F service was inaugurated in January 1975, in conjunction with Air Zaire, between Paris and Kinshasa.

\*Zambia Airways: Operating Douglas DC8-62F aircraft in conjunction with Alitalia once-weekly on the route London-Rome-Lusaka-Rome.

In addition, \*Air Algerie (Boeing 737-200), \*Cameroon Airlines (Boeing 737-200), \*Ethiopian Airlines (Boeing 707-320C) and Sabena (Boeing 707-320C) operate aircraft on scheduled services in mixed configuration carrying pallets or containers on the upper deck. The Air Algerie (2 round trips weekly) and Cameroon Airlines (8 round trips weekly) services are subregional, and the Ethiopian Airlines operation is once-weekly on the route Addis Ababa-Frankfurt-Paris and return, plus other services according to demand. Sabena operates five round trips between Brussels and African points weekly (the one to and from Nigeria in conjunction with \*Nigeria Airways). Sabena serves the following points (figures in brackets indicating the number of arrivals from Brussels per week):

Abidjan (1)

Bujumbura (2)

Conakry (1)

Dar es Salaam (1)

Entebbe (1)

Kano (1)

Kigali (2)

Kinshasa (1)

Lagos (1)

Monrovia (1)

Nairobi (2)

Niamey (1)

Of course, many carriers are now operating wide-body aircraft between the Region and Europe, including \*Air Afrique (5 round trips weekly using Douglas DC10-30 aircraft) and \*Air Zaire (7 round trips weekly with Douglas DC10-30 and Boeing 747-100 aircraft). The following points are served by wide-bodied aircraft from Europe (figures in brackets indicating the number of arrivals from Europe per week):

Abidjan (4, including 2 by Air Afrique)

Accra (3)

Bangui (1)

Brazzaville (1)

Cotonou (1)

Dakar (8, including 4 by Air Afrique)

Dar es Salaam (1)

Kinshasa (14, 7 by Air Zaire)

Lagos (3)

Libreville (2, 1 by Air Afrique)

Lome (2 by Air Afrique)

Nairobi (13)

Ndjamena (1)

Niamey (3, 2 by Air Afrique)

Nouadhibou (1)

Ouagadougou (1)

## 8.2 Charter operations

As mentioned above, a large number of all-freight operations take place in the Region. Below are listed the foreign carriers known to be operating in the Region and some of the relevant indigenous activities. While some carriers operate very infrequently, others made as many as several hundred flights in 1973 and 1974. Again, the information is limited in that it is obtained mainly from countries covered by the BCA Study.

### 8.2.1 Foreign carriers (IATA Airline non-scheduled operations)

<u>Carrier</u>	<u>Aircraft used</u>	<u>Carrier base</u>	<u>States known to be served in the Region</u>
Aeroflot	Antonov An-12 Ilyushin Il-18	USSR	Uganda
British Caledonian	Boeing 707-320C	UK	Kenya, Uganda, Zambia
JAT	Boeing 707-320C	Yugoslavia	Uganda, Zambia
KLM	Douglas DC8-50F	Netherlands	Uganda
Lufthansa	Boeing 707-330G	West Germany	Zambia
Saudia	n.a. (Boeing)	Saudi Arabia	Ethiopia
Tarom	Boeing 707-320C	Rumania	Sudan
Trans Mediterranean	Boeing 707-320C	Lebanon	Nigeria, Sudan
UTA	Douglas DC8-55F	France	Nigeria, Zambia

### 8.2.2. Foreign carriers (non-IATA non-scheduled operations)

<u>Carrier</u>	<u>Aircraft used</u>	<u>Carrier base</u>	<u>States known to be served in the Region</u>
Airlift International	Douglas DC8-54F, 63F	USA, Belgium	Kenya, Rwanda
Alaska International	Lockheed L-100 Hercules	USA	Botswana, Zambia
CAAC	Boeing 707-320C	China	Sudan
Cargolux	GL-44	Luxembourg	Nigeria, Rwanda Sudan, Uganda, Zambia
Donaldson	Boeing 707-321F	UK	Uganda
Douglas International	Boeing 707	?	Uganda
International Aviation Services (IAS)	Britannia 300	UK	Ethiopia, Kenya Nigeria, Rwanda, Sudan, Uganda, Zambia
Invicta International	Vickers Vanguard	UK	Sudan
Jupiter	Douglas DC6B	Cyprus	Sudan, Uganda
Kar Air	Douglas DC8-50	Finland	Sudan, Zambia
Martinair	Douglas DC8-55F, DC10-30CF	Netherlands	Algeria, Rwanda, Uganda, Zaire
Nordic Air	Lockheed Electra (now sold)	Norway	Zambia
Pacific Western	?	Canada	Sudan
Saturn	Lockheed L-100 Hercules	USA	Zaire
Seaboard	Douglas DC8 series F	USA	Kenya, Sudan
Seambair	CL-44	Netherlands	Zambia
Silver City Sterling	?	USA, Denmark	Sudan
Tradewinds	CL-44	UK	Ethiopia, Kenya, Nigeria, Rwanda, Sudan, Uganda, Zambia
Transmeridian	CL-44	UK	Ethiopia, Ghana, Nigeria, Sudan, Uganda, Zambia

### 8.2.3 Regional-based activities

The giant of air freight in Africa is undoubtedly Air Afrique, which owns a Douglas DC8-55F freighter and a DC8-63CF, which are allocated to a number of routes between various West African and French points (see 8.1 above). Air Afrique also has considerable bellyhold capacity for freight carriage on its Douglas DC10-30 (and has two more of these aircraft on order) as well as on its smaller passenger aircraft. Air Afrique carried 30,793 tons of freight in 1973 and this is expected to grow to 90,000 tons by 1980, a growth rate of 16 per cent per annum. Air Afrique is, of course, the international carrier of 11 African countries: Central African Republic, Chad, Congo, Dahomey, Gabon, Ivory Coast, Mauritania, Niger, Senegal, Togo, Upper Volta.

Of course the Air Afrique operations are predominantly scheduled, but elsewhere charter activities have greater relevance as will be shown below from activities observed during the course of the ECA Study so far. Details of volume and commodities carried are included, where available, in Sections 9 and 12.1, the analysis below being of operations. Data on both volumes and movements is, however, limited.

Botswana. Alaska International carried 10,300 tons of chilled beef and mining equipment to Zambia in 1973. Consideration is being given to the construction of an international airport in Botswana, with the primary function of enabling chilled beef to be exported by air directly to Europe, possibly on a Botswana-registered carrier. Botswana, Lesotho and Swaziland are considering joint activities in civil aviation, possibly to the extent of establishing a joint airline. Recent events in Angola and Mozambique present interesting prospects for the enlargement of this concept.

Chad. A freight airline has been established, with the particular function of carrying chilled meat exports from a new ranching project. The Compagnie de Fret Aérien Tchadienne (Cofair-Tchad), originally formed in September 1972, received authority in March 1974 to operate regular jet freight services between Ndjamena, Cairo and Beirut, although operations have not yet started.

East Africa (Kenya, Tanzania, Uganda). East African Airways, the carrier of the three East African Community countries, leased a Boeing 747 aircraft from Aer Lingus to operate scheduled services once-weekly on the London-Frankfurt-Nairobi route from December 13, 1974 to the end of March 1975. As well as supplying passenger capacity during the peak holiday season, bellyhold capacity was available for horticultural produce on the northbound flights to the major markets. Simbair is the East African Airways non-IATA passenger and freight charter subsidiary. At present, Simbair has no aircraft of its own, and leases space from other companies (including EAA's own Super VC10's). On the freight side Simbair wet leases a C1-44 from Tradewinds during the horticultural export season for use between East Africa and Europe. The VC10s were occasionally operated in 1973 in freight configuration to Zambia, and between Zambia and Europe. Trade reports have indicated that a Trans European Airways A300B1 is to be used for a new freight service in East Africa.

Ethiopia. Ethiopian Airlines uses a Douglas DC6B on freight charter operations, for example to Uganda. Horticultural exports are carried mainly by Saudia and Tradewinds, who usually obtain lucrative cigarette contracts for carriage from the UK to the Arabian Gulf for the outbound leg.

Gabon. Affretair (Compagnie Gabonaise d'Affrètements Aériens) was formed in 1969 as a subsidiary of the Rhodesian airline Air Trans-Africa. Ad hoc and contract freight charter services are operated within Africa and to/from Europe using a Douglas DC8-63CF and a Douglas DC8-50F.

Ghana. Pioneer Airlines formed in March 1973 is a Ghanaian-registered company (with substantial Ghanaian capital) which owns a Boeing 720B aircraft with a Boeing 707-320C on order and carries freight between Ghana and the Sahelian Zone. Gemini Air Transport (Ghana) Ltd., was formed in 1974 as a subsidiary of Gemini Air Transport (Massaw) Ltd., which holds 30 per cent of the stock, with Ghanaian business interests holding the remainder. Gemini Air proposes to carry out scheduled all freight services arising a Britain 300F, initially between Ghana on the one hand and the United Kingdom and West Germany on the other, as well as passenger charters. A sub-committee on Air Freight Planning has recommended that the Government should examine the establishment of a subsidiary non-scheduled airline to complement Ghana Airways' scheduled operations, as well as the possibility of Ghana Airways' acquiring convertible passenger/freight aircraft. Wide-bodied aircraft are under consideration for purchase in the long-term.

Kenya. In addition to the Simbair operations (see East Africa above), there is a Kenyan-registered carrier named African Cargo Airways, formed late in 1973 by a group of personnel formerly of African Safari Airways, another Kenyan carrier. African Cargo took over the African Safari Britanria 313, and, working closely with Simbair, operates freight charter services to and from Kenya, Libya, Sudan, Zambia and Europe. IAS also work closely with Simbair and have an office in Nairobi.

Maghreb. The Maghreb countries (Algeria, Morocco, Tunisia) are working towards the establishment of a joint airline, which may include all-freight operations.

Malawi. One of Air Malawi's two BAC 1-11 475's has occasionally been used for all-freight charters within Africa.

Mauritius. Air Mauritius at present exists as a domestic and ground handling company, but leases space on foreign carrier international services and may acquire its own aircraft in due course (possibly including aircraft for all-freight operations). A recent report for the Government has recommended co-operation with Zambia to obtain northbound charter capacity.

Nigeria. With fast-increasing economic development and associated port congestion, charter operations to and from Europe are reaching substantial levels. Trans-meridian has an office in Nigeria and operates 4/5 services per week, an operational level also reached by Tradewinds. Cargolux maintains some 2/3 services per week, and IAS, which also has an office in Nigeria, has some services. Pan African Airlines (Nigeria) is a Nigerian-registered passenger and freight charter carrier, a subsidiary of African (Dispatch Services Incorporated) of Miami, in the USA. A Douglas DC6 aircraft is used on the longer hauls, and many operations are performed on behalf of the United States Government. A recent development which may provide an insight into the future of air freight is the signing of a long-term agreement between UTA and Peugeot to ferry Peugeot parts between France and a new car assembly centre at Kaduna in northern Nigeria, amounting to 38 tons on each special DC8 flight. By the end of 1975 a daily all-Peugeot service is anticipated, and by 1977, two daily flights, enabling the company to assemble 20,000 cars a year.

Rwanda. A feasibility study has been carried out on the establishment of a national airline, the economic cornerstone of which would be freight operations to and from Europe and East African ports. The problem of imbalance and insufficient overall traffic density is likely to render this venture uneconomic unless it is associated with neighbouring countries' plans. A Douglas DC10-30CF of Martinair recently landed in Rwanda with a load of expanded polystyrene from the Netherlands, and picked up 62½ tons of cassiterite for the return load.

Sudan. Sudan is a subsidiary base for British charter carriers such as IAS (with an office), Invicta, (also with an office), and Tradewinds, as well as for DK Aviation, a British firm dealing in aircraft transactions. The main traffic flows have been in cigarettes (imports to Sudan and the Arabian Gulf from the UK), bulk machinery (imports to Sudan) and meat/livestock (exports to North Africa and the Arabian Gulf). Uplift alone for charter carriers was over 6,000 tons in 1973 and much higher in 1974.

Uganda. In addition to the Simbair operations (see East Africa above) Uganda has established a company named Uganda Air in an attempt to guarantee regular freight space for horticultural produce for export to European markets and to encourage the use of air for importing and for export promotion. Initially, Uganda Air has been acting as a commission agent, obtaining charters, when Simbair-organized aircraft have not been available, from such operators as IAS and Tradewinds (a total of 87 charter flights from Europe alone were operated in 1973). Consideration is being given to the purchase of Boeing 707 freighter aircraft in the future, but at present traffic density is insufficient to render this venture economic, unless it is associated with neighbouring countries' plans.

Zaire. Air Zaire occasionally operate their two Douglas DC8-63CF aircraft in freight configuration on international charter work when demand arises, and have freight space in the bellyholds of their Boeing 747-100 and two Douglas DC10-30 aircraft on international scheduled services to and from Europe. Air Zaire also occasionally operate freight charters with Douglas DC4 aircraft to other African countries to collect meat. The Société Générale d'Alimentation is the major foodstuff marketing agency in Zaire. It owns three CL-44s, one Douglas DC-4, and a Namco YS 11A, and obtains high utilization with these, carrying foodstuffs within and to Zaire (from Chad, Rhodesia and Sudan). Army aircraft are also used occasionally to bring in loads of meat from other African countries.

Zambia. As well as being served by four scheduled freighter aircraft services a week in 1973, Zambia was visited by no less than 6 IATA carriers (including Zambia Airways) and 9 non-IATA carriers on non-scheduled freight operations with Europe, and was served from Botswana by Alaska International. IAS maintains an office in Lusaka. Two Zambian non-IATA carriers have been formed with a view to entering the lucrative freight charter market. National Air Charters Zambia, formed in March 1974 is associated with Zambia Airways, and has undertaken full or part-chartering of the southbound leg of non-IATA carriers (Cargolux and Tradewinds) on a commission basis. National Air Charters Zambia has an operating licence and is considering the purchase of a jet aircraft, although it recognizes the need to obtain backhaul to Europe from neighbouring countries in order to make the operation economic. Air Freight Zambia is a private company which wishes to obtain an operators licence and purchase jet aircraft to operate freight charters between Zambia and Europe. Zambia is interested in co-operating with neighbouring countries in order to obtain backloads for charter carriers and hence reduce the cost of air imports.

#### 8.2.4 Brokers

While many of the above charter airlines obtain their market leads for ad hoc and contract operations directly, by maintaining offices and representatives in the Region, the vast majority of freight charter operations (to and from Africa, Western Asia and the Far East) are controlled by only three brokerage firms. Two of these are based in London, and the third is in Brussels. They operate on very low overheads (telex facilities being the major feature) and manpower (2 executive staff maximum). Market intelligence and contact is obtained by maintaining strong personal links with operators and charterers, and income is obtained from commissions (5-7½ per cent of the charter fee). Business for these organizations is profitable and fast growing.

## SECTION 9. INTERNATIONAL AIR FREIGHT POTENTIAL

Summarized below are current and/or potential flows by commodity determined during the course of the ECA Study. Obviously, these are not comprehensive, but hopefully will give an idea of the type of commodity and volumes which can travel by air. In the case of commodities of major volumetric importance, cross-references are given to flows of further commodities on the same routes, in order to give an idea of the aviation sector requirements to meet the demand. The summaries have purposely been kept brief, as full details of potential and problems are included in the individual country reports of volume II. Quantities are quoted where possible, but the uncertainty associated with much of the potential, which is in primary commodities and subject to climatic and domestic demand variation, makes this difficult.

It will be seen that, while there is considerable unexploited air freight potential from the Region, that intra-regional variety in potential is at present limited, and such traffic is likely to remain dominated by meat. ECA has, however, identified a number of multinational industrial investment opportunities which could generate significant intra-African traffic, particularly in electronic equipment, in due course. In volumetric terms, the regional export potential is dominated by horticultural produce, meat, hides and skins. Other regional export products of less volumetric importance but considerable economic importance, and which travel by air by tradition, are exotic edible fish, cinchona bark and other medicinal plants, pappaine, pyrethrum extract, dairy products, textiles and a limited range and volume of industrial outputs. As mentioned elsewhere in this report, it makes economic sense that aircraft should not leave the Region with available capacity if possible. Such a policy would generate substantial additional regular and/or *ad hoc* potential in the form of such commodities as certain minerals, providing they are sold under suitable contract terms (see annex D for a sample total distribution cost analysis); tea, cashew, kola, and macademia nuts; and cloves.

Commodities of lesser importance are also discussed below. An attempt has been made to divide the analysis into extra-regional and intra-regional potential, but there are obviously situations where the potential is alternative rather than complementary, particularly in the case of meat.

## 9.1 From the region

## 9.1.1 Horticultural produce

Most countries in the Region are suitable for the export of fresh fruit and vegetables (including spices), as well as cut flowers, to Europe and Western Asia, not only in the northern hemisphere winter, but by careful planning of exotic types, during the rest of the year at a reduced level. All market reports suggest that there is room for considerable expansion over and above current levels to Europe, and that the Western Asian market, though relatively small, has yet to be tapped. Interesting recent developments are the export of semi-grown items (seedlings, etc), the interchange of seeds and seedlings between farms by air, and work on dehydration and extraction which provides a complementary domestic demand springboard for exports. It is emphasized that the diversification of production and outlets, expertise (both in production and business management) and, above all, co-ordination of production, air freight capacity and distribution, are essential pre-requisites of large scale operations in this field.

Botswana (see also meat, hides and skins). Carnations exported to Europe. Domestic feasibility studies carried out. Potential for wide range of organically grown fruit, vegetables and flowers.

Burundi (see also hides and skins, minerals). Certain produce able to be grown. No studies carried out.

Ethiopia (see also meat, hides and skins, fish). 5,163 tons of vegetables exported by air to Europe in 1973. Very high potential for diversified range of fruit and vegetables, flowers and spices.

Ghana (see also fish). Some products (e.g. green peppers, pineapples, yams) already sent to Europe. Potential for some expansion and diversification (e.g. avocados, mangoes, tomatoes).

Ivory Coast (see also fish). Air Afrique carried 707 tons of plants and flowers, year round, from West Africa to Europe in 1973, mainly from Ivory Coast.

Kenya (see also meat, pyrethrum extract, dairy products). Kenya exported 10,157 tons in a wide range of fruit, vegetables and flowers (mainly asparagus plumosus) in 1973 (mainly to Frankfurt and London), and output is expected to grow at 25 per cent per annum.

Mauritius (see also fish, industrial products). Some fruit, vegetables and flowers (exotic lilies) already travel by air to Europe and there is further potential.

Nigeria (see hides and skins). Some fruit, vegetables (particularly yams when domestic demand permits) and spices are carried to England throughout the year as well as fruit to Saudi Arabia.

Rwanda (see also hides and skins, cinchona bark, pyrethrum extract, minerals). Exports of vegetables and flowers to Belgium and France were expected to reach 610 tons in the 1974/75 season and 2,000 tons (including fruit) by 1976.

Senegal (see also fish). Substantial volumes of fruit and vegetables are carried to Europe using a sophisticated planning system to make full use of available capacity on combination aircraft.

Sudan (see also hides and skins, fish). Successful trial shipments have been made to Europe and Western Asia, and there are possibilities for manifold expansion.

Tanzania (see also meat, hides and skins, fish, pyrethrum extract). The target for exports of fruit and vegetables to Europe via Kilimanjaro airport for the 1974/75 season was 20 to 30 tons per week, and some further produce is exported from Dar-es-Salaam.

Uganda (see also meat, hides and skins, fish, papaine, minerals). Following a period of decline, exports of fruit and vegetables to Europe were expected to reach 1,100 tons in the 1974/75 season, and there is considerable potential for expansion and for redeveloping exports of cut flowers.



Zaire (see also pyrethrum extract, minerals). There is some potential for horticultural exports from the eastern part of the country.

Zambia (see also hides and skins, minerals). Limited volumes (some 400 tons in 1973/74) of fruit (honey melons and strawberries) and vegetables (french beans and green peppers) have been exported to England.

Air Afrique carried a total of 4,346 tons of fruit and vegetables from West Africa to Europe in 1973 (862 tons pineapples, 87 tons avocados, 457 tons mangoes, 655 tons other fruits, 2,285 tons vegetables). From Central Africa the total was 395 tons. Apart from Ivory Coast and Senegal, mentioned above, the other main origins were Chad, Niger and Upper Volta.

#### 9.1.2 Meat

Since agricultural and climatic conditions vary widely over the Region, many countries have surplus livestock production, whilst others have extremely scarce livestock resources. Ethiopia's cattle population alone constitutes some 20 per cent of the total cattle population in Africa, whilst the total of the ten most important producers comprises over 70 per cent of Africa's total. Botswana is the only country in the Region with sufficient disease control to be able to send chilled or frozen meat to the prime European markets, but Kenya is close behind and Chad, Ethiopia, Lesotho, Rwanda, Sudan and Tanzania are all introducing disease-free ranching zones in order to attempt to break in to the European market. Production of suitable output is, however, a long and expensive process and Europe has recently had a beef glut and has considerable potential for producing beef from dairy animals. Hence several authorities feel that African production should be aimed at African consumption, particularly as such countries as CAR, Congo, Egypt, Ghana, Ivory Coast, Liberia, Libya, Malawi, Nigeria, Zaire and Zambia are known major sources of demand. There are also opportunities nearby in Western Asia, although this market is beginning to be exploited by such countries as Australia, Pakistan and Turkey. Critical decisions on establishing export patterns and type of output have yet to be made in many of the exporting countries, and these will affect air mode demand. Canned meat is more acceptable from a sanitary point of view, reduces seasonality and supply problems and provides secondary domestic processing, but involves import leakage and high technical expertise, and has a limited, low-price market. Frozen meat carries higher market prices, but is restricted by sanitary regulations, and the transportation costs (by surface) are relatively high due to the necessary investment in freezing storage on ships and at ports. Chilled meat has a shelf life of 5 weeks, but this is not usually long enough for long-haul surface transportation from or within Africa. However, chilled meat (especially when fresh) bears a higher market price which can often cover the increased costs of air transport. Air transport offers also flexibility, reduced handling and insurance, and improved cash flow. While further viability studies are required, it therefore seems that transportation of chilled meat by air within and from Africa could become substantial, helping to solve nutritional inadequacies, and developing the aviation sector. The countries listed below are those whose major long-term interests lie in exporting outside the Region, their intra-regional potential being discussed here as well, other countries being covered in 9.2.2.

Botswana (see also horticulture, hides and skins). Botswana is seriously considering sending chilled beef by air to Europe (some already travels to Switzerland). The volume would be considerable, and southbound backload would be required to develop an economic operation. The demand in Central and West Africa has been recognized.

Chad (see also horticulture, hides and skins). Chad is developing a disease-free ranching zone, which could lead to exports to Europe, as well as to Western Asia. Chad currently exports around 180 tons of meat per month to Zaire using chartered aircraft, and Air Afrique carried 590 tons to Zaire in 1973 (a level lower than usual - 7,268 tons in 1971 - due to fuel restrictions in Kinshasa), the overall demand on this route being 1,130 tons per month. In the same year Air Afrique also carried 146 tons to CAR, 1,968 tons to Congo, 311 tons to Gabon and 137 tons to Libya (expected to increase dramatically).

Ethiopia (see also horticulture, hides and skins, fish). There is considerable potential for chilled meat exports to Central, North and West Africa, as well as to Western Asia and, when the disease-free ranching zones are fully operational, to Europe.

Kenya (see also horticulture, pyrethrum extract, dairy products). Chilled beef is exported by air, within Africa to Burundi (up to 5 tons per week), Libya (up to 1,900 tons per annum), Seychelles (1 to 3 tons per week), Tunisia (up to 600 tons per annum), Zaire (1,000 tons in 1972, none since) and Zambia (a small proportion of the total exports, most travelling by refrigerated truck). The potential in other parts of Africa, particularly in Ghana and Liberia, has been recognized, as has that in Western Asia. Up to 10 tons of special cut, high quality meat is sent by air to Switzerland, and a disease-free production zone and export abattoir is being established in an attempt to enter other parts of the European market. Pork products and/or poultry are sent by air on a small scale to Aden, Burundi, Ethiopia, Malawi, Zaire and Zambia.

Lesotho. Lesotho wishes to construct an export abattoir and send chilled meat to Europe (c.f. Botswana), but this is a long term prospect, and at present uncertain.

Niger (see also hides and skins). Air Afrique carried 75 tons of horsemeat to France in 1973. These imports were made under a short term licence, but it is hoped to be able to expand exports to 30 tons per week. Air Afrique also carried, within Africa, to Ivory Coast (326 tons) and Libya (89 tons, the demand for 1974 being 20 tons per week). Air shipments to Ghana and Togo have been made in the past.

#### 9.1.3 Hides, skins and their products

While many African countries suffer from a deficiency in meat intake, the hide and skin production from existing livestock production is usually sufficient to generate a surplus to domestic requirements; so the overall exportable volume is substantial. Whether the output should travel by air depends on the cost and transit period of alternative means of transport (air generally being the economic mode in the case of landlocked countries) and the level of processing (e.g. untreated, dry salted, tanned, manufactured leather articles). Tanning and subsequent processing increases the volume of the hide or skin, and generally reduces its weight, thus substantially increasing its value/weight ratio and hence making it suitable for air transport, as will be seen from the following data:

<u>Process stage</u>	<u>Weight (kg)</u>			<u>Unit</u>
	<u>Hides</u>	<u>Sheepskins</u>	<u>Goatskins</u>	<u>Value</u>
Untreated	10.0	1.0	0.6	-
Air dried	7.0	-	-	1.00
Dry salted	-	0.7	0.6	1.04
Pickled	-	-	-	1.15/1.20
Tanned wet chrome or blue	5.2	0.5	0.5	1.20/1.30
Chrome tanned in crust	-	-	-	1.40/1.50
Finished leather	-	-	-	1.80/2.00
Ladies shoes	-	-	-	2.50/3.75
Leather jackets	-	-	-	2.00/2.50

There is an increasing demand for tanned leather as opposed to hides and skins in all the major consumer countries of Europe and North America.

Under this heading should be included the small volumes of gameskins (and hunting trophies) from such countries as Burundi, Ethiopia, Kenya, Rwanda, Tanzania, Uganda and Zaire to the main tourist/hunter generating areas of Europe, North America and Japan.

Botswana (see also horticulture, meat). The value: weight ratio of the output of tanned skins from a proposed tannery suggests that this is marginal air freight potential.

Burundi (see also horticulture, minerals). Exported output from a planned tannery should reach a volume of 1,000 tons by air (mainly to France) by 1977.

Central African Republic. Some of the production is exported by air to Europe.

Chad (see also horticulture, meat). Air Afrique alone carried 1300 tons of hides and skins to France in 1973.

Dahomey. Some of the production is exported by air to Europe.

Ethiopia (see also horticulture, meat, fish). About 100 tons per annum of hides and skins are at present exported by air (via Djibouti) to France, and there is considerable potential for further exports by air to Italy, the United Kingdom and West Germany in particular, as well as to Lebanon, further countries in Europe, and the United States of America.

Niger (see also meat). Air Afrique alone carried 800 tons of hides and skins for air export from the North.

Rwanda (see also horticulture, cinchona, pyrethrum extract, minerals). The value of current, unprocessed output, is not sufficient to justify air shipment, but rebirth of a tannery project could lead to air exports to Europe and Lebanon.

Somalia. There is a considerable volumetric output as a by-product of the ranching projects (see 9.2.2).

Sudan (see also horticulture, fish). Major expansion of the tanning industry is leading to the development of outstanding potential for export by air to northern Europe.

Tanzania (see also horticulture, fish, pyrethrum extract). Major expansion plans in tanning are under way, and once local demand from the shoe industry has been satisfied, output from a high quality leather goods project will be available for export by air.

Uganda (see also horticulture, fish, pappaine, minerals). A tannery is to be established with an export production of 275 tons of hides and 660 tons of skins per annum, which may be sent by air to Europe and various Arabian countries.

Upper Volta. A significant proportion of the output is exported by air to Europe.

Zambia (see also minerals). Hides and skins are exported by air to Europe.

#### 9.1.4. Fish

The general comments above on meat also apply to fish, although the value of staple fish is somewhat lower, making it less prone to transport by the air mode. Uganda is the only country studied which sees air potential within Africa for such production (for Nile Perch). However, the potential for exports by air to Europe (and to a much lesser extent to the limited high income populations within Africa) of edible exotic fresh water and marine output is significant. Many countries with potential have yet to develop it.

Dahomey. Air Afrique carried 743 tons of shrimps to Europe in 1973.

Ethiopia (see also horticulture, meat, hides and skins). Trout, tuna, shrimps (150 tons per annum) and lobster (140 tons per annum) are some varieties awaiting full exploitation.

Ghana (see also horticulture). Shrimps and other exotic fish are exported by air in polystyrene containers to Italy between May and August each year.

Ivory Coast (see also horticulture). Air Afrique carried 240 tons of shrimps to Europe in 1973.

Mauritius (see also horticulture, industrial products). Fresh water prawns are exported to Europe by air.

Senegal (see also horticulture). Air Afrique carried 513 tons of shrimps to Europe in 1973, as well as some lobsters.

Sudan (see also horticulture, hides and skins). As with Ethiopia, tuna, shrimps and lobster from the Red Sea await exploitation.

Tanzania (see also horticulture, hides and skins, pyrethrum extract). Crustaceans in particular prawns, have been shipped by air as a trial to the United Kingdom. Malawi and Zambia have also taken shipments.

Togo.. Air Afrique carried 104 tons of shrimps to Europe in 1973, as well as some lobsters.

Uganda (see also horticulture, hides and skins, pappaine, minerals). In the long-term Uganda hopes to export significant levels of fish within Africa and to Europe. Consideration is being given to exporting fish offals by air to Italy for use in chemical/pharmaceutical production.

#### 9.1.5 Tea

Several countries in the Region are increasing tea production, both for domestic consumption and for successful competition in European markets (especially the United Kingdom) with Asian varieties. Tea is not normally considered as suitable for carriage by air, but this Study has shown that it is certainly suitable as charter backload, particularly from landlocked countries. Apart from avoiding surface transport delays, mishandling, pilferage and middlemen's fees, air transport has further advantages in that packaging can be extremely cheap and light (thus reducing also the net difference between air and surface rates), and the fresh production bears a slightly higher price in the market-place. The shipment of tea is discussed as an example in annex D. Tea samples and instant tea already travel regularly by air.

Burundi. Production is expanding fast and was expected to reach 300 tons in 1974. Consideration is being given to the use of air shipment to Europe.

Kenya. Production is again expanding rapidly, being 53,300 tons in 1972 and expected to reach 98,000 tons in 1978. While air shipment as charter backload would occasionally be justified, there is little suitable capacity due to the requirements for horticultural exports.

Rwanda. Output is fast increasing, exports in 1973 were 2,700 tons and expected to grow to 9,000 or 10,000 tons within a few years. The bulk of the crop is sold at the London auctions and chartered aircraft are used whenever possible to carry this demand, which should reach 2,800 tons by 1976.

Uganda. 19,145 tons were exported outside East Africa in 1972, the bulk destined for the United Kingdom. Most of the tea is currently sold at Mombasa auctions, but consideration is being given to direct air shipments.

Zaire. Tea is grown in the virtually land-locked eastern part of the country. At present exports to Europe are made via Kinshasa by surface means but the growers would like to make use of air when possible.

#### 9.1.6 Coffee

It has been suggested that coffee might travel (to Europe, the major United States of America market being ruled out by lack of suitable backload capacity) by air under similar conditions to tea shipments as above. However, world prices have fallen substantially since mid-1974, and even with the breakdown of the International Coffee Agreement, the terms of sale inhibit transport mode control by the exporting country. Emergency and sample shipments do travel on a small scale from the producing countries in Africa by air to Europe and North America, and there are some intra-African air movements, as will be shown in 9.2.6.

Ethiopia. Some coffee is occasionally exported by air on a small scale to Lebanon.

#### 9.1.7 Cashew, kola and macadamia nuts

Of the world cashewnut crop of 400,000 tons in the 1972/73 season, Mozambique produced 43 per cent, Tanzania 26 per cent and Kenya 7 per cent. Domestic processing of the nuts is being expanded. Selling prices of processed nuts are fixed according to the New York C and F price, which is currently at an average of \$US2.0 per kg., with differing grade prices varying from \$1.10 to \$2.90 per kg. Demand comes mainly from the United States of America, Europe (especially the United Kingdom and both Germanys), Canada and Australia. In Europe sales are made against documents or 45 days after shipment, whichever is the earlier, so the incentive to use air, particularly to catch market peaks, is with the shipper. Thus cashewnuts are marginal air potential as charter backload.

Kola nuts are exported in significant quantities by air from Nigeria to Saudi Arabia.

Kenya expects to develop a crop of 3,000 tons of macadamia nuts by 1978, when a processing plant will have been completed. The export segment will undoubtedly travel by air to long-haul destinations as elsewhere in the world.

#### 9.1.8 Tobacco

World prices of tobacco have risen over recent years, making exporting profitable. Although tobacco is very light, it could be used, as with tea above, to fill back haul air charter capacity. Air Afrique carried 558 tons from Central African Republic to Paris in between January and May, 1973 at a very low rate.

#### 9.1.9 Other agricultural products

Significant volumes of primary and processed production already travel by air on scheduled aircraft, and there is potential for expansion.

The offshore islands of Tanzania are the world's home of clove production. In recent years there has been a tremendous rise in the average price of cloves, which reached \$US2.90 (f.o.b. at official exchange rates), and higher since. Exports have varied from 5,000 to 17,000 tons in recent years, mainly to Indonesia, where they are used in cigarette manufacture. To destinations from which there is inbound charter capacity, they are suitable for air transportation.

Many countries are suitable production areas for medicinal and perfume plants, and small volumes already travel by air to a wide range of destinations. Dry cinchona bark, which is used in the production of quinine, is the major product at present and being worth about \$US60 per kg. always travels by air. Burundi exported 18 tons in 1973. Kenya is establishing production. Rwandan export volumes have reached 300 tons per annum. Uganda has some production. Zaire is exporting about 10 tons a week by air from the eastern part of the country. All these countries are expanding production. Senna pods and leaf are used as purgatives, either in an infusion, or processed and sold as a tablet or in liquid form. There is a small, steady demand in Europe for this product, and some is exported from Sudan.

Pappaine, or pawpaw extract, of high value, and used in tanning processes, brewing and meat tenderizing, is exported by air from several African countries, including Kenya (to Holland and the United States of America), Rwanda (to West Germany), Uganda (134 tons in 1973, to Holland, the United States of America and Japan) and Zaire (4 tons per week to Belgium, 2 tons per week to Japan, from the eastern part of the country). Demand for pappaine is not, however, expected to rise significantly.

There is currently a world shortage of pyrethrum, partly due to concern expressed throughout the world about the harmful effects of synthetic insecticides. Kenya has produced the bulk of the world's supply, being 13,800 tons of pyrethrum flowers in 1972, resulting in 190 tons of exported extract. Pyrethrum extract is a very high value product, exported entirely by air, primarily to the United Kingdom and United States of America. Kenya's output is expected to reach 290 tons by 1978. Rwanda has recently introduced an extraction plant, exported 57 tons from this in 1973, and hopes to reach 140 tons of exports by 1976 (to Belgium and North America). Tanzania exported 160 tons of extract in 1972 to Western Europe. Uganda and Zaire are both establishing major production programmes, exports of extract from the latter being anticipated to reach 145 tons by 1980.

Uganda exported about 300 tons by air of ginger and jaegery in 1970, but a decline in sugar production and the tying of sugar exports had reduced this to zero by 1974.

Botswana is considering exploiting demand for the root plant delicacy, truffles. These grow wild in the country and could be exported by air to Europe.

Gum arabic is occasionally carried as fill-up load to Europe. Air Afrique has carried it mainly from Chad, but also from Mali, Niger and Upper Volta. Gum arabic is a major export of Sudan, which also exports kark adeh (a kind of tea), of similar value : weight ratio, to Europe.

Apiculture is a minor sector in many African economies, and a proportion of the output of beeswax is often exported by air. Burundi (6 tons to the United Kingdom in 1973), Kenya, Rwanda (4 tons in 1972) and Uganda have exported small volumes to Europe in this manner.

Civet are farmed in Ethiopia. Extracts from the glands of these animals are used in perfume manufacturing and are exported in small quantities by air to France, the United Kingdom, the United States of America, Aden and Japan.

Dairy products such as milk, cheese, butter and ghee are sent by air from Kenya to supplement surface shipments, or replace them in cases of difficulty, to Western Asia. Eggs are also sent by air to the same destinations. Ethiopia exports fresh eggs by air to Aden, Israel, the Netherlands, Sudan and the Yemen, and liquid eggs to the Netherlands (a total of 210 tons of egg products by air in 1973).



### 9.1.10 Minerals

As is demonstrated in annex D, if suitable selling agreements are in hand, the economic mode of shipment for the producer country can be air freight at a fairly low value: weight ratio. Some minerals are within this bound, and could generate substantial air shipments, particularly as charter backload.

Burundi (see also horticulture, hides and skins). Cassiterite or tin ore (156 tons production in 1972) is currently sent by surface for processing in Belgium, but is definite charter potential. Wolframite and gold are also air potential, but production volumes are currently very low.

Ethiopia. Gold (762 kg. produced in 1970/71) is already exported in base or processed form by air, and output from a recently opened copper mine may produce the by-product cobalt, which has sufficient value to be air potential.

Kenya. The only minerals of sufficient value for air shipment are silver, niobium and europium, but even if fully exploited, these will not produce significant volumes.

Rwanda (see also horticulture, hides and skins, cinchona, pyrethrum extract). As with Burundi, cassiterite (to Belgium) is definite potential, which should reach 2,600 tons by 1976 and air movements have already been stimulated by the ECA Study. Wolframite or tungsten ore (1,100 tons by 1976) is of similar value, but travels to diverse destinations (the United States of America, Holland and Japan) and may be difficult to consolidate into aircraft loads.

Sudan. A feasibility study has recommended the exploitation of copper deposits, from which cobalt may be produced as a by-product.

Tanzania. Gemstones, such as diamonds are exported by air, but in very small volumes. Meerschaum is processed into meerschaum pipes, and it is believed these are exported by air.

Uganda (see also horticulture, hides and skins, fish, papaine). Gold is already exported by air. Cassiterite (100 tons produced per annum), wolframite (171 tons produced in 1973), cobalt from a possible extraction plant at the copper mines and beryllium (137 tons of ore in 1973) are all potentials for charter backloads.

Zaire (see also horticulture, pyrethrum extract). Zaire accounts for more than 60 per cent of world production of cobalt, and exports reached 12,731 tons in 1972. Air shipment is presently inhibited by the marketing procedure. Cassiterite is processed in Zaire, and the output of tin (5,892 tons in 1972) is an ideal source of supply for air freight to Belgium, but there is no suitable airport near the production point. Wolframite (520 tons produced in 1973) also has potential as charter backload, but once again is sold to diverse markets. Silver (65 tons in 1972), gold (4 tons) and diamond production already travels by air due to the high value: weight ratio involved.



Zambia (see also hides and skins). Substantial volumes of cobalt have potential for carriage by air to Europe, amethyst ore is already carried (5 charter loads per year) and other semi-precious stones and malachite move in small quantities.

#### 9.1.11 Textiles

Long term cotton agreements tend to preclude penetration of external markets such as those in Europe. Nevertheless, some significant shipments have been made by air, and textiles are considered to be important potential in the future from West Africa, particularly as traffic is non-seasonal and the product is of high density. Textiles are, of course, of relatively high value, and subject to rapid obsolescence.

Botswana. Output from a tapestry weaving project, such as bespreads and tapes-tries is to be exported by air worldwide, but the total annual weight will only be in the region of 5 tons.

Central African Republic. While air exports were previously low, substantial volumes were uplifted by Air Afrique to Europe in 1974.

Chad. Significant uplift to Europe is anticipated by Air Afrique (see Togo).

Dahomey. As Chad (see also Togo).

Ethiopia. Some exports (particularly shirts) are made by air to such destinations as Italy, North America, Saudi Arabia and West Germany.

Ivory Coast. As Chad (see also Togo).

Kenya. Some finished products, mainly the colourful 'vitenge' designs, are exported by air to Scandinavia, the United Kingdom, Western Asia and West Germany.

Mauritius. Some textile products are exported by air to Europe.

Niger. As Chad (see also Togo).

Nigeria. Limited volumes have been exported by air in the past to the United States of America.

Sudan. Increased domestic transportation of Sudan's cotton is expected to lead to an export surplus, initially in the form of yarn, then grey fabrics, and finally finished cloth.

Tanzania. Local designs have been sold in the past in America and Western Europe, and demand is high in India and Japan, but the prime need at present is to meet domestic demand.

Togo. Exports to West Germany were formerly made using surface transport, but Air Afrique has persuaded the shippers to switch to the air mode, and volumes were expected to reach 1,000 tons in 1975. The success of this venture is leading to further air mode marketing in other West African countries, with some positive reactions.

Zambia. Jeans are to be exported by air to Belgium, Holland, Western Asia and West Germany.

#### 9.1.12 Other industrial products

The exporting sector of industry in the Region is generally still in the preliminary stage of transforming minerals and agricultural produce, and the tariffs of developed economies restrict entry of industrial products from developing countries. Thus there are few opportunities for industrial exports by air at present. The example of Mauritius, however, which is developing export processing industries geared up to a system of importing by sea and exporting by air, is noteworthy. Reference to such industrial development opportunities and a brief discussion of the concept of duty free industrial zones linked with international airports is made in section 12.7. Some further isolated examples of industrial products from the region are also of interest. Uganda has forestry reserves which include high quality trees, and reproduction antique furniture is manufactured for shipment by air to the European market (interest could also be generated from high-income households within the region itself). Uganda also distills the juice of bananas to produce a spirit called Waragi, a trial air shipment of which has sold very successfully in the United States of America. Further ideas along these lines are undoubtedly awaiting exploitation.

#### 9.1.13 Handicrafts

Most countries in the region produce indigenous handicrafts, in the form of bark cloth products (Uganda); baskets and other straw articles; bone, ivory and wood carvings; carpets; game skin products; jewellery and metalware (particularly Ethiopia); musical instruments; paintings; pottery; shields and spears; and traditional clothing. Many of these items are of sufficient value or fragility to justify the use of the air mode. Much selling is carried out to tourists, who either take their purchases with them or ask the seller to undertake packing and transport when they are over-encumbered with luggage for their journey. However, the sales of such articles are not necessarily linked to tourist traffic. They have market value in their own right, apart from being souvenirs. Successful marketing abroad has extended to sales of wooden carvings in particular by supermarket chains. Kenya was notably successful in arranging a charter flight to Japan for such articles in 1973. Undoubtedly the potential in Europe, Japan and the United States of America is underexploited, and awaits only marketing enterprise.

#### 9.1.14 Miscellaneous

The legal output of ivory, which is generally not carved or otherwise processed in the region, is usually exported by air. The elephant populations of Burundi, Rwanda, Uganda and Zaire provided ivory exports in 1973, to Belgium and Hong Kong. However, output is variable due to culling only as necessary, poaching and smuggling.

Aquarium fish are exported by air from many countries, as are parrots, particularly from West Africa (Gabon and Ghana are important sources). Zoo animals also fall into this category.

In countries where the use of air has yet to be fully exploited, personal and household effects contribute a significant proportion to air uplift. Even from West Africa to Europe on routes where there was substantial air freight traffic, personal effects comprised 7 per cent (838 tons) of Air Afrique's total freight traffic in 1973.

## 9.2 Intra-regional

### 9.2.1 Horticultural produce

While the main stimulus to and demand for horticultural produce comes from the European market (and in the winter season), there are various countries in the region which are unable to meet domestic demand from local production. This demand tends to be limited to the high income brackets of the population, but would provide diversified markets for the existing producers. Some horticultural produce is already carried within the Region, but the volumes are, as expected, fairly small. Air Afrique carried fruit and vegetables from Chad to Central African Republic and Congo, and from Senegal to Mauritania, in 1973. Kenya has exported fruit and vegetables by air to Burundi and Zaire. Zaire is in fact a major importer, from South Africa and from Europe. Several other countries presently import from Europe (e.g. Burundi and various West African countries) products which are available from the Region.

### 9.2.2 Meat

A general background to meat exporting was given in 9.1.2. The Trade, Fiscal and Monetary Affairs Division of ECA has a programme to develop intra-African trade in meat and meat products generally, particularly through establishing specific agreements between net meat importing countries and net meat exporting countries in the Region (see annex I - References). It will have been seen that the countries listed in 9.1.2 who have a major long-term interest in entering the European market for chilled beef, also supply some of Africa's domestic needs, and could supply more. In addition, there are further intra-African prospects, as follows:

Central African Republic. Air Afrique carried 514 tons of meat to Congo in 1973, although Central African Republic is a net importer of meat.

Madagascar. Madagascar is a major exporter of meat to other African countries.

Nigeria. Meat is to be exported by Air to Kinshasa from the northern town of Maiduguri, whose airport is being upgraded to 707 status to carry this traffic. Volumes will be limited as there is currently a meat shortage in the country as a whole.

Rwanda. While meat intake is presently at a less than desirable level, chilled beef may in due course become an air export to Burundi, Western Zaire and perhaps Europe.

Senegal (see also horticulture, fish). Air Afrique carried 52 tons of horsemeat to Ivory Coast in 1973, and there is demand of 25 tons per month from Zaire.

Somalia. Somalia has a major ranching project for 35,000 cattle with a feedlot on the Juba River. Exports will be made via the Kisimayo processing plant, some by air. Use of air has been evaluated by sending trial shipments to the Comoro Islands. In 1973, Somalia exported 895 tons of meat by air to Zaire.

Sudan. Sudan has surplus ability to supply substantial volumes of meat for export. Export-oriented projects are at the feasibility stage, and include two major ranching schemes. One in the West of the country, is expected to achieve maximum exports of 9000 tons of chilled beef and 9000 tons mutton per annum by air. The major markets will be Libya in particular, Ghana, Nigeria, Zaire and Zambia, as well as the Arabian Gulf. Large volumes of chilled meat have already been sent by air to some of the above destinations, as well as livestock by air to the Arabian Gulf.

Tanzania. Tanzania intends to meet some of the demand from Zaire and Zambia (probably by surface transport) for fresh beef, and has also sent trial shipments to the Arabian Gulf. Beef to the European market would be sent in frozen rather than chilled form, and thus use surface transport. Poultry exported to Western Asia by surface in frozen form would be switched to the air mode (and to chilled form) if capacity became available.

Uganda (see also textiles). It is hoped to be able to meet fast increasing domestic demand within 5 years, and then to export chilled beef by air to such countries as Ghana, Kuwait, Libya (and other North African countries), Southern Yemen and Zaire. Poultry is already exported, and shipments by air to Zaire are planned.

Upper Volta. Upper Volta is a major exporter of meat to the African countries.

### 9.2.3 Hides, skins and their products

From 9.1.3 it will be seen that most African countries are well able to satisfy domestic demand from domestic resources, although some shoes are exported by air from Ethiopia to Kenya, and from Kenya to Zambia, and there is unsatisfied demand for raw materials for leather industries in Egypt. There is, however, an important rider to the above. The domestic demand for products such as shoes which is satisfied, is that of everyday mass requirements. There is insufficient demand in any individual country in the region to justify production for the fashion-conscious, quality markets. Thus imports by air from Europe are made by individual countries to meet this select demand. This appears to be an opportunity area for an indigenous African operation to serve a number of countries in the region by air.

### 9.2.4 Fish

As mentioned in 9.1.4, the prospects for staple fish movements by air within Africa are limited. Exotic fish can and do travel by air, but the market demand is limited to a very high income bracket. The only significant recorded carriage is between Senegal and Zaire.

#### 9.2.5 Tea

There is some intra-African demand for tea, but this is not substantial, and in few cases justifies air shipment.

Nigeria. Some of the output from factories is exported by air along the West Coast.

Zaire. Tea is exported by air to Chad from Kinshasa (having travelled by surface transport from the East), usually as backload for the inbound charters of meat. The demand is estimated at 120 tons per month. Air Afrique carried 385 tons on this route in 1973.

Ethiopia imported 142 tons of tea by air from Kenya in 1973, but this level is expected to fall to zero with surface transport infrastructure improvements and Ethiopia's own increasing production.

#### 9.2.6 Coffee

Intra-African demand for air shipment is very low, due to the nature and value of the commodity.

Nigeria. Limited volumes are exported by air along the West Coast.

Zaire. Ground coffee (about 141 tons in 1973) is exported by air from Kinshasa to Chad as backload for the inbound charters of meat.

#### 9.2.7 Cashew, kola and macadamia nuts

No intra-African potential ascertained.

#### 9.2.8 Tobacco

Prospects are again limited, as domestic production is available in most countries. Significant volumes travel by air from Malawi to West Africa (by surface transport on the Malawi-Zambia sector).

#### 9.2.9 Other agricultural products

None of the products mentioned in 9.1.9 above lends itself to intra-African potential, with the significant exceptions of dairy products and eggs. Kenya exports dairy products and eggs by air to Burundi, Ethiopia, Mauritius, Seychelles, Somalia, TFAI\* and Zambia. Ethiopia exports eggs to TFAI. Many African countries are importing dairy products from Europe (much by air) and this would seem to indicate an opportunity for intra-African air trade, along with such secondary Kenyan products as chocolates and confectionery. However, the major problem is to develop production levels so as to meet domestic demand and be capable of exporting.

\* Territoire français des Affaires et des Issas.

#### 9.2.10 Minerals

No intra-African potential ascertained.

#### 9.2.11 Textiles (see also 9.2.12)

Textiles generally have low export potential within Africa since most countries are able to cater for domestic demand due to the low investment necessary for manufactures. Thus the movements are limited, although one area of interest is the marketing of products in local designs.

Botswana (see also meat). Military and paramilitary caps, helmets and webbing are exported to Nigeria, Tanzania and Zambia, some by air. Hats are exported to Zaire.

Ethiopia (see also meat). Some exports (particularly shirts) have been made by air to Somalia and Nigeria.

Gabon. Air Afrique carried some textiles to Congo in 1973.

Ghana (see other industrial products). There is potential for export of textiles within West Africa, and particularly to Liberia, by air.

Ivory Coast. There is 2 tons per week demand from Zaire.

Kenya (see also horticulture, meat, other industrial products). Finished products are exported by air to Ethiopia, Madagascar, Mauritius, Seychelles and Somalia.

Nigeria. Some production is exported to Congo and Gabon on scheduled aircraft.

Sudan. Some clothing is exported by air to Ethiopia.

Togo. Exports to Central African Republic, Congo, Gabon and Senegal are significant and have used scheduled aircraft.

Uganda (see also meat). Such items as trousers, knitted underwear, T-shirts, ladies' and children's wear have been shown to have markets in Somalia, Zaire and Zambia, and some trial shipments have been made.

Zambia. Jeans are to be exported by air to Nigeria.

#### 9.2.12 Other industrial products

There is an emphasis on import-substitution within the Region, and most high demand low investment markets are well covered by domestic production. The national markets of African countries are also too small and fragmented to attract investment beyond a narrow range of import-substitution industries. While manufactured goods represented 32.7 per cent of intra-African trade in 1972 (against only 6.8 per cent of the total exports from the Region), ECA feels that there is considerable opportunity for the establishment of further multinational industries. The ECA studies have already identified a number of multinational industrial projects

which, if implemented, would absorb investments of \$US1200 million, create numerous jobs and lay a sound foundation for the restructuring of African economies. Amongst the priorities for such development is the electronics industry, which would supply significant volumes of intra-African air freight.

ECA also maintains a register of new and planned industrial projects in selected African countries. It is not possible from this to ascertain which, if any, of these projects are intended to supply exports in due course, but some which could be of interest to intra-African air freight, taken from the 1972-1973 register, are listed below:

Algeria	Two textile factories (under investigation)
Cameroon	Tannery (proposal)
Congo	Textile factory (under construction)
Gabon	Electronic consumer goods factory (under construction).
Ivory Coast	Four textile factories (under construction or evaluation).
Kenya	Nylon polyester plant (to open 1975). Two radio set and allied equipment assembly plants (licences granted). Two mills (expansion, proposal approved, see also 9.2.11).
Nigeria	Two textile plants (one at feasibility stage, one under construction, see also 9.2.11).
Swaziland	Radio and TV sets factory (output has commenced).
Tanzania	Pharmaceutical workshop (under construction).
Uganda	Textile mill (expansion, plan prepared, see also 9.2.11).

Few opportunities for intra-African air freight of industrial products were identified in this ECA air freight study itself, but more specific research could realize significant volumes, provided the air transport network and trading terms improve. At present such items as radio and television sets and sewing machines are assembled within the Region, but are rarely exported to other African countries, who import from Europe or elsewhere (radio and TV sets travel by air from Zambia to West Africa, and sewing machines by air from Zaire to Central African Republic). The situation regarding fashion shoe imports was mentioned in Section 9.2.3 above. Further items identified in this study are tyres as charter backload (meat is imported) from Zaire to Sudan; plastic articles from Zaire to Central African Republic and from Congo to Central African Republic and Chad (29 tons by Air Afrique in 1973); aluminium articles from Ghana within West Africa (particularly to Mali) and elsewhere; pharmaceuticals from Kenya to Ethiopia, Zaire and Zambia; cigarettes and processed sugar (44 and 873 tons respectively carried by Air Afrique in 1973) from Congo to Chad; cigarettes and textiles from Zaire to Burundi (1 ton per week); mining equipment from Zambia to Uganda and West Africa; perfumes and small motorcycles from Cameroon to Central African Republic (about 900 tons by Air Afrique in 1973) and to Chad (350 tons).

9.2.13 Handicrafts

The ever-increasing interest of Africans in parts of Africa other than their own, together with improving intra-African communications links, suggest that the products mentioned in 9.1.13 have significant potential for sales within the Region, particularly as each country produces a unique output.

9.2.14 Miscellaneous

At present personal effects comprise a significant proportion of traffic within the Region.



## SECTION 10. PROBLEMS AND CONSTRAINTS

In a few member States, the basic aviation infrastructure is inadequate in terms of traffic volumes and economic requirements. However, most countries in the Region have reasonable access to an airport of international standard (see frontispiece map). Apart from the lack of development stimulus and currency/sanitary agreements (see section 5), therefore, the main constraints on air freight development could be overcome with only marginal investment. Increased emphasis on air freight development, too, can lead to ad hoc agreements and hence to the fall of non-physical barriers.

In the sample of 13 countries covered by field surveys for this ECA Study, there has been no evidence to suggest that the marginal obstacles have changed since the ICAO 'Air Freight and Air Mail' study in 1970. These obstacles were traffic imbalances, inadequacy of terminal equipment, slow customs clearance, lack of capital for marginal investments, lack of capacity and lack of knowledge of the benefits of air freight. The subject of directional traffic imbalances is a crucial one, which leads to the major recommendation of this Study, concerning increased co-operation between countries with insufficient and excess capacity, and is therefore discussed separately from Section 12.1. The other problems are mostly able to be solved by individual member States, and are thus discussed in detail in the individual country reports. Very brief summaries are also provided below for information:

### 10.1. Capacity constraints other than those caused by directional traffic imbalances

Apart from the capacity constraints caused especially by directional traffic flow imbalances to be discussed in section 12, further problems are caused by peaking, seasonality and poor control of space.

Air freight exports from the Region are dominated by horticultural products. Since the majority of these are destined for the European market to meet off-season (i.e. European winter) demand, there is a peak demand for outbound capacity during this period, which exacerbates imbalance problems and the inability to obtain high year-round load factors. Virtually all transport operations suffer from such seasonality problems, and care has to be taken to evaluate the economies of year-round operations. Some success has been shown, particularly by Kenya, in developing all-year products or products for the European summer (e.g. tropical produce), and hence levelling out the peak while continuing to increase European winter production. This is the only logical solution for perishable shipments as, obviously, financial incentives cannot be offered to develop traffic in trough periods, and it emphasizes the need to consider the total distribution network when planning developments. Such a solution not only reduces the need to plan aviation facilities to handle volumes much greater than the average and to offer only seasonal employment, but also increases year round employment on the farms themselves.

Financial incentives are, however, a useful tool in reducing short-term peaking, for example during the week. IATA freighters and particularly chartered freight aircraft tend to arrive in the Region from Europe at the weekend, or early in the week. Such peaking is fairly common worldwide as forwarding agents build up their non-perishable consolidations during the week and send them off to the airlines at the end of the week for administrative convenience. As this timing helps horticultural exporters by allowing their return loads to reach European markets in time

to obtain good prices at the beginning of the week, the peaking is tolerated. It leads to high costs in terms of overtime payments and customs clearance backlogs and aggravates the seasonality problem referred to above. The peaking is not, however, necessary. The inbound factor, where perishable produce is not concerned, can be met by offering reduced landing and/or handling fees at off-peak times. Outbound, off-peak rates could be introduced for less perishable horticultural products (e.g. avocados, mangoes, pineapples). There would be no need to put day-of-week limitations on the rates, but merely to introduce lower rates for these products, which would therefore be loaded onto the aircraft last, or offloaded first, as they would present lower yield to the airline, with the result that shippers would deliver at off-peak times, when there would be less chance of an offload. There may be a need to obtain some guarantee from the airline accepting a booking that the produce would be shipped within, say a week. Rate structures are discussed in more general form in section 11.

Space control systems applied by regional airlines are generally not very effective, particularly on combination aircraft. Control is maintained either from headquarters or from route origin. Initial allocations are granted to individual stations en route, and further space is requested by signal from the individual station to the control point. In much of Africa, prevailing 'hot and high' conditions restrict uplift, and passenger load variations affect freight capacity. Thus in some cases only 50 per cent of the anticipated available freight capacity can be allocated to stations in advance. This leads to a complex and expensive administrative control procedure, which often breaks down due to last minute changes, resulting in wasted capacity or offloads. The first step towards higher utilization can be made by improving performance analyses. Considerable research into this problem has already been carried out, particularly by the aircraft manufacturers, and a joint development programme could be carried out by African airlines based on this research. Integration of the control systems could lead to traffic interchange when necessary, thus increasing utilization of available space and providing an improved service to the customer.

For the future, the opening of the Suez Canal will undoubtedly have a major effect on outbound capacity availability for countries in Eastern Africa. With the reduced transit times and increased frequency offered by surface transport, importers are likely to increase their dependence on this mode. While it is unlikely that air imports will actually be reduced, given current developments, the growth of air imports is likely to be severely restrained. On the other hand, few of the current air exports are suitable for switching to surface transport. Some horticultural produce, such as avocado pears, mangoes and pineapples are less perishable products which could be sent by surface to Europe, some of the meat to North Africa may also switch to the surface mode, and increased surface shipping frequencies will help to open up Western Asian markets for these products. Overall, though, lack of air freight export capacity is likely to be a major hindrance, and IT IS RECOMMENDED (3) that a detailed study be carried out on the long term effect of the opening of the Suez Canal on air freight import and export requirements. This could be part of a general analysis of the effects on the economic infrastructure, to aid development planning.

While it was not possible to determine the quantities of air mail on many routes due to lack of data, there was little evidence that volumes are currently constraining significantly scheduled capacity for air freight from and within the

(g) 5th freedom by European carriers between Burundi/Rwanda and Lubumbashi in Zaire.

The above are for both freight and passenger operations (complementary loads would be necessary at first). Existing bilaterals tend to be flexible where freight operations are concerned and in general, where capacity clauses are invoked, two all-freight services are considered equivalent to one passenger service. Further study would undoubtedly expand the list, and the need for additional agreements with States outside the Region is great - these, however, are essentially the responsibility of the individual countries concerned, unless joint negotiating machinery is established (see below).

Licences for non-scheduled operations are usually granted on an ad hoc or short-term series of flights basis when a shipment justifies carriage by air but by its nature it cannot be carried economically by the national airlines concerned. An important recent development is modification of such a policy by the British Government, recognizing the developing function of freight charter carriers, to offer longer term licences to those carriers operating out of the United Kingdom. There are the carriers that dominate charter operations to and from Africa.

While sovereignty considerations are sometimes the major hindrance to traffic right negotiation, the usual constraint is the fact that revenue achievement by the carriers concerned is unlikely to be equal, especially where the traffic density is low. Such inequalities can be removed, either by setting up commercial pooling agreements (of which there are very few within Africa) or by imposing 'head' taxes (i.e. a fee on the additional passenger and/or freight traffic carried). The latter approach would aid smaller countries with insufficient resources to establish their own international airlines. Development of such agreements would be aided by the intervention of expert third parties, whose only concern was the equitable allocation of revenues. AFCAC has been concerned with bilateral agreements for some time, and published a document, 'The Policy of Member States on Bilateral Air Transport Agreements' as circular no.3, in September 1973. This and subsequent AFCAC work on the subject, could be a start towards establishing agreements such as the above, which are discussed in the specific context of multinational developments in the Region in Section 12.4.2.

As far as extra-regional agreements are concerned, the establishment of joint negotiating machinery could strengthen the collective position of African countries, the corporate philosophy being based on the principle of a specified share in traffic and/or revenue. The experience of the East African Community, which negotiates jointly on behalf of its member States; and of the Air Afrique member States, which negotiate independently, following consultation, is of relevance, and could be used as a basis for establishing joint negotiating machinery.

#### 10.5 Lack of knowledge of the benefits of air freight

The benefits of air freight have yet to be perceived in many countries, not only in the Region, but all over the world. This applies, not only to the individual shipper, but often to the agent, the airlines themselves and even the economic planning authorities. This has led to inadequate development within the economic and surface transport infrastructure, particularly for the land-locked countries.

'Air Freight as a Development Tool' is included as annex D and hopefully demonstrates some benefits to be gained at all levels by increased development of air freight in the Region. Arguments from this text may be useful in stimulating such development.

#### 10.6 Transshipments

Related to 10.2 and 10.3 above, is the problem of transshipment delays. Some stations within the Region have a particularly poor record where transshipments are concerned, delays of up to a month being not uncommon. Handling of transshipments on a through airwaybill of IATA airlines is free, and there is apparently little incentive to handle them quickly, particularly as by definition they are not destined for the host country, and the persons most concerned with the shipment are remote from the procedure. However, efficient handling of transshipments is likely to generate a higher throughput and effectively increase aircraft frequency and hence landing and associated fees. As an example, Nairobi already serves as an air-to-air entrepôt, loads from incoming freight charter flights from Europe being broken down and distributed by East African Airways to neighbouring countries - handling fees equivalent to import handling fees are also obtained for such operations.

While shippers and agents tend to avoid transshipment wherever possible, use of high frequency intercontinental passenger routes linked to intra-regional services makes sense in terms of aircraft utilization and (given efficient transshipment) door-to-door delivery time. It is thus important to recognize that where transshipments form a significant proportion of traffic, specific facilities in terms of storage and personnel should be allocated in order to expedite throughput.

#### 10.7. Packaging materials

Virtually all the countries visited are undergoing shortages of packaging materials, and packaging for air freight is no exception. In addition, domestic production is sometimes of poor quality and costs as much as imported production, which is itself extremely expensive. Packaging costs per kg for fruit and vegetables are in some cases at a level of 70 per cent of the air freight rate to Europe; so this is evidently a critical factor. Some African countries have developed new packaging techniques using 100 per cent indigenous materials (mainly raffia) and labour-intensive production. While much of the existing packaging is designed to meet market requirements and to be used right through to retail display, there seems to be scope for further research and production into new methods and the possibility of developing collapsible packaging for return by air or surface means. In annex D there is an example for the packaging of tea which reduces the cost of packaging by 90 per cent and the cost of air freight by 11 per cent; so the benefits of such research could be substantial.

UNIDO has already carried out considerable research on packaging for developing countries, and ECA is considering obtaining the services of a packaging expert to deal with the particular problems of the African Region. It will be seen that such an expert could be of considerable benefit to air freight development and IT IS RECOMMENDED (7) that a joint ECA/UNIDO research and development programme into packaging for air freight in Africa be established. ECA has already contacted UNIDO on this subject and received a positive preliminary response.

Containers and pallets are gradually being introduced into the Region, but only on wide-bodied combination and freighter aircraft operating to and from Europe. Pallets tend to be in short supply, and, for example, with many chartered freighter aircraft, it is the ones carried on board that have to be used - loading pallets while the aircraft is on the ground negates the advantage of unitizing loads. Pallets are simple to construct from indigenous materials and could be added to the above-recommended programme, in accordance with IATA and ICAO standards.

#### 10.8 Availability and cost of fuel

Each of the land-locked areas visited during the Study has had aviation development hindered by shortage and high costs of aviation fuel. The lines of supply are inadequate, an infrastructural problem for all modes of transport outside the scope of this Study. The aviation inputs in these countries are therefore higher than elsewhere (and involve a high proportion of imported material) leading to higher costs and hence reduced air freight potential, for which outbound demand is highly elastic. Fuel now comprises some 30 per cent on average of the direct operating costs of charter carriers; so this is a major problem. Some of the land-locked countries may have to offer incentives in the form of higher revenues or reduced landing fees to attract charter operators.

#### 10.9 Statistical production

The quality of statistics relating to air freight is not always of a sufficient standard to enable sensible analyses and planning to be carried out. At annex F are attached some 'Guidelines for Air Freight Statistics' to aid future development of statistical production. As discussed in the 'Guidelines', the requirements will differ from country to country, depending on the nature and volume of the traffic.

## SECTION 11. RATE STRUCTURES

Both charter operators and IATA airlines use the policy of subsidizing northbound freight from Africa by the inbound higher yield traffic in order to generate demand. Northbound charter rates are based on the simple philosophy of estimating what rate the commodity will bear, and offering this, provided the revenue covers the marginal difference in costs between flying an aircraft full and empty. There is little evidence that southbound rates, which we generally based on round trip operating costs have been reduced as a result of obtaining such backload. The IATA rate structure is more complex, but does not vary from day-to-day (a factor which often leads to unutilized capacity). There is no single rate, but a wide variety based on one 'general rate' from any one point to another with a number of discounted rates (specific commodity rates) related to the size and method of packing of the consignment (higher weight 'breakpoints' define lower rates per kg); the direction of the shipment and the nature of the commodity. IATA rates are normally applied according to weight criteria, unless the volume exceeds 7,000 cubic centimetres per kilogram when a density rule is invoked and charges are made pro rata. Where bulk volumes are concerned, the northbound rates are surprisingly similar between charter and IATA carriers, although charter operators show a highly significant competitive price advantage southbound.

Tables 3 and 4 below have been compiled to demonstrate some elements of the rate structures in the region in mid-1974. The IATA Unit of Value (IUV), approximating to \$US1.0, is used as the currency unit.

In the case of Africa, even the general IATA rates have been devised with imbalances in order to generate northbound traffic to Europe (in a ratio between 1.6 and 1.9 southbound: northbound). Assuming this policy is devised to generate equal volumes of traffic (which has not occurred) the average of southbound and northbound rates per ton-kilometre should be roughly equal for all points (slightly lower for lower cost longer-haul). As shown by table 3 there is considerable variation between different routes. On routes within Africa, where there is no imbalance in general rates by direction there is similar variation in the levels per tonne-kilometre, although the levels are in the same region as the average of the northbound/southbound levels. While most of these rates compare favourably with the 45 kg breakpoint rate on the major London-New York route, on which costs should be significantly lower due to economies of scale, this route has 3 further breakpoints at much lower rate levels. There is no over 45 kg breakpoint in the general rate in IATA Tariff Conference 2, which includes Africa, and yet very little traffic southbound is carried using commodity rates.

Examples of specific commodity rates are also shown in the tables. These cover a limited number of origins as some of the francophone territories have yet to develop any outbound specific commodity rates and others generally have rates for fruit and vegetables only. The Association des Transporteurs Aériens de la Zone Franc (ATAF), which includes some operators in north and west Africa, has developed a flexible system of establishing commodity rates to and from metropolitan France and between other countries represented by the operators. These rates are outside IATA jurisdiction and based on theoretical 500 kg and 1,000 kg 'general rate' breakpoints. No analysis has been possible of this system for the ECA study as requests for further information to ATAF itself and to some of its member airlines invoked no response.

Table 3: Some comparative air freight rates

Commodity	Origin	Destination + = or return	Distance (shortest available route)	Estimated charter rate IUV	IATA general rate	Highest IATA rate breakpoint kg	Lowest IATA rate per ton-km
General	+London	+New York	+5,530	0.850	2.590 (1.100)	500 (45)	0.199 (0.468)
	+London Accra	Accra London	5,054	n.a. n.a. n.a.	2.714 1.710 2.212	45 45	0.537 0.338 0.438
	+London	+Algiers	1,640	n.a.	0.759	45	0.462
	London Kinshasa	Kinshasa London	6,539	n.a. n.a. n.a.	2.997 1.901 2.449	45 45	0.458 0.291 0.375
	London Lusaka	Lusaka London	8,197	1.890 0.617 1.254	3.972 2.149 3.061	45 45	0.483 0.262 0.373
	London Nairobi	Nairobi London	6,782	1.360 0.451 0.906	3.704 2.042 2.873	45 45	0.547 0.301 0.474
	+Accra +Addis Ababa +Dakar Khartoum	+Lusaka +Kinshasa +Nairobi Kinshasa	3,909 3,067 6,557 4,328	n.a. n.a. n.a. n.a.	1.627 1.660 2.860 1.831	45 45 45 45	0.416 0.541 0.437 0.423
	Algiers Nairobi	Nairobi Algiers	5,653	n.a. n.a. n.a.	3.007 1.865 2.436	45 45	0.531 0.335 0.433
		Average					

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Table 3: Some comparative air freight rates (contd.)

Commodity	Origin	Destination	Distance (shortest available route) km	Estimated charter rate IUV equivalent	IATA general rate	Highest IATA rate breakpoint kg	Lowest IATA rate per ton-km
Fruit and vegetables	Abidjan	Frankfurt	5,071	n.a.	1,710	500 0.423	0.083
	Addis Ababa		5,330	0.464	1,920	500 0.477	0.089
	Dakar		4,550	n.a.	1,591	250 0.463	0.102
	Kigali		6,995	0.638	2,007	500 0.577	0.082
	Nairobi		6,280	0.451	2,042	1,000 0.429*	0.068
	India (Delhi)		6,086	n.a.	2,146	100 0.927	0.152
	Israel		2,140	n.a.	1,321	500 0.345	0.161
	Mexico		9,897	n.a.	1,862	500 0.970	0.098
	South Africa		9,196	0.330	2,281	1,000 0.614	0.067
	USA (California)		10,277	n.a.	1,637	500 1.637	0.159
Cut flowers	Kigali	Frankfurt	6,995	0.933	2,007	250 0.927	0.133
	Nairobi	Frankfurt	6,280	0.552	2,042	500 0.645	0.103
	Colombia	Miami	2,421	n.a.	0.520	100 0.350	0.145
	South Africa	New York	3,979	n.a.	0.710	100 0.460	0.116
Meat		Frankfurt	9,057	n.a.	1,750	500 1.020	0.111
		Frankfurt	9,196	n.a.	2,281	250 0.922	0.100
	Addis Ababa	Beirut	3,022	n.a.	1,401	1,000 0.698	0.231
		Frankfurt	5,330	0.577	1,920	100 0.853	0.160
	Mogadiscio	Rome	5,499	n.a.	1,747	250 0.649	0.118
	Argentina	Frankfurt	11,506	n.a.	1,960	1,000 0.640*	0.056
	South Africa	Frankfurt	9,176	n.a.	2,281	1,000 0.710	0.077
	Addis Ababa	Accra	4,346	n.a.	2,098	1,000 0.262	0.060
	Khartoum	Accra	3,718	n.a.	1,863	1,000 0.910	0.245



Table 3: Some comparative air freight rates (contd.)

Commodity	Origin	Destination	Distance (shortest available route) km	Estimated charter rate IUV	IATA general rate	Highest IATA rate breakpoint kg	IATA rate per ton-km	Lowest IATA rate per ton-km
Meat (contd.)	Nairobi	Accra	4,210	n.a.	1,869	1,000	0.413	0.098
	Nairobi	Kinshasa	2,397	n.a.	1,579	1,000	0.422	0.176
	Rhodesia	Kinshasa	3,514	n.a.	1,014	250	0.554	0.158
	S. Africa	Kinshasa	2,760	n.a.	1,256	1,000	0.351	0.127
	Khartoum	Tripoli	3,355	0.605	1,304	1,000	0.587	0.175
	Nairobi	Tripoli	5,285	n.a.	1,547	250	0.527	0.100
Hides and skins	Addis A.	Rome	4,446	n.a.	1,671	100	1.074	0.242
	Khartoum	London	4,899	0.488	1,815	100	0.987	0.201
	S. Africa	Rome	7,683	n.a.	2,139	100	0.885	0.115
Tea	Bujumbura	London	6,787	0.315	2,019	1,000	0.537	0.079
	Nairobi	London	6,782	0.451	2,042	1,000	0.543	0.080
Mineral ore	Entebbe	London	6,442	n.a.	1,971	1,000	0.651	0.101
	Kigali	Brussels	6,544	0.584	2,019	1,000	0.651	0.099
	Lusaka	London	8,197	0.617	2,149	1,000	0.855	0.104

\* = Government-directed.

O = Subsidized.

Table 4: Air freight rate structure summary

Commodity	Origin/ Destination	Charter		IATA		Average of IATA co-rate/lowest general rate	As packed density kg/m <sup>3</sup>	Average IATA rate per t-m <sup>3</sup>
		Average rate per t-k IUV	Breakpoint used kg	Average rate per t-k	%			
Fruit and vegetables	Africa/Europe	0.083	500	0.083	27.0		250	20.8
	Other/Europe	n.a.	500	0.139	39.1		250	34.8
Cut flowers	Africa/Europe	0.110	250	0.116+	40.6		130+	15.1
	Other Inter- continental	n.a.	250	0.126+	50.0		130+	16.4
Meat	From Africa	0.108	1,000	0.154	40.5		1,100	169.2
	Within Africa	n.a.	1,000	0.147	30.5		1,100	161.7
Hides and skins	Africa/Europe	n.a.	100	0.186+	53.3		100+	18.6
Tea	Africa/Europe	0.057	1,000	0.080	26.6		150	12.0
Mineral ore	Africa/Europe	0.082	1,000	0.101	45.0		Highly variable	-

+ = Bears volume surcharge due low density.

As far as fruit and vegetable exports by air are concerned, IATA provides a good service for Africa. The rates are lower than the equivalent ones elsewhere in the world, close to charter rates, and differing little at comparable break-points by origin/destination. The rates for cut flowers are also reasonable compared with those from Colombia.

There is no apparent logic in the structure for meat shipments. The rates differ widely, both within and from Africa. In particular high-priced meat from Nairobi is charged 43 per cent lower per ton-kilometre at a lower breakpoint than lower priced meat from Khartoum to Tripoli (both these routes are also served by charter carriers, the Khartoum-Tripoli volumes having been very great indeed). The rates for hides and skins also vary by route, and are relatively high with only a low breakpoint, to accommodate the high value segment of this market. This ECA study has produced much evidence to show that lower bulk rates would generate a great deal of the lower value traffic as well; revenue dilution could be avoided by specifying bulk low rates for cattle, sheep and goat skins only. IATA rates for tea and mineral ores each fall within a narrow band and are substantially higher than charter rates, as IATA carriers are not particularly interested in carrying these bulk commodities.

Table 4 was drawn up using weighted averages of traffic on major routes for Africa, and using the origins and destinations of table 3 for other routes (subsidized and government-directed rates being omitted). To compensate for the lack of a general rate breakpoint greater than 45 kg, commodity rates from Africa are proportionately lower relative to the general rate than elsewhere. In Africa the IATA density rule is generally less important than elsewhere, as uplift capability is lower due to the 'hot and/or high' conditions. Nevertheless, the conversion factor used is still too low, at 143 kg/m<sup>3</sup>, to obtain maximum revenue from uplift, as the volumetric capacity of aircraft will still be the limiting factor at this density. Some incongruities become apparent when examining the equivalent rates per volume in the final column of table 4.

It is evident that Africa requires a more carefully thought out rate structure, possibly incorporating some of the 'ATAF' concepts, and as, with the increasing use of wide-bodied aircraft and hence unit load devices, the time is ripe for change, IT IS RECOMMENDED (Recommendation 5) that a review of all international rates be commissioned, outside the framework of IATA but taking IATA procedures into account, to include combination scheduled, and all-freight scheduled and charter operations. The major factors to be considered are:

- (a) The true cost of carriage, be it marginal or full direct costs;
- (b) The differential between f.o.b. price and current wholesale market price of commodities;
- (c) The density of the commodities
- (d) The available and potential capacity, both from African carriers and from the offers likely to be obtained from foreign carriers at the proposed rates.

Obviously, marginal cost space on scheduled combination aircraft should be filled as a priority. One solution which would simplify procedures and yet maintain full freight space on scheduled combination aircraft could be to scrap commodity rates into Africa, and compensate by introducing higher general rate breakpoints and ULD ('Unit Load Device' or container/pallet rates). Outbound and within Africa, there is in any case a limited range of major commodities, and breakpoints could be extended and rates evaluated on the above basis in order to obtain freight load factors as high as possible, other commodity rates being abolished and a further general rate breakpoint being introduced to compensate. Government-direction of rates should be avoided wherever possible, and subsidies given instead. As will be seen from table 3, government-direction causes distortion in the rate structure, and will affect carriers' interest in picking up freight at these rates when higher-yield freight is available elsewhere on their routes. An advantage of subsidy over government-direction, is that modifications to policy may be made unilaterally by the Government concerned. Capacity constraints caused by peaking and seasonality, and the possible influence of rate factors were discussed in Section 10.1.

As mentioned elsewhere in the text, the real need for Africa is in charter operations; which find their own rate levels according to costs and are more logical than scheduled rates, but are not published and are subject to variation. At current cost levels however, and with the available range of commodities at current world prices, a general rule for rates outbound from Africa should be that no aircraft, scheduled combination or all-freight, should leave with a significant proportion of empty freight space provided marginal costs are covered.

In Section 12.2 it is suggested that increased use of semi-palletized aircraft could bridge the gap between the capacity constraints of passenger aircraft and the available capacity of all-freight aircraft. Associated with routes developed in this way would need to be high breakpoint rates. A novel, but interesting development could be the selling of freight space as part-charter, and serious consideration should be given to such development in the above analysis.

Where perishable produce is concerned, air freight presents several problems. If an aircraft is delayed, or is inadequately cooled, the produce deteriorates. On the other hand, delivery of the produce to the aircraft is obviously left as late as possible in order to avoid deterioration, and delivery may be late, or the forecast load size not reached. At present, under IATA regulations, the scheduled carrier takes no responsibility for deterioration of perishable produce, and the shipper does not pay for unused space on the aircraft which he or she requested or for the cost to the airline of any delays caused by late delivery. IT IS RECOMMENDED (Recommendation 6), therefore, that consideration be given to the establishment of contracts with penalty clauses for the scheduled airline if it fails to supply the specified capacity or fails to deliver the produce in good condition, and for the shipper if he or she fails to supply the specified produce on time. This system has worked well in Ethiopia, and is being considered in other African countries following the author's visits. A possible disadvantage is that the carrier may be cautious and offer limited capacity, but additional capacity found to be available could be utilized outside the contract, as at present.

While the average operating costs for both freighter and passenger aircraft fell from year to year with the help of advances in technology and economies of scale prior to 1973, following the substantial increases in fuel prices these costs rose significantly, and they are now expected to rise further at a slow rate over

the next few years. In the past general levels of rate changes (including the increases of 1973 and 1974) had little effect on air freight traffic for the region, since the majority of this was in emergency items and perishables, and hence demand was relatively inelastic. While it is a revision of the structure rather than a general reduction in rate levels that will stimulate efficiency and generate additional traffic, the weighted average level of the revised structure will need to rise in line with cost levels, which will affect the increasing volume of traffic moving according to total distribution cost criteria. However, given the increased efficiency of a co-ordinated network of freighter operations, the cost per revenue-ton-kilometre (as opposed to the cost per capacity-ton-kilometre) could actually fall. The competitive position of air freight against surface freight is also likely to improve, as the recent general rise in inflation has led to higher relative cost increases in surface transport, and in terms of total distribution costs there is still room for increased efficiency in the ancillary costs associated with air freight.

## SECTION 12. DEVELOPMENT SCHEMES

Apart from the problem-solving recommendations already offered in earlier Sections, there are further strategic developments which could improve efficiency and stimulate the substantial air freight potential shown to be available in the region. The problem of directional traffic and yield imbalances is a major constraint, and, as mentioned, the ECA is of the opinion that some part of this, at least, could be solved by increased regional and subregional co-operation. As a strategic issue, this is discussed below (Sections 12.1 to 12.4), together with other aspects of development within the direct sphere of aviation influence. As discussed in Section 5, there are further barriers to air freight development, such as import restrictions, tariff barriers, sanitary regulations, lack of financial agreements, etc., which are only slowly being dismantled. It is hoped that this report will provide a further stimulus to progress in the areas.

### 12.1 The problem of directional traffic and yield imbalances

The ICAO study on "Air Freight and Air Mail - Africa" pointed out that air exports from Africa are to a large extent low rated perishable items while air imports are to an equally large extent high rated manufactured articles. Thus the weight, value, and particularly the freight revenue yield of air imports in general exceed those of exports; so that the airlines concerned are faced with serious problems of traffic and revenue imbalance. While, as shown by the export situation covered in Section 9.1, this general situation remains true, and while fast-rising fuel prices are emphasizing the need to subsidize outbound rate levels by inbound ones in order to generate demand, some noteworthy developments are taking place. Firstly, with slowly increasing acceptance of total distribution costing concepts, inbound traffic, especially to land-locked countries, is growing fast, particularly using chartered freight aircraft as shown by Section 8.2. However, secondly, exports within and from Africa of meat are growing even faster, as are exports of fresh horticultural produce (especially to Europe). Thirdly, while industrial development for export is currently limited in the region, some countries are developing export-oriented, labour intensive light industry, highly dependent on air freight to reach the market place. Finally, and most importantly, these developments have led to a situation whereby some countries are actually experiencing an acute shortage of air export capacity whilst their neighbours are still generating an excess. Further use of palletized mixed freight and passenger aircraft (as will be discussed in Section 12.2) would provide further capacity while utilizing currently unused spacetaken up by passenger seats. However, as will be shown in Section 12.2, carriage of freight (especially where perishable) on services predominantly attuned to passenger requirements is by no means ideal, and substantial increases in the level of all-freight scheduled and charter operations will undoubtedly come about. Formal co-operation on charter operations (initially) between countries with surplus and deficits of capacity, and multipoint routings (e.g. A to B to C to A, rather than A to B to A and/or A to C to A), would obviously increase utilization and reduce costs. Further consequences and opportunities of such co-operation are also discussed in this Section.

Some information to indicate current and anticipated future imbalances is given below. The deficiencies of the regional published data will immediately become apparent (no freight charter traffic data are available at all, for example). The data compiled during the ECA air freight study are more useful (and indicate demand rather than carriage), but could not be comprehensive and

a request for individual member States to provide further data is included in Section 12.3. As we are here concerned with aviation infrastructure rather than trading patterns (covered elsewhere in the Report), only broad indications of commodities are given.

#### 12.1.1 Published multinational data

As a crude guide to major imbalances for scheduled international services, one may take the ICAO Traffic Flow Statistics for September 1972 (the latest available at the time of writing) between city pairs and select routes with a one-way traffic flow of more than 40 tonnes (assuming, even on low frequency routes, that passenger services could carry smaller volumes) and an imbalance in flow of more than 20 tons (a freighter aircraft load, say). From this are produced tables 5 (intraregional) and 6 (interregional) below, carriage on all-freight services being marked with an asterisk.

Further information is available from statistics published by ASECNA (Agence pour la sécurité de la navigation aérienne en Afrique et à Madagascar). These cover Madagascar and 13 francophone countries in West Africa and are more up to date than the ICAO statistics, but do not give uplift-discharge data for all-freight aircraft, only for freight on scheduled passenger operations. However, examination of the monthly and annual data for 1973 confirms some of the imbalance data shown in the tables, and supplies two further intra-African items not recorded in the ICAO statistics (tons in 1973):

<u>From</u>	<u>To</u>	<u>Out</u>	<u>In</u>
Accra*	Dakar	42	549
Kinshasa	Ndjamena	383	826

In addition, the ASECNA data indicate further deficits in imbalance with France, both in terms of quantity at the relevant stations in table 6 and for further points (Brazzaville, Douala and Tananarive).

Before any conclusions are drawn from the above data, two further precautionary notes are made:

(a) The figures are based on uplift and discharge data, not on true origin and destination, and hence include transshipment traffic.

(b) The ICAO data is out of date, incomplete (European points to Lusaka being noteworthy omissions), and for one month only, a month outside the prime horticultural export season.

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\* This may be in error as Ghana DCA statistics recorded these flows as 11 out, 5 in.

Table 5: Interregional traffic imbalances by city pairs on scheduled services, September 1972 (tons)

From	To	Brazzaville	Bujumbura	Khartoum	Libreville	Lagos	Lusaka	Monrovia	Nairobi	Niamey	Ndjamena	Ouagadougou	Tanana- nive	Tripoli	Tunis
Abidjan	Out		43+35*			12+53*		72		28					
	In		21			26		n.a.		15+229*					
Accra	Out					63		66							
	In					65+25*		n.a.							
Addis Ababa	Out								25						
	In								68						
Bamako	Out								n.a.		5+25*				
	In								12*		10				
Bangui	Out	46+98*		8*		1+16*				20+27*					
	In	33		191*		n.a.				68+141*					
Benghazi	Out								No ser- vices						
	In								51*						
Brazzaville	Out									n.a.					
	In									87*					
Cairo	Out			93					15						
	In			17					21+47*						
Dakar	Out							30							
	In							51							
Dar es Salaam	Out					42			48				15		
	In					11			93				83+86*		
Djibouti	Out														
	In														
Douala	Out					60+162*				282*					
	In					18+100*				242*					
Entebbe	Out		46												3
	In		5												34+35*
Libreville	Out					3+117*									
	In					3									
Lusaka	Out								14+29*						
	In								46+129*						
Reunion	Out												8+65*		
	In												137		
Tripoli	Out								No ser- vices						
	In								117*						



Table 6: Interregional traffic imbalances by city pairs on scheduled services, September 1972 (tons)

From (Africa)	To	Aden	Amster-	Athens	Beirut	Bombay	Bor-	Brus-	Frank-	Geneva	Kuwait	London	Madrid	Marsei-	Paris	Rome	Zurich
Abidjan	Out														22		
	In														52		
Accra	Out										5						
	In										47						
Algiers	Out														8		
	In														141+64*	7	
Asmara	Out															48	
	In														23*		
Bangui	Out														3		
	In																
Cairo	Out				76	36			50+49*	40	26						
	In				194	95			45	5	75						
Casablanca	Out														109+12*	6+19*	
	In														127+34*	2	
Cotonou	Out						90*										
	In						No ser-										
							vice										
Dakar	Out							63	24+61*	76					17		27+33*
	In							37	12+75*	39					48		10
Entebbe	Out										89					53	
	In										50					4	
Kinshasa	Out							8									
	In							67									
Lagos	Out							6				19				1	
	In							41				60				26+41*	
Libreville	Out														13+3*		
	In														23+79*		
Luanda	Out			65				11			29						
	In			1				78			n.a.						
Nairobi	Out	35		73					183+25*		108					62	117*
	In	9		48					106+63*		216+29*					72+103*	62
Niamey	Out														9+1*		
	In														12+333*		
Ndjamena	Out														8	3+25*	
	In														19+91*	23+373*	
Ouagadougou	Out															4+25*	
	In														7		
Tripoli	Out	2															1+65*
	In	58+24*															34+126*
Tunis	Out										6				1		
	In										11+43*				82		

However, even bearing the data limitations in mind, some interesting points arise. In the intra-African picture, for example, even considering that northbound traffic may have been subsidized by high yield southbound loads from Europe, it may be seen that some imbalances operate in reverse directions, for example:

(a) Abidjan to Cotonou and Lagos, Dakar to Accra, West-East; Lagos to Accra, East-West;

(b) Ndjamena to Bangui, Bangui to Brazzaville, and Douala to Libreville, North-South; Douala to Bangui and to Ndjamena, South-North;

(c) Cairo to Khartoum, North-South; Nairobi to Addis Ababa and to Cairo, South-North;

(d) Entebbe, Nairobi and Dar es Salaam to Lusaka North-South; and Tananarive to Djibouti, South-North.

A notable feature of the analysis is that all positive flows lead to Lusaka and from Nairobi.

On the interregional side, little significance should be attached to the data for Cairo, due to the high frequency of passenger aircraft and transit services there, and for Dakar, due to the high density of transit traffic between Europe and South America. On the evidence of this data then, there is very little to counter the southbound domination, apart from flows from Luanda (to Athens, although this may well be traffic in transit from South Africa), from Cotonou (to Bordeaux), from Ouagadougou (to Paris), from Bangui (to Paris), from Entebbe (to London and Rome), from Nairobi (to Frankfurt, London and Rome) and from Casablanca (to Rome).

#### 12.1.2 Additional data on demand and carriage derived from ECA study (see Section 9 for details)

##### 12.1.2.1 Outbound flows exceeding inbound

Botswana: Botswana is seriously considering sending chilled beef by air to Europe and to some African points. The volume would be considerable and south-bound loads would be required to provide an economic operation. A charter carrier uplifted 4,300 tonnes of Botswanan meat and 6,300 tons of mining equipment for Zambian destinations in 1973. Botswana already exports some horticultural produce to Europe, and if direct capacity became available, export levels could be raised considerably.

Chad: As mentioned in 9.1.2, exports of meat by chartered aircraft to Zaire are around 180 tons per month, with Air Afrique carrying 590 tons also in 1973. Air Afrique also carried in 1973 146 tons of meat to Central African Republic, 1968 tons to Congo, 590 tons to Zaire, 311 tons to Gabon and 137 tons to Libya (expected to increase dramatically) with little return load.

Ethiopia: During the horticultural export season up to 1,300 tons of produce per month have been exported to Europe from Asmara (primarily on charter aircraft returning from the Gulf area) and some 100 tons per month from Addis Ababa. The major constraint on both origins is shortage of capacity. Ethiopia could export

meat to Central and West African countries if suitable charter backloads were available, and is also establishing a disease-free ranching zone and abattoir with a view to exporting to Europe.

Ghana: The Air Freight and Air Mail Planning Group, established to follow up the ICAO study of "Air Freight and Air Mail - Africa", feels that the introduction of air freight rates marginally lower than the existing IATA rates would mean considerable growth in fruit and vegetable exports to Europe. Ghana also has industrial potential for air exports, particularly in aluminium ware. Ghana has an import requirement for meat and currently has a negative air trade flow with European points (particularly Frankfurt, London and Rome), which will need to be countered before there is surplus demand. Consumer goods are already flown into the Sahelian zone with return loads of meat by a charter company (see Section 8.2.2).

Kenya: Kenya exported 10,157 tons of horticultural produce in 1973 (mainly to Frankfurt and London) and use of supplemental capacity is already an essential part of the horticultural distribution system (around 100 tons per week in the season). Total uplift on scheduled aircraft to Frankfurt was 2,348 tons in 1973 and to London was 3,170 tons, against discharge figures from these points of 455 tons and 1,115 tons respectively. The charter figures also show major imbalances, the uplift to London being 2,854 tons, discharge from London only 1,481 tons in 1973. To all destinations uplift in 1973 was 10,163 tons (scheduled), 5,848 tons (charter), discharge being 4,424 tons and 3,667 tons respectively. These imbalances occurred despite measures introduced by the East African Community such as a reduction in customs tariffs for air imports. With a planned passenger traffic growth of 11 per cent per annum and a planned horticultural export growth of 25 per cent per annum (including the development of "off-season" markets) the need for all-freight aircraft will obviously increase. Kenya is likely to experience further curbs caused by capacity shortages on the export development of meat, dairy and horticultural products to West Africa; meat to Zaire; beef and horticultural produce to Western Asia.

Lesotho: As mentioned in 9.1.2, Lesotho wishes to construct an export abattoir and send chilled meat to Europe (cf Botswana).

Mauritius: The development of export processing industries by Mauritius, which are geared up to a system of importing by sea and exporting by air, along with horticultural and fishery exports, is expected to lead to an increasingly large imbalance, mainly with Europe, reaching 7,900 tons by 1982 (5,500 non-seasonal) and shortages of capacity. In addition Mauritius acts as an air entrepôt between Australia and Africa, and lacks capacity to Africa to carry out this function to its full capability.

Rwanda: The ECA study has shown that by 1976 air import potential, assuming charter operations, to Rwanda will be 1,400 tons (27 tons per week), while the export potential will be much greater at 6,615 tons per annum (80 tons per week with an additional average 77 tons of horticultural produce from November to April). Imports are primarily from Brussels, while exports would be to a variety of destinations, mostly in Europe.

Somalia: Some of the exports from the major ranching project will be made by air.

Sudan: Sudan is currently a net air importer, with substantial traffic on both scheduled and chartered aircraft arriving from Europe, and in particular the United Kingdom. It will be some time before chilled meat exports to Libya and fruit and vegetables to Europe compensate the inbound loads. However, the exports of chilled meat, fruit and vegetables (often using the chartered aircraft arriving from Europe) within Africa and to Western Asia are constrained by lack of backload.

Tanzania: While Tanzania is currently a net air importer, lack of direct capacity is hindering the development of horticultural exports to Europe and Western Asia from Kilimanjaro. The development of beef for exports will necessitate further capacity requirements within Africa.

Uganda: Shortage of capacity has been a contributory factor to a decline in horticultural exports to Europe. However, such exports are planned to reach 1,100 tons in 1974/75 and increase rapidly thereafter, provided capacity is available. Hides and skins (to Europe) and meat (within Africa) are further prospects.

#### 12.1.2.2 Inbound flows exceeding outbound

Malawi: It is understood that significant numbers of freight chartered aircraft operate from Europe to Malawi carrying investment, emergency and consumer goods, with very little backload available (of Zambia).

Nigeria: Considerable volumes of freight are carried to Nigeria from the United Kingdom on behalf of the Crown Agents by chartered aircraft (at least seven services a week) with only limited return loads, apart from the daily UTA service to the Peugeot plant at Kaduna, mentioned in 8.2.3.

Zaire: Zaire is a major air importer of meat, using chartered aircraft. Currently, such imports total about 600 tons per month to Kinshasa from Angola (40 tons), Chad (180 tons), Rhodesia (120 tons), Senegal (60 tons), Somalia (50 tons), Sudan (100 tons), etc., though individual country levels fluctuate from month to month. Horticultural produce is also imported by air from South Africa (50 tons per month). Demand for meat in particular is much higher, but further imports may be obtained by surface transport. Air exports are limited, and Kinshasa has a major negative air trade imbalance with Europe, especially Belgium (320 tons per month).

Zambia: In 1973 Zambia's air imports amounted to 24,238 tons (34 per cent from Europe, 35 per cent from South Africa and 18 per cent from Botswana), while air exports reached only 2,162 tons. No less than 61 per cent of the total tonnage was carried by chartered aircraft. It is not expected that improved surface communications to the sea arising from current political changes in Southern Africa will modify this situation dramatically. In addition air charter capacity from the Far East would reduce the costs of certain imports.

#### 12.1.3 Conclusions

Even the limited information above will indicate that significant opportunities for co-operation exist, particularly as the demand for inbound and outbound carriage in any one country will fluctuate from week to week (sometimes to the extent of reversing an imbalance). For example, Malawi and Zambia are countries with negative air trade imbalances with Europe, while nearby Kenya, Mauritius, Rwanda, Tanzania and Uganda are short of capacity. Often lack of information contributes to aircraft

flying unnecessarily empty. Some charter operators arrive with loads for an African country from the Far East and have no knowledge of return load demand from neighbouring countries. On the other hand Western Asia is known to have high demand for African meat and horticultural produce, but current exports are completely constrained by lack of air capacity. A point which is not often recognized is that available capacity on all types of aircraft is considerably less from most points in Africa than to these points, due to the technical constraints imposed on the aircraft having to take off in "hot and high" conditions.

This study has established some opportunities for co-operation, and further opportunities undoubtedly exist elsewhere (although the Air Afrique member States operate a closed shop on charter operations, relying on the scheduled operations of Air Afrique and UTA to serve the markets). Also, it has been shown, demand is higher than available capacity in many areas. The possible development of formal air-sea entrepôt points (see 12.5), may not only develop trade to and from Africa, but also provide further opportunities for intra-African trade development generated by the services offered.

## 12.2 The need for co-ordinated all-freight operations

Because the approach to licensing charter operations is usually ad hoc, such operations are often inefficient, as the broker concerned may not be able to obtain a return load in the vicinity of the delivery point at short notice. There are cases on record in 1974 of chartered aircraft flying from Europe to Zambia with industrial goods and then flying empty to Hong Kong (a distance of 13,000 kilometres) to pick up another load destined for Europe, a costly exercise for the shippers and consignees concerned. Once a broker has obtained a one-way load for a carrier, his own commission for obtaining a return load is of marginal benefit at the low rates holding from Africa, particularly as solving additional licensing problems may be time-consuming and costly. The embryo regionally-based freight charter operators, which would usually require either southbound or backload traffic from neighbouring countries to achieve economic viability, are likely to experience particular problems in obtaining licences. For example, a British carrier taking goods from London to Zambia and subsequently picking up horticultural produce from Kenya bound for London on the return journey needs only licences for carriage involving its own country as origin or destination. However, a Zambian carrier would be operating between two foreign countries on the backload leg, and the British Civil Aviation Authority in particular would be reluctant to give a permit which might draw traffic from a British carrier. This subject is discussed further in Section 12.4.2.

More efficient utilization of freight charter aircraft would undoubtedly lead to lower costs, both for importing and exporting countries, and it is evident that, due to the imbalance situation, co-operative ventures between countries in the region would be the prime means of achieving this end. The future of air freight lies in all-freight semi-scheduled or charter operations for the following reasons:

(a) In many cases combination aircraft are unable to supply sufficient capacity for freight.

(b) Freight is usually marginally costed on combination aircraft, a system which reduces incentives for freight marketing and development, and which can produce uneconomic rates which eventually prove a disservice to development.

(c) Combination aircraft schedules are designed for passengers. Much freight (apart from emergency and perishables) can bear delays while building up into loads sufficient to fill an aircraft.

(d) Freight for combination aircraft is often off-loaded when anticipated passenger demand is exceeded (particularly in the 'hot and high' conditions experienced in much of Africa), or is not loaded when transit time is short. This applies particularly to perishable products, which are in any case only accepted on a standby basis, and are often inadequately cooled on combination aircraft. The typical loading priority for a scheduled airline given below will indicate the relative priority accorded to freight on combination aircraft.

- (i) Crew slip;
- (ii) 'Aircraft on Ground' consignments;
- (iii) 'Lettres, Cartes/Autre Objets' mail;
- (iv) Press photos/TV and newsreel films;
- (v) Diplomatic mail;
- (vi) Booked company duty travel;
- (vii) Booked revenue passengers;
- (viii) Booked non-revenue non-company passengers;
- (ix) Booked Government discount passengers;
- (x) Company mail;
- (xi) Company service priority freight;
- (xii) Booked diplomatic freight;
- (xiii) Revenue freight etc.

(e) Air freight potential cannot be developed until there is adequate control over the transport mode. Service is often a more important feature than price in air freight transportation. A grower of horticultural produce, for example, cannot be expected to plant his or her seed unless there is some guarantee that when he or she comes to harvest the crop, capacity will be available at an economic price to carry the production quickly and safely to the point of sale. In the African region, the bulk of imports arrive on a c.i.f. basis and purchasers take the exports on an f.o.b. basis, a situation which means that African countries have little or no control over the external transport systems, achieving only a small share of this economic sector. In addition, there is little control over the distribution of the exports themselves, which is unfortunate, as distribution is becoming increasingly integrated into marketing systems in the developed world. Increased African control of air freight operations could improve distribution, particularly for the least developed and land-locked countries.

A major indirect argument for increasing air freight operations in the 1970s is that freight operations are often more profitable to the airlines themselves than are passenger operations. As worldwide inflation and prospects of recession hit business and the tourist industry, and passenger traffic falls, air freight traffic continues to grow as the benefits of total distribution costing become emphasized. In March 1975 there were 7 all-freight Boeing 747 aircraft operating in the world, as well as 19 in convertible passenger/freight form. Of greater significance is that on order were a further 7 all-freight and 8 convertible 747s. The Martin air DC10 freighter service to Rwanda, mentioned in 8.2.3, was used as a cheaper alternative to two DC8 services; so Africa is starting to benefit from such developments. Senior airline executives and Government representatives are overcoming their psychological blockages which have previously led to priority being given to prestigious and glamorous passenger operations rather than to more profitable freight operations. In fact, overall on routes between Europe and Africa south of the Sahara, even allowing for low return freight volume and yield, the revenue obtained by a Boeing 707 on a scheduled service roundtrip is some 20 per cent higher with a freight load than with a passenger load (see annex D). Thus, as freight volumes grow, freight operations become increasingly attractive.

The above being said, priority will and should be given to filling the belly-holds of passenger aircraft which would travel in any case with or without a freight supplement, before use of all-freight aircraft is invoked. In particular, use of semi-palletised combination aircraft on certain routes would provide a palliative interim arrangement to allow traffic to build up to aircraft loads in stages. On routes where passenger load factors are low, this would not constrain passenger traffic and may, in any case, provide higher volumetric profit. Specific recommendations for use of such aircraft have been made in some of the individual country reports of this study. It is, of course, difficult to generalize, but, where there is significant freight potential, IT IS RECOMMENDED (Recommendation 2) when planning aircraft purchases for the carriage of passengers, that consideration be given to aircraft with freight doors and strengthened floors. The increased capital cost and reduction in uplift ability may well be justified by operation in mixed or all-freight configuration, either regularly or at times of high freight and/or low passenger demand. Some comments on rates to be associated with semi-palletised combination aircraft were made in Section 11.

### 12.3 An interim solution - An African charter brokerage system

In the opinion of the ECA, regional co-operation in the air freight charter field would go some way to solving the imbalance problems discussed above. Judging by recent charter developments, the time is ripe for such co-operation, which would also aid the development of intra-African trade and, if sufficient interest were generated, lead to the establishment of an African multinational freight airline.

A national civil aviation department attitude to granting temporary air service permits is usually based on the premise - 'Can a national carrier take (or bring) this load? If not, grant the licence'. From the direct point of view of national economics, this is a rational argument, but from the point of view of regional or subregional economics, it may well not be. Since national carriers are well-established, and freight charter operations are basically supplemental to these, co-operation in this area is relatively straightforward. Thus IT IS RECOMMENDED (Recommendation 1) that developments be undertaken along the following lines (within time-scales to be established by interested States):

Step 1: Collection of further data. While the ECA has collected relevant information during the course of its freight study, little is corporately known about the movements of freight charter aircraft in and around Africa. As long as the origin or destination country ships or receives its loads satisfactorily, it is not necessarily concerned with the routing of the aircraft, either for positioning or for carrying outward and return loads. For a period of one year, say, Temporary Air Service Permits for international freight operations for countries interested could be monitored by a central agency (see 12.11 below for implementation). The countries concerned would ensure that carriers provide information such as the following:

- (a) Type of aircraft;
- (b) Name of carrier;
- (c) Name, address and business of charterer, if any;
- (d) Itinerary from point of origin to return, and estimated times of arrival and departure;
- (e) Load carried (number of shipments, nature, volume, origin and destination of goods) on sectors in which the individual country is concerned;
- (f) Capacity available and rate paid on sectors in which country is concerned.

(a) to (d) above are included in the maximum detail required to obtain operating permission according to the Recommended Practice of ICAO's annex 9 on Facilitation. (e) is available from customs and/or shipping documents and (f) could be obtained or estimated fairly easily.

In addition, if individual countries were agreeable, similar information would be supplied for all-freight scheduled operations, particularly by regional carriers (i.e., Air Afrique, Air Zaire and Zambia Airways).

Such information should provide a basis for the following further developments:

Step 2:

- (a) Establishment of an African brokerage and planning agency to match charter supply and demand (and to obtain commission payments). Besides improving co-ordination of flows, an African-based agency should have good access to the market demand since, when air is used, the choice of mode has in most cases been made by the importer, and it is the high yield import traffic to Africa which will be the economic foundation of the operation. The operation would be a close parallel of the Baltic Exchange in the shipping field, which, based in London, co-ordinates the supply of and demand for capacity in tramp (i.e., non-Conference) shipping. The Baltic Exchange also runs an Air Brokers Association. The organization would initially require two executive staff (to ensure full-time coverage), preferably with commercial airline experience, and an administrative assistant/secretary. A single office and telex/telephone facilities would comprise the bulk of overheads (along with a high travel budget), and the operation should be self-financing, (repaying an initial loan).



If it were intended to proceed with the developments shown in Steps 2(b) and 3 below, however, a third staff member with time and capability for research and development would be necessary and need financing.

Two major factors should be taken into account when deciding where the above operation should be based. Firstly, of course, the traffic density (particularly of imports, which will provide the prime source of revenue) and secondly, the telecommunications facilities. The ability to communicate efficiently and regularly by telex both with European cities and, more importantly as far as the development of the system is concerned, with African cities, is vital.

At present, satellite earth stations are situated at or near the following cities in the region:

<u>Existing</u>	<u>Planned</u>
Abidjan*	Lusaka*
Dakar*	Nairobi*
Kinshasa*	Yaoundé*
Lagos*	Accra
	Addis Ababa
	Khartoum*

The cities marked with asterisks indicate those stations to be equipped as CT2 transit points by 1980 in the Pan African Telecommunications Network.

It is suggested that the brokerage operation be based initially on the eastern side of the region due to higher level of charter operations there, although further developments to include the scheduled all-freight operations in West Africa could revise the situation. The obvious sites seem to be Khartoum, Lusaka or Nairobi. Khartoum is already a base for major British charter carriers, Lusaka generates large volumes of high yield southbound traffic, and the Nairobi telecommunications links are the most attractive; so there is little to choose between these three cities. In any case, a final decision will obviously take into account the national Government interest and local cost levels.

The marketing network would essentially be generated by the existing airlines of countries taking part in the operation, although in due course it may be necessary to set up a branch office (again, possibly existing airlines staff working part-time) in Kinshasa or Lagos to cover the Western African aspects.

Two important features of the operation should be noted. Firstly, it would essentially be commercial rather than Governmental (although preference would be given to regional-based carriers). Secondly, there would be no intention of overriding national priorities. At present charters are only used when demand exceeds the scheduled capacity available, and it would be up to the shipper or State concerned to specify their charter requirements to the central agency (which would, of course, be used in preference to non-African agencies where possible).

#### Step 2:

(b) Extension of the above agency functions into market research and marketing (including co-ordination and pooling of existing airlines' research). One particular aspect of marketing development would be education into the advantages of using air for part or all of a journey. As mentioned in the ICAO study, and

detailed in 10.5 and annex D of this report, the savings (as opposed to the costs) of using air versus other modes, in terms of inclusive agency fees, lower pick-up and delivery costs, packaging, lower pilferage, lower insurance, lower storage charges, less documentation, lower inventory requirements and obsolescence, and less capital tied up in transit, are not generally recognized in Africa. Nor is the advantage of flexibility.

The agency would also act as an independent pressure group to attempt to improve facilitation and other problems hindering air freight development in the region. The agency could take the first steps in examining the problems that charter operators currently face with overflying and technical stop rights. Aircraft are sometimes obliged to land by the nations over which they are flying and often experience considerable administrative difficulties when weather conditions impose the (unplanned) use of an alternate airport for a technical stop. This is despite ratification by many African countries of the International Air Transit Services Agreement of January 1945, and is partially due to the (sometimes justified) supposition that carriers are flying on business for the illegal Rhodesian regime. Hopefully, such problems would not be inflicted on carriers participating in the brokerage scheme. Technical co-operation could be extended by offering the engineering, maintenance and spares facilities of existing airlines in the countries participating to aircraft operating under the scheme (charter aircraft have been known to be grounded for several days at a time due to lack of a suitable spare).

Steps 3: From the groundwork laid above, significant further development could be undertaken. Initially, this would be the carrying out or commissioning of consultancy studies, preferably through the machinery of AFCAC, (see 12.11), which is ideally suited to such work, and hopefully aided by international agency funds, on the economic feasibility of establishing an African multinational freight airline. Such a carrier would carry out some or all of the functions controlled by the above agency. Operations of such a carrier could develop into a semi-scheduled or scheduled type, and displace some of the existing IATA scheduled freight operations by non-regional carriers. The economic and political advantages of a multinational African airline have been widely discussed elsewhere (though not specifically for freight only operations). Some suggestions for feasibility studies are presented in Section 12.4.2.

Step 4: If the above evaluations show a viable proposition, and sufficient support were received, the airline could be established.

A point to note is that participation in the above programme is not necessary by all countries in a subregion or the region. While the structure of imbalances suggests a regional network as the most viable form of operation, provided the requirements of the countries interested complement each other and provide sufficient revenue and volume, developments could take place, at least initially, among these countries only. It is suggested, however, that some kind of penalty system be established for late joiners, in order that the (hopefully few) risks of development be shared out equally. Needless to say, the steps above could overlap or be telescoped should circumstances dictate.

If the charter brokerage system is seen from the beginning as an intermediate step in the establishment of a multinational freight airline it may serve a greater purpose, and the operational elements such as marketing, marketing research

and pooling of capacities would then be invoked at an earlier stage. While, as mentioned, all the above operational aspects would be essentially commercial, Governments would obviously need to be directly involved in the system, as aviation and telecommunications facilities are largely controlled and owned by Governments. The participation of Governments could, for example, take the form of equity shares by parastatal agencies such as the airlines themselves or even telecommunications bodies.

#### 12.4 Towards an African multinational freight airline

As mentioned in 12.3, several proposals have been made in the past for all-African and subregional airlines, but none of the proposals has been for freight operations only, and few have reached the stage of economic and technical evaluation. A brief history of co-operation in African civil aviation is given in annex G.

The proposal below for an African multinational freight airline hopefully has the advantage of being specific, although considerable additional research needs to be carried out. The existence in Africa of two of the world's three major multinational airlines, namely Air Afrique and East African Airways, is a living testimony to the feasibility of multinational co-operation in African civil aviation.

##### 12.4.1 Objectives for the airline

The prime objective of the multinational freight airline itself should be expressed in strictly aviation terms in order to present a definable target. For example, initially it could be to help existing African operators to obtain a 50 per cent African share of all air freight charter traffic and/or revenues to, from and within Africa (or even 50 per cent to and from, 75 per cent within) while generating a commercial net return on investment. This is an even higher share than the UNCTAD II Recommendation of 40 per cent (see Section 4.4), but it is suggested that 50 per cent should be the target for the following reasons:

(a) Unlike maritime transport operations and because of the geographic location of Africa, air transport operations do not generally transit through the region, but terminate within it (the exceptions being in the extreme north-eastern and north-western points such as Cairo and Dakar). Hence third party operations should account for a very small proportion of the capacity.

(b) Initially, at least, the target would apply only to charter operations, and the overall share of capacity would be well below 50 per cent.

If the airline were to extend into scheduled operations, the target could be revised to include such operations. There is, of course, no reason why additional revenue could not be obtained outside Africa - for example, with the existing backlog available from Ethiopia and Sudan which means higher utilization and hence lower costs, African airlines have a case for carrying some of the outbound cigarette traffic from the United Kingdom to Saudi Arabia.

Of course, the major benefits of the operation would be less quantifiable, such as the co-ordination of traffic flows, the development of intra- and extra-African trade (particularly for the least developed and land-locked countries in

accordance with Africa's strategy for development in the seventies), and the indigenous control of the transport mode by African countries. However, measures of development of these benefits could be established.

The freight airline would present an opportunity to have the first 100 per cent African owned and operated international airline, and could provide training facilities for African staff of existing airlines, particularly pilot training, should utilization be otherwise low, for example in the horticultural export off-season. Aircraft belonging to the airline could be made available for airlift operations to and from a specific country or group of countries if and when these became necessary.

Feeder services could be developed in conjunction with existing airlines, and consolidation points established, both in Africa and in Europe (in addition to air-sea enterpôts, see 12.5). Further developments could include vertical integration into air freight forwarding, or the establishment of an African federation of air freight forwarders (see 12.8).

Wherever possible, the new airline would utilize the facilities of existing airlines on a contract basis.

#### 12.4.2 Preliminary studies

As mentioned in Section 12.3, a number of further studies need to be carried out to establish the viability of the airline. Apart from the investigation of secondary prospects for utilization mentioned in 12.4.1 above, the following aspects should be considered, always taking into account existing operations and study reports.

##### 12.4.2.1 Constitution

A formal constitution for the airline, acceptable to as many States interested in the project as possible, will need to be drawn up. Consideration of the role of existing African charter airlines and of the possibility of revenue pools with each of the national carriers (or Governments) affected should be major factors in developing the constitution. ICAO has published for use by member States the instruments which established Air Afrique, East African Airways, and the Scandinavian Airlines System, which might provide a useful starting point.

##### 12.4.2.2 Operating plans, costs and revenues

An operating plan for the first five years (including profit and loss statements) should be drawn up, evaluated on the basis of one or more alternatives as laid down by the interested States, and on the utilization of differing aircraft types. The second-hand aircraft market is currently mainly one for buyers, and investment costs for aircraft should be based on anticipated market prices. An aircraft-type purchase decision should be based not only on operational capability and purchase costs, but on the operational types of existing regional airlines in order to facilitate spares and maintenance pooling (see 12.4.2.5 below). Information on freight charter aircraft operating costs is available from a number of sources, and the ECA is already collating data on this subject. An important output from the cost and revenue analyses should be the foreign exchange components. While aircraft

and spares purchase would have to be made in a non-African currency, and landing fees and ground equipment costs indirectly turn predominantly into foreign currency, an African airline would save hard currency in terms of crew expenses, some fuel expenses, maintenance labour, and possibly insurance (an important factor, as was mentioned in 4.4). The subject of fuel costs could generate a further sub-study on co-operation. Fuel is an important and sensitive factor in charter operating costs, and significant diversions from direct routes are currently made to obtain low-priced fuel. For example, freight charter carriers operating southbound from Europe to Zambia formerly transitted through Bangui in the Central African Republic in order to obtain fuel, which was imported via barges up the Oubangui river. The increased cost and problems caused at Bangui by the lowering of the river level following rainfall deficiencies has meant that most carriers now divert as far as Jeddah in Saudi Arabia, where transit administration is simple, to pick up fuel. Jet A1 fuel was 42 US cents/US gallon in Jeddah in May, 1974, and yet only 45 cents in Lagos, 56 cents in Khartoum, and undoubtedly at a reasonable level in Algeria and Libya. Co-operation in the provision of fuel and other transit facilities to charter aircraft would reduce operating costs and provide revenue to the countries concerned in the form of landing and handling fees.

In the above studies, estimates should be made of the direct economic benefits generated by African countries controlling an increased share of the air transport business.

#### 12.4.2.3 Finance and insurance

Consideration should be given to the means of raising finance in order to commence operations. The African Development Bank and the World Bank may well be interested in such a venture, particularly as both these agencies currently have relatively low investment levels in aviation as opposed to other modes of transport. Leasing of aircraft would be an option, and could lead to further co-operative developments such as short-term leasing arrangements with existing airlines in the region to meet demand arising outside the operating environment of such airlines.

By establishing insurance facilities (particularly for aircraft hulls) in Africa, considerable foreign exchange savings could be made. Developments for the specific functions discussed here could lead to extension to cover all interested African airlines.

#### 12.4.2.4 Traffic rights

An individual African country can experience difficulty in carrying out fifth freedom operations involving countries outside the region. Hence procedure needs to be established on negotiating air service permits, both between African countries and with foreign countries. A formal attitude to negotiations with non-African countries would underlie the allocation of permits, and the principle of a 50 per cent share in traffic and/or revenue could provide the bargaining tool. If problems were experienced with particular European countries, negotiations could be conducted with a country such as Luxembourg, which is generous on the allocation of charter operating permits, to establish an air-surface and/or air/air entrepôt. In fact a great deal of Zambian imports are already consolidated in Luxembourg by surface (and air) from points in Europe as far away as Scandinavia and the United Kingdom, and even from the United States of America, before being flown to Zambia on chartered aircraft. This gives the advantage of reduced air transport costs while still saving

considerably on transit time (a guarantee of air shipment within 10 days of arrival in Luxembourg was offered in times of high demand). AFCAC has carried out work on licensing policy for passenger non-scheduled operations, which could be valuable for establishing freight policy.

As mentioned in 10.4, the machinery for joint negotiation is an important area for evaluation. Ideally, one would hope that, within the region, a multinational air freight services agreement (at least for participating States) could be a trial precursor to a similar passenger agreement. A system of concessions could be developed, for example in terms of compensation to small States not operating their own airline.

It should be pointed out that a multinational African carrier would not only achieve negotiating strength with non-African carriers and Governments on traffic rights matters, but would also be in a position to break into commercial contracts currently held by non-African carriers primarily by virtue of their size of operation.

#### 12.4.2.5 Operational pools

Studies should be undertaken on the development of technical operating pools as well as revenue pools. While a contract could be established with an existing airline for regular engineering and maintenance, pools could be established with further airlines of spares (including engines), ground maintenance equipment, radio and electronic equipment, as well as for the provision of en route maintenance.

Freight charter operations in Africa are currently subject to unreliability, a breakdown at an African airport resulting in considerable delays while spare parts and/or skilled technicians are flown out from Europe. Pooling with existing regional airlines (bearing in mind the comments on aircraft compatibility in 12.4.2.2) would increase on-time operations, enabling the African-based airline to provide an improved service. Pooling arrangements could be extended to aircraft interchange facilities.

Ground handling would if possible be carried out under contract by existing African airlines in the region, and by their agents in the rest of the world. Even a brief analysis reveals that African carriers use different handling and/or sales agents in countries outside the region. For these agents, the account of an African airline tends to be relatively small, resulting in low priority and poor service for the airline. African carriers are rarely in competition with each other on routes to and from the region, and a first step could be the joint appointment of handling and sales agents, to achieve a stronger negotiating and priority position.

#### 12.4.2.6 General

One function of the above studies should be to show up the benefits (and costs) of the economies of scale. New aircraft required for competitive reasons could prove to be extremely expensive, with especially complex maintenance problems. Co-operative ventures would help to share the costs, risks and benefits involved in the capital intensive aviation industry. When the studies are completed, it should be possible for each interested country to evaluate the gains that it would achieve from the functioning of the airline (including foreign exchange savings, if any) as against the cost savings it may forego by adhering to the present form of operation.

### 12.5 Air-sea entrepôt points

It has been suggested that air freight and economic development could be enhanced by the establishing of formal air-sea entrepôt points in North Africa (to serve Europe/America and the Sahelian zone), West Africa (to serve Europe/America and East Africa) and possibly East Africa (to serve Central/West Africa and Asia). These would not only develop trade to and from West Africa, but also provide further opportunities for intra-African trade development generated by the services offered.

Road and rail links into the Sahelian zone from the coast have naturally been generated from the South and West, since they have thus served indigenous populations en route. As a result, traditional marketing and distribution channels have been created, and these control the flow of traffic to and from the Sahelian zone. The economics of air transport movements, however, are not dependent on the distribution of the populations over which the aircraft pass. Since the bulk of goods travelling to and from the Sahelian zone originates in, is transhipped in, or is destined for, Europe, it would seem logical that where air transport is used to carry goods between coast and land-locked country, that North African transshipment points be used, since these are served by high shipping frequencies, and are close to Europe. However, in general, due to the controls referred to above, air-sea movements are not differentiated from surface movements in terms of routing. Air charter operations from West Africa into the Sahelian zone (carrying industrial machinery and rehabilitation materials from Europe and North America, along with West African industrial products) and back (carrying meat) are being developed. But such a routing does not necessarily imply reasonable receipt of the benefits of using air, since shipping charges are high, and port congestion and low shipping frequency increase transit times considerably. There also remains room for further capacity development. Charter operations to and from North African ports, linked with efficient bonded transshipment services, could relieve congestion, provide an alternative service, provide opportunities for increased trade between the North African subregion and the Sahelian zone, and provide revenue to North Africa from handling and landing fees.

An air-sea venture formerly existed whereby goods from Europe were shipped by surface to Tema Port in Ghana, transferred under bond to Accra's airport, and flown by chartered aircraft (Transmeridian's C144's) from there to Lusaka in land-locked Zambia. This service cut costs while providing a fast delivery averaging 14 days Europe-Zambia, with a 28 day guarantee. The service was, however, withdrawn due to poor aircraft operational reliability and inadequate handling in Ghana. A P-E Consulting Group Study showed that such an operation was commercially viable as far as Zambia was concerned, and as the quality of charter operations to Africa has increased substantially over the past few years, the project may well be worth reviving. A transport officer could be posted to Accra to facilitate clearance there. P-E also examined a similar proposal for services via Ghana to Kenya and Uganda, but found that the volume at that time (1970) was insufficient to justify the operation, though a joint operation with Zambia could have been of interest. There is further similar sea-air traffic through several further West African ports, notably Douala (about 5,250 tons carried to Ndjamena, 1,930 tons to Bangui by Air Afrique on scheduled services in 1973 all from Europe/United States of America).



Significant sea-air movements already exist through the ports of Dar es Salaam and Mombasa on the Eastern seaboard to Zambia from such countries as India, Japan and Pakistan, and with increasing trans-African services such movements could be developed to cover Central and West African points.

The ECA has had insufficient resources to evaluate the economic feasibility of the above operations, but they are undoubtedly worthwhile considering, and IT IS RECOMMENDED (Recommendation 8) that they be specifically examined. Attention is drawn to three major factors:

(a) Facilitation at the entrepôt point is essential, and experience suggests that a transport officer from the country (countries) of origin/destination would need to be posted to this point.

(b) Reliability of chartered aircraft is essential.

(c) Examination should be made of possible backloads for part or all of the journey, or of alternative uplift possibilities nearby.

#### 12.6 Reduced and uniform valuation of air freight charges for customs purposes

It is often argued that levying duty on a c.i.f. basis discriminates against the air freight mode since air freight rates are much higher than sea freight charges. Partly in order to counter such 'discrimination' and to encourage the use of air several countries in the region (and elsewhere) use non-c.i.f. bases as follows:

Botswana (f.o.b., for air and surface)

Cameroon (f.o.b. + a maximum of 50 per cent of the purchase price)

Central African Republic (f.o.b. + a maximum of 50 per cent of the purchase price)

Congo (f.o.b. + a maximum of 50 per cent of the purchase price)

Ethiopia (f.o.b. + 33 1/3 per cent of transport costs for items imported under IATA specific commodity rates)

Gabon (f.o.b. + a maximum of 50 per cent of the purchase price)

Kenya (f.o.b. + 50 per cent of transport costs)

Lesotho (f.o.b., for air and surface)

Swaziland (f.o.b., for air and surface)

Tanzania (f.o.b. + 50 per cent of transport costs)

Uganda (f.o.b. + 50 per cent of transport costs)

Zambia (f.o.b., for air and surface).

All countries in the region use the Brussels Tariff Nomenclature (BTN) except Ethiopia (its own tariff, based on the Standard International Trade Classification, SITC), Gambia (its own tariff) and Mauritius (SITC). The East African reduction for air imports was brought in to encourage air imports and thus provide more outbound capacity to meet Kenya's requirements for fruit and



vegetable exports - the c.i.f base was also undoubtedly discriminatory against the inland international airports, as the duty rating was c.i.f at the coastal port for surface shipments.

Lower duty ratings for air shipments are controversial. The major arguments against these are discussed below:

(a) The higher costs of importing by surface transport (e.g. packaging, interest on capital tied up in transit and inventory, insurance, obsolescence) are in effect taxed (by the higher basic cost and/or the higher volumes imported). Reduction in air freight duties would induce importers to switch to air to substitute untaxed air freight charges for taxed higher imports necessary by surface transport, thereby increasing the cost of a given bill of final goods to the economy, and decreasing Government revenues. This argument ignores the net revenue increase to the national carrier (African carriers have a far higher share of air transport capacity than of surface transport capacity). Also it suggests a contrary view that the differential between air and surface customs duties should be increased in order to tax the inefficiency of high stock control holdings, etc. The foreign exchange component on air imports based on a total distribution cost evaluation, too, is proportionally lower than on surface imports.

(b) Government revenues would be lost from those goods which would in any case travel by air, such as perishables (including fashionwear), newspapers and 'emergency' materials. This is a valid argument, and presents a possible complication of having to distinguish between these commodities and those travelling according to total distribution cost precepts, with associated administrative difficulties. On the other hand, an increasing share by the air mode of imports could actually lead to an overall increase in revenues due to the higher value of the imported commodity (the higher import cost being not necessarily in foreign exchange and compensated by increased distribution efficiency).

(c) To the importer a reduction in air freight rates is similar to a reduction in import duties. A reduction in customs duties reduces the onus on the carriers to charge lower rates. In fact IATA rates on non-dutiable items are not very different from those on dutiable ones to Africa, and it is unlikely that IATA is able to take much account of duty values in its complex rating evaluation procedure, particularly as these are subject to change.

(d) Where non-c.i.f. bases are used (for surface or air) this has often led to abuse due to the value of goods being understated by adjusting the 'shipping charges' on the suppliers invoice. The Ethiopian system operates against such abuse by specifying imports on IATA commodity rates only, but then the reduction is lost on charter imports.

Obviously, from the above, the subject of customs valuation for air imports is a complex one. In the case of land-locked Uganda quoted above, and possibly in the case of Kenya, a specific situation justified an adjustment (which may apply to other countries with major international airports inland), although it is doubtful how much effect these marginal import cost reductions will have on generating volume in the short term since total distribution costing is a concept which is not well grasped or used in Africa or elsewhere as yet. Total distribution costing can show considerable economic benefits (see annex D) and education on the concept should be the first priority, along with increased use of all-freight aircraft offering lower rates.

On the other hand, reduced duties could have strategic implications for the region in terms of increased control of distribution and increased intra-African trade due to the significant rôle that aviation can play where surface infrastructure is weak. As a contribution to the latter, customs duties could be reduced for imports by air from countries in the region. This, however, is an issue outside the scope of this study.

#### 12.7 Duty-free airport distribution and/or manufacturing zones

The establishment of duty-free airport distribution and/or manufacturing zones has in many cases benefitted the distributor/manufacturer concerned, the economy of the host country, and air freight traffic. The examples of Hong Kong, Rotterdam Europoort and Shannon spring immediately to mind. Nearer at hand, the current situation in Mauritius (which uses generous tax and other incentives rather than creating a specific duty-free zone) was mentioned in Section 9.1.12.

The concept in the above cases has been to establish the zone and to encourage investment for the setting up of light manufacturing industries, using mainly air freighted raw materials and components (except in the case of Mauritius), and exporting by air worldwide. Section 9.2 showed the possibilities within Africa alone for manufacturing and exporting such articles as radio and TV sets, sewing machines, fashion shoes, plastic articles, pharmaceuticals and lightweight vehicles. In addition a free airport usually serves as a distribution and break-bulk centre.

Obviously the decision to establish such a free zone lies entirely with an individual country or within the framework of an established economic community and manufacturing is likely to be concerned with the processing or assembly of non-strategic commodities. Hence for this regional report attention is merely drawn to the possibilities which exist.

Apart from the case of Mauritius, there are several zones connected primarily with surface transportation already completed or under way in the region, notably in Egypt (the Suez Canal zone), Kenya, Liberia, Morocco, Senegal and Tunisia. Further such zones are projected in Gambia, Ghana, Nigeria and Zaire, and zones specifically related to airports are under preliminary consideration by several countries, including each of the East African Community Member States.

UNIDO is very much concerned with the development of further duty-free zones, and organizes visits to existing sites, runs workshops, and produces a wide range of publications on the subject. The UNCTAD/GATT International Trade Centre published an Annotated Bibliography on Free Ports and Free Trade Zones in 1971 (see annex H - references).

#### 12.8 The rôle of the air freight agent

The relationship between the carrier and the agent needs to be carefully considered.

The agent assists the shipper by:

- (a) Explaining the terms of shipment;

- (b) Working out the total transport costs (often complex, containing as many as 23 different items);
- (c) Paying all transport charges (and sending the shipper a single bill);
- (d) Arranging and advising on packing, marking and labelling of goods (agents sometimes actually carry out packing, particularly of personal and household effects);
- (e) Organizing the transport operations;
- (f) Arranging for insurance;
- (g) Carrying out the necessary documentation and formalities, including customs clearance;
- (h) Making the necessary communications;
- (i) Advising on new developments in the freight field;
- (j) Where unitization rates have been developed, offering lower rates than the airlines themselves.

The agent assists the airline by:

- (a) Taking the bulk of the administrative and surface transport feeder work, allowing the airline to concentrate on flying operations;
- (b) Providing consolidated loads which are easier and cheaper to handle than more numerous small shipments.

Both the airline and the agent have the development of air freight as a fundamental objective, although this may take the indirect form of concentrating on improving on the (air mode) market share versus the competition. It is vital that there is very close co-operation between them as it is the performance of the overall distribution system (from door-to-door) that determines the air market share.

Over 80 per cent of freight is currently supplied to the airlines by members of FIATA (International Federation of Forwarding Agents' Associations). As forwarders have no say in the IATA rate-making machinery (although FIATA now has Observer status at conferences) they are naturally hostile to this. On the other hand, IATA airlines feel they are losing control of the distribution process, as the substantial investments involved in worldwide door-to-door distribution are leading to mergers between agents, consolidation by agents can lead to use of charged aircraft, and the power of IATA carriers to fix rates is weakened. Some carriers are considering linking up with an agent or agents to overcome these problems but such a move is currently against IATA regulations and would also imply a loss of traffic from other agents.

The largest agents dealing with air freight in the region have headquarters elsewhere. As an example, listed below are some of the agents with interests in more than one country in the region.

Table 7: Some air freight agents operating in the region

Agent	Base	Operations in regional countries
Air Express International (AEI)	UK	Kenya, Nigeria, Tanzania
AMI	Belgium	Burundi, Kenya, Malawi, Rwanda, Tanzania, Uganda, Zaire, Zambia
Express Transport	East Africa	Kenya, Tanzania, Uganda
Freight Services	South Africa	Botswana, Malawi, Swaziland
Notco	East Africa	Kenya, Tanzania
Schenker	West Germany	Egypt, Ethiopia, Kenya, Tanzania, Uganda
Transintra	Belgium?	Burundi, Rwanda

While there are a number of small indigenous agencies in the region, their operational networks are not widespread within the region itself or elsewhere. This reduces the impetus for intra-African air trade development and helps to keep the control of the transport mode within the hands of extra-regional operators. It would therefore seem worthwhile establishing an African federation of air freight forwarders, with a view to developing an intra-African network. Of course, strong links would need to be maintained initially with European agents to provide a high quality door-to-door service and to enable transshipments to other parts of the world. A joint African approach could be put forward within the framework of FIATA. FIATA is not specifically for the air mode, and is apt to relegate African affairs to a low level in its deliberations, since most of its member firms dealing with Africa are based in Europe.

Some further truisms have been noted during the ECA study. While agents dealing with both air and surface forwarding generally receive a more valuable commission from their air freight operations, since the air freight proportional volume is currently small, development tends to get neglected. A similar neglect of air freight is found with agents dealing with both air freight and passenger operations. In addition, where one air freight agent dominates activities in a country, its only method of increasing turnover is to develop the air market, and as a result such monopoly has proved beneficial - it should be noted, however, that this applies where the operation is a branch of a European firm, and indigenous agencies have yet to be tested in this fashion.

Most authorities in Africa do not permit off-airport clearance, which hampers the developmental rôle of the agents. At the least, where volumes justify, terminal development should be in the form of a bonded freight 'village', where agents may consolidate and break down loads. Consolidation can reduce costs to the shipper and provide an incentive to development, while reducing the administrative load on the airlines and enabling them to concentrate on flying operations. The concept of bonded trucking services and inland clearance depots is worthwhile considering where there are major centres of population at a distance from international airports. Such centres can not only reduce congestion at the airport itself, but reduce costs

in the form of the number of individual journeys between the airport and the population centre and even improve on door-to-door delivery where transshipment on to low-capacity domestic flights is the alternative.

### 12.9 The rôle of airships

This Section has been compiled to draw attention to the possibilities of airships and comment upon some current activities. Technical data will be found in the references and from the organizations listed at the end of the Section.

A tragic series of disasters to heavy lift airships in the 1930s effectively killed off interest in this form of transport for many years. Since 1970, however, there has been a considerable resurgence, mainly because of the availability of helium at reasonable cost levels (the hydrogen that was used in early airships was inflammable when coming into contact with the air) and of the availability of high power to weight ratio engines which should provide the necessary to keep the airships out of trouble.

The major research effort in recent years has been expended on designing and evaluating small capacity (2-25 tons) airships with a view to transporting heavy indivisible loads over relatively short distances (e.g. for locating heavy transformers after construction). Some work has also been carried out on heavy lift (120 - 1,000 tons) airships for medium and long range operations (1,000 - 6,000 km). The latter developments are of particular interest to Africa, especially for the land-locked areas, where the lack or cost of surface transport is inhibiting trade development. It has been suggested that there are three major rôles that such airships could play in economic development:

- (a) As an economic alternative to current modes of transport;
- (b) As a bulk carrier of perishable produce;
- (c) As an alternative to infrastructure development.

As far as the first rôle is concerned, airships have the advantage of speed over surface transport, and the advantage of bulk capacity over aircraft. The lift of an airship is acrostatic while that of an aircraft is aerostatic (to double the lift capacity, the dimensions of an airship have to be increased  $3/2$  times, of an aircraft  $\sqrt{2}$  times). Also, unlike an aircraft, the airship power loading decreases with size. Nevertheless, the estimated direct operating costs of current heavy lift airship projects are by no means lower than those for existing jet aircraft types, and concrete data has in fact yet to be produced. Table 8 provides some comparative figures from known projects. Airfloat Transport is a British firm which has been concerned with airship research and design for several years, but has yet to receive financial backing, either for its heavy lift project, or for a smaller ship to carry a 28-ton payload over moderate ranges. Two alternative proposals, for open-site operation or module operation, have been put forward, and power would be provided by kerosene and/or natural gas, the latter being of particular interest as it is lighter than air. 'Flight International' magazine has examined airships in some depth technically in articles on 19 November and 24 December 1970 and 7 October 1971. Apart from providing a résumé of the airfloat project at its 1971 development stage, flight did not, however, produce any detailed economic data.

The World Bank (IBRD), like the ECA, has been evaluating the economic viability of airships. Data produced by Sir Peter Masefield, Chairman of the British Airports Authority and veteran of the airships era, are quoted (from flight and 'freight international') to show the pessimistic view - it seems that the 'direct operating cost' is here likely to include some infrastructural cost. Sir Peter also feels that major problems such as icing, gas volume variation with temperature (especially in the tropics), vulnerability to gusts, high winds and squalls, will face development, whose costs would be in the region of \$US250 million. The Transconsult project is of particular interest as it is specifically designed to cater for the trade links between the Central African Republic, Chad and Niger on the one hand, and France on the other. A financial study was made by a firm called COTONFRAN, which has interests in African economies, in conjunction with Transconsult, for a short-run production of 5 to 6 ships. Southbound they would carry cereals, iron, steel, sugar and construction materials; northbound such items as cotton, oil seeds and sodium uranate. Development costs, at 1973 levels, were estimated at \$US21 million, and the infrastructure for construction at \$US20 million. The last two columns show that the conventional jet aircraft has little to fear from direct cost comparisons, and even compares reasonably well where productivity is concerned.

The jet aircraft is unlikely to lose its perishable shipments to the airship either. Firstly, the low speed would make the airship less flexible in meeting the timing requirement at the market outlets. Secondly, the bulking problem at the point of origin would be very demanding.

Where infrastructure development has yet to take place, the airship could have a substantial competitive advantage over conventional aircraft. The requirements for unloading are minimal, being essentially a suitable cleared ground space and a tethering point. Most heavy lift airships on the drawing board feature on-board winches for loading and unloading, though one project anticipated the use of helicopters with the airship continually moving to achieve high block speed. Obviously, terminal facilities such as collection and delivery points would still be required. Against the cost of a jet airport, such infrastructural costs are minimal. However, it is likely that further jet airports will continue to be built, if only to cater for passenger traffic. It has been suggested that heavy lift airships could transport passengers as in the past, mainly tourists on high density routes or tourists with the time and money to spend in luxurious world travel. The costs of passenger operations, though, are likely to be very high, and jet aircraft are likely to be the prime means of long-haul passenger transportation for many years to come. Nevertheless, there are obviously some opportunities open to airship operation as an alternative to infrastructure development.

In conclusion, it would seem that African countries, while not becoming directly involved in airship development at this stage, should express further interest as a stimulus to development, and continue to monitor progress fairly closely. To aid this approach some further current developments and references are given below.

#### 12.9.1 Some current developments

##### France

(a) The Secretariats General of Marine Transport and Civil Aviation, as well as the Equipment Ministry, are undertaking studies on airships. The National

Table 8: Some comparative characteristics for heavy lift airship developments

Item	Airfloat transport 1974	Flight inter- national 1970	IBRD <sup>a/</sup> 1974	Masfield 1970	Transconsult 1973	Boeing 707F 1973	Boeing c/ 747F 1973
Payload (tons)	300	500-1,000	121.7	450	500	38.3	116
Stage length evaluated (km)	2,700	n.a.	1,290	2,660	6,000	2,716	4,700
Airspeed (km hour)	145	n.a.	129	n.a.	170	787	814
Ground speed (km/hour)	n.a.	185	113	150 (block)	n.a.	721 (block)	752 (block)
Utilization (block hours/annum)	n.a.		n.a.	n.a.	5,000	3,394	2,920
Productivity (million capacity ton kilometres per annum)	350-470		n.a.	224	n.a.	93.7	254
Unit cost <sup>d/</sup> (\$ million)	18-26		26.6	14-17	16		
Capital charge <sup>e/</sup> (US c/ct-k)	0.8		3.8			0.6	1.8
Variable operating cost (US c/ct-k)	1.9-3.3		1.9			2.9	1.5
Total direct operating cost (US c/ct-k)	2.7-4.1	1.3-6.4	5.7	27.7	4-6	3.5	3.3

<sup>a/</sup> Source: Studiengruppe Luftschiffbau und Anwendungs Bereiche - Study prepared for IBRD.

<sup>b/</sup> Derived from US CAB Aircraft Operating Cost and Performance Report - actual data.

<sup>c/</sup> Derived from manufacturer's estimates and CAB data.

<sup>d/</sup> Excluding development costs (Airfloat costs are only \$7 m higher for a one-off project, others are considerably higher).

<sup>e/</sup> 20 years depreciation at 10 per cent interest for airships, 14 years to 10 per cent residual at 10 per cent interest for 747F (707F data, being actual, may include written-off operations, lower interest charges, etc.).

Aerospace Office (ONERA, Office National d'Etudes et de Recherches Aerospatiales) and the Atomic Energy Authority are participating.

(b) Transconsult (with COTONFRAN), BP 148, Bureaux de la Colline de Saint-cloud, 92213, Saint Cloud. (See text above.)

(c) A project called Pegasus (Pégase) is concerned with establishing airships at very high altitude (22,000 m) for use in telecommunications work.

(d) A 'flying crane' project concerned with carrying heavy indivisible loads for short distances.

#### Japan

A firm called Nippon Airship purchased an airship in 1972 with a view to evaluating the possibilities of carrying freight and passengers.

#### United Kingdom

(a) 'The Airship Association' (48 Hadley Road, Enfield; Middlesex) has been established and at present is mainly concerned with assisting communication between those engaged in study and research and those who might be concerned with applications. The Government is interested in developments and a Parliamentary Airship Group has been formed.

(b) Airfloat Transport Ltd., The Old Mill, Dorset Place, London E.15 1DJ. (See text above.)

(c) Manchester Liners, a major British container ship company, established a subsidiary called Cargo Airships Ltd. The major project (called the CA4) was to have a payload of 30 tons, on airspeed of 145 km/hour, a range of 2,500 km and cost \$US2.4 million per unit. The project appears to have fallen through recently.

(d) The Airship Association lists further interested agencies as follows: Aerospace Developments Ltd., 19-21, Newbury Street, London, EC1. Cranfield Institute of Technology, Cranfield Bedfordshire (constructing a 1 ton capacity airship). Skyships Research and Development, Westgate House, Epsom, Surrey.

#### United States of America

(a) A firm called Aereon has been developing since 1965 some original conceptions of airships of a triangular form, to carry 125 tons of freight in containers. This project has, however, run into serious financial difficulties.

(b) Some work has been carried out at Boston University into designing a nuclear-powered airship which would carry 500 tons at a speed of 200/km/hour.

(c) Goodyear Corporation have used airships for some years for publicity purposes, and are considering various possibilities of small and intermediate capacity projects. Fairly concrete proposals for a 30-ton payload airship at a unit cost of \$6 million (for the fifth unit) have been put forward.



(d) Shell has financed a modest preliminary study on the potential of large airships as natural gas carriers. Aerospace Developments Limited carried out this study and were optimistic about the future.

(e) The International Latex Corporation and the Sheldahl Corporation (the latter in conjunction with Westinghouse) have produced small tethered aerostats and are interested in developing airships for local freight movements.

#### West Germany

(a) A firm called Von Veres is concerned with resurrecting passenger travel in large airships, and has produced a plan for a 700 passenger ship to cruise at a speed of 300 km/hour, nuclear-powered.

(b) A firm named Willhemkumper at Mulheim is currently constructing an airship with 6,000 m<sup>3</sup> of gas capacity, and plans further ones with gas capacity from 20,000 to 64,000 m<sup>3</sup>.

Further developments are taking place in Canada and the USSR. The Canadian Airship Development Company has a 1 ton airship under construction as an experiment in design and construction. The Russian projects are probably the most advanced of all, but are kept secret due to their military applications.

#### 12.9.2 Some references

- (a) 'Flight International' magazine, various issues (see above);
- (b) 'Transports' magazine, No. 189, February, 1974;
- (c) 'The Airfloat HL Project', September 1974. Edwin Mowforth, Design Director, Airfloat Transport Ltd;
- (d) 'Roles for Airships in Economic Development'. Paper for MIT conference on airships, 1974. George J. Beier and Gerardo Cahn Hidalgo, IBRD;
- (e) Symposium at Royal Aeronautical Society, United Kingdom, on airships, 20 September 1971.

#### 12.10 Further research

Section 12.4.2 indicated some studies which would need to be carried in preparing the ground for the establishment of a multinational freight airline. The role of air freight, and indeed of aviation, in developing countries has yet to be clearly defined, and thus further general research also needs to be carried out.

AFCAC has initiated an ICAO/UNDP project (RAF 74/021) entitled 'Studies to Determine the Contribution of Civil Aviation to the National Economies of African States'. This project, which started in April, 1975, is to last for a period of two years, and to cover the 36 States in the region under the UNDP African Office. The six States in the North African subregion which are not included have been

advised by the AFCAC Bureau that they should indicate to the UNDP their desire to be included in the project. The project will involve the operation of four separate investigatory teams during its life, and is designed to satisfy requirements such as the following (described in the project document):

(a) Meet the recognized need for civil aviation to make a more effective contribution to the development of the national economies of African States;

(b) Propose specific well-defined and well-costed projects, in which civil aviation is a part, which can assist the economic (and social) development of African States;

(c) Meet in a practical manner certain aims expressed in the 'Programme of Action for the Establishment of a New International Economic Order', adopted by the sixth special session of the United Nations General Assembly in 1974.

The ECA has been aware of this project since its inception, has made information available for it, attended the briefing of experts in Montreal in March, 1975, and expects to make further contributions to the studies and implementation, in recognition of the role air transport can and should play in the economic development of the region. The ECA hopes that the output from the study will give a guide to some of the following determinants, which have yet to be clearly identified:

(a) The capital-output and labour-output ratios of civil aviation in developing economies against those for shipping and other major industries;

(b) The comparative net hard currency earnings as above;

(c) The comparative per dollar purchasing power generated (i.e. the multiplier effect, including the relationship to tourism) as above;

(d) The rôle of subsidy in the sphere of civil aviation.

Apart from the above aspects, it is also evident that there is a need for substantial additional marketing research to be carried out, both within and outside the region. The research should not be confined to establishing demand alone, but also to evaluating policy in relation to tariff, terms of sale, and other barriers. Such research may also evaluate air imports which would undercut in price those currently obtained via the traditional links of expatriate traders with metropolitan countries. The Africa Trade Centre has already agreed to place items with air freight potential in a special category in its opportunity/request documentation. As will be seen from the references in annex I, the International Trade Centre in Geneva has produced a considerable volume of information on export markets for developing countries. Apart from this ECA study, which was not able to cover extra-regional demand markets in any detail and which covered a limited number of regional countries, little specific air freight marketing research has, however, been carried out. Using this report as a guide, therefore, IT IS RECOMMENDED (Recommendation 9) that the Africa and International Trade Centres launch a comprehensive survey to complement the work already done by themselves.

### 12.11 Implementation

From the text of this report, and particularly from Section 3's recommendations, it will have been seen that, as expected, the air freight opportunities involve a diverse range of sectoral activities. Some of these lie directly within the aegis of ECA, some with AFCAC should AFCAC so wish, and others logically with other international and national organizations. Suggested machinery for development is discussed below.

The major recommendation of the first phase of this study is the taking of various steps towards the establishment of an African multinational freight airline. While the study has not covered a full sample of countries in the region, it is felt that there is ample justification for examining further the prospect of carrying out the first step of a capacity brokerage agency, primarily for the East and Central subregions, particularly as the unique role of Air Afrique in West Africa has yet to be evaluated. Thus the ECA intends to follow up this objective and, provided resources are available, continue with the extension of the study of Air Freight Potential to further States, particularly in North and West Africa.

Further developments towards the multinational freight airline are less specific and more complex at present. Nevertheless, in order to achieve practical progress and day-to-day development, responsibility for undertaking the project will need to lie in the hands of one organ only. By virtue of its commercial background and the geographic location of its headquarters in Nairobi, AAFRA would seem an ideal co-ordinating body, but it only represents Governments indirectly, and its constitutional bias towards IATA airlines must rule it out. Thus it would seem that AFCAC, in conjunction with the ECA and OAU, would be the best agency to co-ordinate development work. AFCAC has shown interest in the developments of the ECA study as far, and, if positive comments are received from AFCAC member States on the earlier paper 'Towards an African Multinational Freight Airline', IT IS RECOMMENDED (Recommendation 10) that ECA, OAU and AFCAC get together to discuss detailed proposals and if possible set up a work programme, preferably by the end of 1975. Obviously further organizations with an interest in aviation in the region will be involved in due course, in particular the International Air Carriers Association (IACA) and the International Civil Aviation Organization (ICAO), as well as financial institutions such as the African Development Bank (ADB) and the World Bank (IBRD), and also the United Nations Development Programme. Thus, to monitor and co-ordinate strategic developments, it is suggested that a standing working group be established, comprising representatives of ECA, OAU, AFCAC and the ADB, together with two or three of the interested States (one of them would be invited to chair the group). Invited to attend meetings of the group as observers would be AAFRA, IACA, IBRD, ICAO, UNDP and the embryo freight charter organizations in the region. As far as the latter are concerned, it is evident that while the developments towards a brokerage system are in progress, it would be worth-while their getting together to solve immediate problems, perhaps through setting up a regional charter carrier association. One of the first tasks of the working group would be to establish a feasible programme of priorities.

As far as the other major recommendations of this report are concerned, the agencies for implementation are self-evident. The ECA obviously has no authority over other international agencies, but is getting together with them to demonstrate

the need for work programmes and to develop a co-ordinated programme. It is hoped that those aspects which directly concern AFCAC will be discussed in the general context of the meeting(s) with AFCAC and OAU referred to above in 1975. In particular, since one of AFCAC's subregional meetings on airline co-operation and integration has already set up an air freight and air mail working group, following the completion of these subregional meetings, it may be worth establishing a joint ECA/AFCAC regional group, to include experts on agricultural and industrial development. UNIDO has already indicated its interest in a project on air freight packaging, and close links have been maintained with the Africa Trade Centre, the Association of African Central Banks, and the Association of African Trade Promotion Organizations, all of which have secretariats provided by ECA itself. The Transport and Communications Division of ECA looks forward to receiving comments on this report from all the above organizations, and to working with them towards developing air freight transport in Africa.

Annex A - Objectives of the study

(1) The primary objectives are:

(a) To evaluate the potential air freight carriage for intra-African and African originating intercontinental movements (at economic cost levels);

(b) To recommend methods of increasing utilization of capacity, allocation of and requirements for capacity and facilities (both ground and air);

and, most importantly,

(c) To stimulate thought and discussion on the development of air freight and its infrastructure.

(2) It is considered that the study will show that strategically planned development of air freight in Africa could help in:

(a) Increasing intra-African trade flows;

(b) Exploiting agricultural and horticultural potential (and establishing new markets, diversifying exports, increasing rural employment, and acquiring foreign exchange);

(c) Utilizing currently wasted capacity (often developed by growth in tourist traffic), with particular reference to lessening directional/seasonal imbalances;

(d) Increasing African carriers' market share of the inter-African market as well as the extra-African market (only 34 per cent of total to/from/within Africa in 1968 - ICAO). Increasing competition with non-African charter carriers (who obtain lucrative loads into Africa, and can fill-up at low yield on the return journey);

(e) Creating employment in the air freight industry itself.

(3) The study is expected to show the need for and to contribute towards:

(a) Improved planning of future ground and air facilities;

(b) Examining the possibility of setting-up multinational air freight services in Africa;

(c) Improving the knowledge and marketing of air freight in Africa at government, airline and commercial levels.

(4) With the above in mind, the study will need to provide information such as the following:

(a) An assessment of the air freight import and export potential by route by commodity (value, weight and volume) by season, in selected countries;

(b) Estimates of unutilized freight capacity (by route, direction, season, and usable volume);

(c) Observations on suitability of such capacity for the segments of potential determined in 4a) above, and/or indications of alternative suitable capacity needs (e.g., freighters or upper-deck combination aircraft) for such freight;

(d) An evaluation of available and required physical equipment for organizing air freight movements by despatch and reception;

(e) An evaluation of, and comments upon, administrative machinery controlling air freight movements (customs procedures, airline documentation, insurance procedures, costs, etc.);

(f) An examination of possibilities of multinational collaboration and the financial feasibility of achieving capital injection and simplified procedures for 4d) and 4e);

(g) An evaluation of the marketing machinery (at governmental, airline, agency and commercial levels) for air freight development. More specifically, determination of current air freight costing procedures (and possibilities for subsidy), and recommendations for non-dilutionary structures of freight rates and terms designed to provide flexible encouragement for the use of air freight.

Annex B - Questionnaire issued to Governments prior to field survey

(Note: This is not a rigid questionnaire to be strictly completed step-by-step. It is intended to solicit data and to give time for preparing considered replied to field survey questions).

1. General

We should be grateful for any background information you wish to give us on the organization and control of civil aviation in your country, and on air freight movement in particular.

2. Marketing

We should welcome any information you can give us on the organization of, and facilities offered by, marketing units to aid the export development of air freightable products. For example, do you have any specific export promotion schemes, are you considering export credit insurance, how do you handle overseas representation (both within and outside Africa)? How well do you feel the benefits of air freight are known in your country? What is the current primary use of air freight (e.g. emergency, perishables, lower cost on total distribution basis, etc.)? How closely and at what level do the Government and carriers liaise with exporters and potential exporters? Have you established agreements which share risks between those involved? Do African carriers get a fair share of your import and export market? If not, why do you think this happens?

3. Air freight problems and needs

What do you feel are the major problems facing air freight development in your country? Is there any particular problem you would like to have investigated? Do you feel the directionality/seasonality of air freight movements is a problem? Is lack of traffic rights a problem? What about currency agreements within Africa? Do you feel future airfreight development in Africa will be in combination, palletised, or freight charter operations? Do you have any difficulty in obtaining charters when you want them? How do you go about obtaining charters? Do mail requirements limit freight capacity at all? Are they likely to do so? Do you feel your ground facilities are sufficient? What levels of through-put can be handled? Any plans for expansion?

4. Customs/sanitary arrangements

Does your country use special rates for air carriage as a stimulus? For intra-African movements by air and/or surface? If so, what are these? Are your export, import and transshipment formalities and documentation in line with ICAO recommendations, or do you have further requirements? Do you feel your storage and access facilities are adequate? Do you have details of equipment, areas, etc. which you could give us? Do you have special goods storage facilities? Is there any data available on dwell times? Are your sanitary regulations on imports in line with WHO recommendations?

5. Potential

Do you know of any exportable commodities (to Africa or elsewhere) that would benefit from the availability of more regular air freight capacity? Are they seasonal? What is the annual volume? Are they perishable? Do they need special facilities (e.g. refrigeration)? How often would they need uplifting? Do you know of any commodities at,

near or en route from, their destination which could be back-hauled on an aircraft? Do you know of any other commodity needs which could be imported by air freight into your country? Do potential exporters or airlines have access to opportunity/request lists for air freightable products? What future products could be expected from your country by air, and to where? Are there any plans for processing raw materials at home rather than overseas, and thus giving them air freightable qualities (e.g. textiles, footwear)?

6. Rate structures (within and from Africa)

What do you consider are the generalised cost-related needs for the development of air freight for the full benefit of your country and airline? Do you feel there are any major anomalies in the rates at present? Do you feel the IATA rate-making machinery is currently biased against African airlines? If so, what should be done to improve the situation? Have you considered government directives for rates, charters or part-charters? How do you think the recent fuel price increases will effect air freight?

7. Development schemes

Do you have any specific schemes proposed or in hand which will help develop air freight directly, or indirectly through the promotion of air freightable products? What are your training, marketing research and capacity information needs in this area? How much are you involved in developing multinational links in Africa (e.g. using AAFRA, AFCAC, developing multilateral freight service agreements, pooling market research and resources abroad, etc.)?

8. Data

Any historic, current and anticipated relevant traffic data you can supply us with prior to the field survey would be most useful and much appreciated. In particular, we should like to have up-to-date trade flows by commodity. These would preferably include air trade total market by commodity (using your standard classification), by value, weight and volume, by country and by direction with seasonality indications. Mail flows by type, country and direction, would also be useful in order that estimates may be made of underutilized capacity. Also traffic movement data by country by aircraft-type (and scheduled versus charter), and preferably by name of carrier. Airport freight uplift, discharge and transshipment volumes would also be useful for cross-referencing.

9. Advice

We should, of course, be most grateful for any ideas you could give us on how we might best carry out the project, both within your country and in Africa overall, and would welcome leads to information and personnel.



Annex C - Questionnaire issued to airlines prior to field survey

(Note: This is not a rigid questionnaire to be strictly completed step-by-step. It is intended to solicit data and to give time for preparing considered replies to the field survey questions).

1. General

We should be pleased if you would send us a copy of your latest annual report, in order to give us a general picture of your traffic flows, revenues, costs, etc. and the rôle of air freight in relation to these. We should also welcome details of your freight organizational structure (e.g. reporting level; cost or revenue centre or neither; number of staff - especially overseas and versus competitors - and training; plans for expansion, particularly with wide-body belly-hold, palletised combination aircraft or freighters; use of containers, pallets, etc.). How do you cost freight operations on combination aircraft?

2. Marketing

Is your strategy to sell freight on a wholesale basis or to offer a total service to the shipper and/or agent? Do you have any personnel trained in marketing and distribution who specialize in high-level selling? How closely do you liaise with trading bodies such as Chamber of Commerce, Marketing Boards, etc.? How widely do you feel the benefits of air freight are known in your country, particularly as related to the total distribution cost concept? Do you have any particular problems with representation overseas? Perhaps you would send us a list of your handling and selling designees worldwide for comparison with those of other African carriers, as well as a list of your own active handling and selling agreements for other carriers at home.

3. Air freight problems and needs

What do you feel are the major problems facing air freight development in your country? Is there any particular problem you would like to have investigated? Do you feel the directionality/seasonality of air freight movements is a problem? Is lack of traffic rights a problem? What about currency agreements within Africa? Do you feel that customs and sanitary controls and delays are a problem? Are airport facilities and security levels in your country adequate in your opinion? If not, what could be done to improve them? Would this need capital injection, and if so, where do you feel it should come from? Is space control on passenger aircraft a problem on your international routes? Do mail requirements limit capacity? Are they likely to do so in the future? Do you feel the future of air freight development in Africa lies in combination, palletised or freight charter operations? Do you feel that non-African carriers are getting an unfair share of your markets? If so, why do you think this is?

4. Potential

Do you know of any exportable commodities (to Africa or elsewhere) that would benefit from the availability of more regular air freight capacity? What is the annual volume? Are they seasonal? Perishable? Do they need special facilities (e.g. refrigeration)? How often would they need uplifting? Do you know of any commodities at, near, or en route from, their destination which could be back-hauled on an aircraft? Do you know of any other commodity needs which could be imported by air freight into your country? What future products (e.g. processed goods) could be exported from your country, and to where?

5. Rate structure (within and from Africa)

What do you consider are the generalized cost-related needs for the development of air freight in Africa? Do you think there is a future, say, in a delayed delivery, lower cost service? Would this lead to dilution of revenue from existing traffic? Do you feel a suitable rate structure could help solve directionality, seasonality and prorating problems at economic levels? Do you think improved ground facilities could lead to rate reductions? Do you feel there are any major anomalies in the rates at present? Do you feel the IATA rate-making machinery is, currently biased against African airlines? If so, what should be done to improve the situation? Have you considered trying to obtain government directives for rates, charters or part-charters? Do you feel current government controls are adequate to pave the way for development of the indigenous African airlines? How do you think the recent fuel price increases will affect air freight?

6. Development schemes

Please let us know your ideas for schemes which will help develop air freight directly, or indirectly through the promotion of air freightable products. What are your training, marketing research and capacity needs in this area? How much are you involved in developing multinational links in Africa (e.g. using AAFRA, developing multilateral freight service agreements, pooling market research from your country and outside Africa, setting up brokerage schemes, joint appointment of handling and sales agents abroad, etc.)? What do you feel would be the most beneficial multinational project for African airlines?

7. Data

Any historic, current and anticipated relevant data you can supply us with prior to the field survey would be most useful and much appreciated. In particular, we should like to have up-to-date air traffic flows by commodity. These should preferably be estimated total market (which we have asked your Government to supply) and airline shares (in complete confidence, of course) by value, weight and volume, by country and by direction with seasonality indications. True Origin and Destination (TOD) data is preferred, but if you have Flight Uplift and Discharge (FUD) data as well, so much the better. Estimates of your own and market under-utilized capacity after extraction of mail volumes would be of interest. We should welcome the results of any studies you may have done such as air waybill analyses (No of pieces, average weight, density, revenue, etc.), shipper analyses (direct vs commercial account/contract vs agency split by revenue and sales operations), cubeout problems. We are also collating market research studies by airlines of air freight potential in their own countries, which are obviously essential given the limited resources we have at ECA for our Study. If you have any such study, and are prepared to release it to us in confidence we should be most grateful. We are also interested in more specific market research in such areas as export/import terms used, credit facilities, insurance methods, transport mode/airline decisions and reasons, shipper/agency breakdown, etc.

8. Advice

We should, of course, be grateful for any ideas you could give us on how we might best carry out the project, both within your country and in Africa overall, and would welcome leads to information and personnel.

#### Annex D - Air freight as a development tool

This annex has been produced to provide, in a general form, the arguments for increased use of the air mode for freight transport in Africa. Air freight is at present, all over the world, the poor relation of surface transport, the poor relation of air passenger traffic, and an undervalued tool of economic development. Perhaps the major reason for this inferiority is the lack of knowledge by transport, business and economic executives of its quantitative benefits. Some of these are identified below.

The first part of the annex, liberally sprinkled with simple examples, attempts to show:

(a) That air freight, when considered as part of a distribution system rather than as a separate entity, is often little more expensive, and sometimes cheaper than, surface transportation;

(b) That the use of air freight can meet the demand of markets unattainable by surface means;

(c) That the availability of the air freight mode can be and is being exploited as a basis for economic development in specific production segments.

The second part concerns the relationship between passenger and freight traffic by air. General examples are used to demonstrate a principle that usually holds in more specific cases, that is that freight is more profitable than passenger traffic to airlines. The fact that it is only slowly coming to be recognized as such is due to lack of specific evaluations and to the glamour of more prestigious passenger operations.

##### D.1 Air versus surface

The operating costs and advantages of the air mode compared with surface transportation are discussed below. A comparison of infrastructure costs is beyond the scope of this text, particularly as passenger transport would be involved and surface transportation provides economic inputs to the areas through which it passes. Nevertheless, most countries in the Region already have relatively easy access to an international standard airport, which is all the infrastructure required to serve any other country in Africa, or indeed the world.

##### D.1.1 The concept of total distribution costing

Air freight rates are high. Often they can be as much as 10 times the equivalent surface transportation rates (though occasionally they do match these). What is not generally recognized is that the ancillary distribution costs are often much lower than those for surface shipments, reducing, or even more than counteracting, the discrepancy. To take some examples for these ancillary costs:

Pick up delivery costs. Since airports are generally nearer to true origins and destinations than seaports (ships being the primary competitive mode in terms of distance covered), these costs are often lower by air. The difference in favour of air is great in Africa, particularly in the landlocked areas. The costs of the land segment of the journey to the coast is in many cases higher than for the far longer sea journey, reaching double the level for some commodities and countries.

Packaging. Little packaging is needed for air transportation as goods are handled less often and more carefully than by surface, are at risk for less time and in a less hazardous atmosphere (e.g. no salination problems) and more secure environment. The gravity forces met in air freighting are lower than for any other form of transport (dock handling is particularly harmful). Packaging of instruments for surface shipments is usually around 50 per cent of the weight of the item - by air the proportion is reduced to 10-15 per cent. More pertinent to Africa as an example, a crush-proof air pack could be produced for tea which would save about 6 kgs. of packaging weight on 50 kg. net of tea. Such developments save on the cost of packaging (about a 90 per cent reduction in the case of tea), the relative cost of air freighting, and in some importing countries, on the customs duties. Some air freight is not packed at all, but simply loaded on a pallet, covered in plastic sheeting and wired down - when a loader can see what he is loading he can be more careful. One problem that air shipments do meet is the need for them to be packed to cater for pick-up and delivery; so care is needed at these stages.

Pilferage/spoilage. Due to short transit times, fewer transshipments and a secure environment, losses are lower by air. Pilferage losses for some landlocked countries in Africa reached up to 25 per cent of the value of the commodities in 1974 for surface shipment, while, despite the higher value of air shipments, pilferage of these was at a level of 1 per cent to 3 per cent of the value. Spoilage en route is a very real problem for many of the agricultural products exported from the Region.

Insurance. Because air freight shipments are at risk for shorter periods and in a secure environment with lower pilferage and spoilage levels, insurance costs for air transportation are low. And if one also considers that there are non-insurable losses, and that claims often take a long time to be settled, then this can be a considerable advantage (linked to pilferage/spoilage above).

Port storage charges. Unless collection is delayed, there are usually no storage charges by air, although these are regularly applied for surface shipments. With increasing congestion at ports and subsequent delays of a month or more at many ports in the Region, these charges have risen dramatically in recent times.

Miscellaneous charges. Surface shipments often incur a number of charges (e.g. freight forwarder charges, provision of pallets, handling clearance) which are non-existent or cheaper by air. Conference lines are currently imposing both a bunker surcharge and a congestion surcharge (25 per cent) on their tariffs. Some port congestion surcharges as at November, 1974 will give an idea of current problems. These charges were: Dar es Salaam up to 30 per cent, Durban up to 20 per cent, Lobito Bay up to 50 per cent, Lourenço Marques 30 per cent, Mombasa 10 per cent.

Documentation costs. Air documentation is simple, and saves much administrative work. It can take a fortnight merely to obtain quotes for surface shipment charges, due to the complexity of the charging system, while IATA rates are readily available in published form and air charter rates are simple to obtain.

Inventory. By using a central distribution depot and air shipments from this, a substantial reduction in stock levels can be made at outlets, thereby saving capital tied up, warehousing costs, inventory taxes and insurances (where applicable), while maintaining the same level of service to the customer (due to the fast flexible frequency of air).

Such a distribution policy also cuts down obsolescence. Inventory saving is a major reason for using air freight, recognized particularly by American and Japanese firms operating in Europe and closer at hand by European and Japanese firms (particularly vehicle manufacturers) with outlets in Africa. As far as the Region is concerned, since the major inventory saving is at the distribution point, this is a benefit for air imports rather than exports, which are in any case mainly agricultural and hence require less complex distribution processes.

Obsolescence. Some commodities become obsolescent so quickly that air shipment is the only practical means of avoiding risk. The fashion-conscious textile market is a case in point, and is one which opens up opportunities for African suppliers, particularly where local prints are concerned. While African markets themselves are generally well-covered due to the low investment necessary for manufacture, more indigenous production at low cost and more contact with the fashion-hungry markets of the West could break through long-term cotton agreements and lead to rapid development. Specialized packaging for air carriage of clothing is already available.

Capital tied up in transit. Surface shipments between Africa and Europe or the USA take from 1 to 9 months depending on nature of the journey. During this period the earnings from the goods, if they were shipped instead by air, could be reinvested in production or placed in a bank and earn interest.

With all these benefits, why is the air mode not used more often? Firstly, as previously mentioned, the concept of total distribution costing is often not recognized; secondly, it can be quite a complex problem to quantify and sum the above items; and thirdly air does have some disadvantages apart from the rate. Customs charges are often levied on a c.i.f. basis, which thus includes the high air freight rates (although air has an advantage where duties are levied on gross weight). Some Governments in the Region (e.g. Ethiopia, East African Community) have modified this policy to f.o.b. or f.o.b. plus a proportion of the transport costs for air imports in order to stimulate use of the air mode (see 12.6 in main text).

To give an idea of the level at which air becomes the economic mode for a landlocked State in the Region, a simple analysis prepared for Rwanda in mid-1974 is given below:

Let value of commodity (f.o.b. Kigali for exports, c.i.f. Kigali for imports) be \$US/kg. (strictly, V will vary according to the location of the freight en route).

Then, excluding costs which are the same or similar for both modes, the total costs to from Europe are, in \$US/kg:

	<u>Air</u>	<u>Surface</u>
Transport	T    Kigali to/from Mombasa	0.19
	Mombasa to/from Europe	0.15
Pilferage/damage	1% = 0.01V	8% = 0.08V
Interest on capital	-    3½ months at 15 %, say	= 4.4% = 0.044V
Packaging/documentation/ obsolescence/insurance	1% = 0.01V	3% = 0.03V
Total	<u>T + 0.02V</u>	<u>0.34 + 0.154V</u>

From the above it will be seen that air/surface breakeven occurs when  $T + 0.02V = 0.34 + 0.154V$ . For exports at the average air charter cost of \$US0.60 per kg, the breakeven value: weight ratio is \$US1.94 per kg, which suggested that even mineral ores such as cassiterite and wolfframite should travel by air. Of course further analysis would have to be carried out for individual commodities and into terms of sale as the above analysis is simplistic and sensitive, but nevertheless it provides an indicative level. For imports the analysis excludes the major benefits of inventory savings (particularly valid in the case of pharmaceuticals and vehicle spares) but comes up with a breakeven value: weight level of \$7.4 per kg. Of course, emergency and perishable items of lower value will also travel by air.

Any firm involved with importing and exporting should be alive to the ideas of total distribution costing. Distribution should be part of corporate policy and not delegated to a shipping department or agency. The total distribution concept may inevitably reach back into the production cycle (or vice versa) - for example an African agency considering the export of meat will need to evaluate the overall economic benefits of sending the meat live, chilled, frozen, dried or canned in association with various modes of transport and market prices.

Of course, there are items which will never travel by air - in general bulk low value per unit weight goods. But air carriers have yet to exploit fully movements of higher value products, or of perishables with strong market demand (e.g. fresh fruit and vegetables). Many firms plan their operations on a product selection basis, higher value items being sent by air. Many firms also allow for a proportion of air shipment in their pricing procedures, in order that they can meet deadlines or replace damaged goods should their surface shipments not come up to scratch. Port congestion and strikes have often converted shippers permanently to the air mode.

While air offers flexibility, many firms are inflexible and traditionalist, and it is difficult to persuade them to switch to air. Fortunately in Africa new companies are continually being established, and by the very nature of its fast-moving development, Africa is open to flexible ideas.

#### D.1.2 Some benefits of air freight

Air freight has advantages over surface transport modes in terms of services, which is very difficult to quantify, and other benefits that are only relevant in certain cases. Below are some of these.

(a) Foreign exchange saving. Payment to air carriers may normally be made in local currency (and often there exists a national carrier). Payment in local currency to shipping lines is not usually acceptable (and shipping lines are normally under foreign ownership). In the use of imports and exports made on a c.i.f. basis, the country concerned saves foreign exchange through using air on pilferage/damage losses, interest on capital, shipping and miscellaneous inputs, but loses on aviation inputs.

(b) Low risk market expansion. Test marketing can be a risky business, but, by using air, the test investment can be low, as there may be no need to set up complex distribution channels, warehousing and other facilities at the consignee end. The psychological barrier against products originating in developing countries can be great, even if the products meet all the necessary standards. Sample shipments by air could provide the key to solving this problem.

- (c) Overcoming competitor's advantage of being nearer the market.
- (d) Flexibility. The ability to switch markets according to demand (e.g. to provide chilled meat to southern Europe to meet the summer influx of tourists). The ability to catch temporarily premium prices (especially of agricultural and mineral commodities).
- (e) Ability to deal with emergencies, production-line problems, breakdowns, unpredictable product demand.
- (f) Increased use of production facilities and equipment - for example, reduction in transit between jobs for mobile production units such as oil drilling equipment.
- (g) Improved cash flow.
- (h) Improved information flow.
- (i) Improved control over goods in transit - and less uncertainty over delivery dates.
- (j) Improved customer service.
- (k) Improved market image.

#### D.1.3 Air freight and economic development

Air freight is being used to satisfy demand otherwise unattainable. Each evening freshly baked French loaves are sent by air from Paris to New York to be purchased by upper-income Americans and French emigrés the next day. This is an extreme example, but is the sending of exotic tropical produce from Africa to western fruit and vegetable markets so very different?

The availability of air freight can be used to exploit differences in climatic and labour conditions. Many countries in Africa enjoy reverse or complementary growing seasons to those in Europe. As a result horticultural concerns in several African countries are able to grow flowers for sale in the western European market.

One light industrial firm in Africa is an excellent example of how air freight can become an integral part of a company's production and marketing effort. The products that this firm markets are "rivets made to order and to customer's own design". The key competitive powers of the firm as set out by the Managing Director are:

- (a) The ability to supply faster than any competitor, at the same or cheaper price, but at a similar quality standard;
- (b) A guarantee that the user will never run short of rivets provided that his firm is allowed to supply the rivets.

Both a) and b) are supported by an aggressive programme of personal visits by the Managing Director. The air mode is used to support surface operations to guarantee both a) and b). Giving an undertaking such as b) and fulfilling it, often by means of the air mode, means that the firm being supplied tends to reduce its stock holdings of rivets, thus saving inventory costs, but thereby it becomes more dependent on the firm in question for its future supplies of this vital component.



The growth of the company is a good example of how first-industrial-age production can move away from second-industrial-age countries such as the United Kingdom, the USA and West Germany, to countries at a relatively low level of industrial development. Light industry could be further developed along these lines in Africa to serve overseas markets or to generate an interwoven segmented network to meet pan-African demand. The example of Mauritius demonstrates that such production can be carried out on a large scale. In order to curb high unemployment and to earn foreign exchange by benefitting from low labour costs, the Mauritian Government has enabled the development of export processing industries. These are geared up to a system of importing material requirements by sea and exporting semi-finished or finished products by air. Hong Kong has successfully used just this approach to develop to its present relatively advanced economic level.

An important feature of air freight is that it can provide the shipper or consignee with an adequate control over distribution. A grower of horticultural produce is unlikely to plant his or her seed unless there is some guarantee that when he or she comes to harvest the crop, capacity will be available at economic prices to carry the production quickly and safely to the point of sale. In the African Region, the bulk of imports arrive on a c.i.f. basis and purchasers take the exports on an f.o.b. basis, a situation which means that African countries have little or no control over the external transport systems, achieving only a small share of this economic sector. In addition, there is little control over the distribution of the exports themselves, which is unfortunate, as distribution is becoming increasingly integrated into marketing systems in the developed world. The example of tea exports from Africa is interesting. Tea is often sold by contract in the country of production or by auction at coastal ports. Thus not only is much of the transportation segment of the final economic output taken out of African hands, but also much of the final profit. Some countries have realized that while air transport is more expensive than surface transportation, the net economic return to the exporting country can be greater if the air mode is used. Increased African control of air freight operations could improve distribution, particularly for the landlocked countries.

There are many problems to be overcome before air freight plays its rightful rôle in development strategy (e.g. dilatory, bureaucratic and non-uniform customs procedures; non-uniform sanitary procedures; poor handling and storage facilities; directional and seasonal imbalances; lack of capital) and rates will not be reduced until total distribution costing is used as a concept, ground facilities are improved, and a flexible charter network is established. But there is no doubt that air freight will play a major rôle, and in some cases proceed surface transport as a development tool.

#### D.2 Freight economics versus passenger economics for the airlines

Below are some figures that may help to dispel the myth that passenger traffic is necessarily more profitable than freight traffic. Some recent estimates of direct flight up-lift and discharge traffic between the United Kingdom and Africa south of the Sahara for 1974 are given.



(a) Passenger traffic (both to and from Africa)

<u>Mode</u>	<u>Passengers</u> ( '000 one-way journeys)	<u>Revenue</u> ( '000 \$US)	<u>Yield</u> (\$/passenger)
Scheduled	568	161,800	285
Charter	65	7,265	112
Total	633	169,065	267

(b) Freight traffic (both scheduled and charter as no split is available)

<u>Direction</u>	<u>Weight</u> (tons)	<u>Revenue</u> ( '000 \$US)	<u>Yield</u> (\$/kg.)
UK - Africa	12,921	35,800	2.77
Africa - UK	9,501	5,840	0.61
Average	11,211	8,673	1.86

As a first step, we assume that the average passenger and his or her baggage weight 90 kilogrammas (the standard used); then the passenger yield per kilogramme becomes in \$US:

Scheduled	3.17
Charter	1.24
Total	2.94

Thus the average freight yield is 37 per cent below the average passenger yield (which includes first class) on a round-trip. However, passengers take up a lot of space (in the form of seats, galleys, toilets, stewardesses, breathing space, etc.), which freight doesn't need. A Boeing 707 in a typical configuration carries a maximum of 140 passengers weighing 12.6 tons (with the above conversion factor) when it could be carrying 30 tons of freight instead on the upper-deck (and some more in the passenger baggage space). Below is evaluated the revenue produced by an average one-way journey of a Boeing 707 on a United Kingdom - Africa - United Kingdom route at a 65 per cent scheduled load factor for passengers and an average 65 per cent load factor for freight southbound and only 48 per cent northbound to account for the current low north-bound volume above. This will give a pessimistic revenue for freight as it makes no allowance for charter loads at high load factors and freight operations generally achieve higher load factors than passenger operations due to the necessity to hold back space for late bookings by business people.

(a) Passenger revenue

Scheduled:	140 seats x 65% load at	\$285 = \$25,935
Charter:	170 seats (say) x 100% load at	\$112 = \$19,040
Average:	(at 1974 traffic levels):	= \$25,227

(b) Freight revenue

UK - Africa:	30 tons x 65% load at \$2.77/kg.	= \$54,015
Africa - UK:	30 tons x 48% load at \$0.61/kg.	= \$8,784
Average:		= \$31,400

So at current rates for scheduled and charter operations, freight produces 20 per cent higher revenue than the equivalent passenger operation and would produce 7 per cent revenue without any backload from Africa at all. At present southbound freight rates there is therefore little justification for any northbound freight operation to leave with space on board.

Coming to the cost side, little information is available on African routes. However, freight operations in general have substantially lower costs than passenger operations. Table 9 shows some comparative figures for the two major international carriers from the USA, the international operations of two American all-freight carriers (Seaboard, the third major American carrier, has costs very similar to Flying Tiger), and perhaps more pertinently, the international all-freight and combination carriers based in Lebanon. It will be seen that overall operating costs for the freight carriers were substantially lower in terms of available capacity (on average 43 per cent lower) and even lower in terms of revenue load carried (56 per cent lower) due to the higher load factors achieved (64 per cent against 49 per cent). As mentioned, scheduled freight operations are able to achieve higher load factors than passenger operations, and the freight carriers also included a higher proportion of charter operations (56 per cent against 11 per cent) - nevertheless the cost comparison is valid as the ability to meet demand with semi-scheduled or charter services rather than scheduled is a feature of freight operations.

Freight operations are seen to be cheaper on almost every count. Flight operations costs are usually lower due to the lower pay scales for pilots on the older and smaller aircraft types and to the longer flight stages operated. The proportion of the freight costs relative to passenger costs will have increased since 1972, as will the proportion of flight operations costs to the total, due to the large increases in fuel prices. Maintenance and depreciation costs for freighter aircraft show significantly lower levels, but comparison here may not be valid, as freighter aircraft tend to be tested, older models (some of which may have borne the major part of depreciation while formerly in passenger configuration). Ground equipment costs for the freighter airlines are less, although much of these costs are borne indirectly, through airport authorities and may be covered under 'Other Ground Expenses' - the freight airline costs are, however, also lower under this heading. A true comparison of ancillary costs can be made in items 6 to 9, in which freight carries an overall advantage of 65 per cent in terms of revenue load carried (or 30 per cent on total costs, an estimate of 'Other Ground Expenses' being made for TMA).

In conclusion, freight revenue per unit capacity on African routes is currently around 20 per cent higher than passenger revenue and freight operating expenses are probably substantially lower than for passenger operations (the revenue figures are likely to include a lower proportion of charter operations than the cost figures, and are therefore not strictly comparable).

While the above analysis is general, similar conclusions are likely to be found in more specific cases. The only constraint on increased use of freighter operations is the need to generate sufficient demand, which in turn depends on the lower costs generated by freighter operations. The figures suggest that more thought should be given by airlines and Governments into increasing the African freighter fleet, or at least using some of the upperdeck capacity of combination aircraft for freight. The ECA Study has shown that the potential is there. More emphasis, too, should be placed in filling the bellyholds of combination aircraft, particularly the wide-body jets. A Boeing 747 combination aircraft can travel across the North Atlantic with no passengers on board, only freight in the bellyhold, and break even financially. The freight proportion of airline revenue is low at present, but increasing fast.

Table 9 - Comparative operation costs of international airlines, 1972

Airline base Type of operation	USA				Lebanon	
	Mixed pax and freight		All freight		Mixed	All freight
Airline	Pan Ame- rican (Atlan- tic and Pacific Ops.)	TWA (Atlan- tic & Pacific Ops.)	Airlift (Inter- national Ops.)	Flying Tiger (Inter- national Ops.)	MHA (Middle East Airli- nes	TMA (Trans- Mediterranean Airways)
Revenue ton km performed (million):	3,549	1,936	231	893	172	252
<u>Operating expenses:</u> (US cents per revenue revenue tone km)						
(1) Flight operations (% of total)	6.3 (25.4)	7.0 (28.0)	6.9 (61.2)	3.9 (41.4)	10.3 (22.5)	5.7 (35.4)
(2) Maintenance & overhaul (% of total)	3.0 (12.1)	3.7 (14.8)	1.4 (12.7)	1.4 (14.7)	6.2 (13.5)	1.7 (10.6)
(3) Depreciation of ground equipment (% of total)	0.4 (1.6)	0.5 (2.0)	0.1 (0.9)	0.1 (0.7)	0.5 (1.1)	0.2 (1.1)
(4) Other depreciation (% of total)	2.2 (8.9)	1.4 (5.6)	0.4 (3.6)	0.5 (5.2)	6.8 (14.7)	0.5 (3.0)
(5) Landing and departure fees (% of total)	1.1 (4.4)	0.7 (2.8)	0.1 (1.0)	0.3 (3.1)	2.0 (4.3)	2.6 (16.2)
(6) Other ground expenses (% of total)	3.6 (14.5)	2.9 (11.6)	1.1 (9.9)	1.5 (15.3)	3.9 (8.5)	
(7) Passenger services (% of total)	3.0 (12.1)	3.2 (12.8)	0.5 (4.2)	0.2 (2.2)	3.3 (7.2)	-
(8) Ticketing, sales & promotion (% of total)	4.0 (16.1)	3.8 (15.2)	0.1 (0.9)	1.1 (11.2)	7.4 (16.0)	4.4 (27.7)
(9) Administrative & other (% of total)	1.2 (4.8)	1.8 (7.2)	0.6 (5.6)	0.6 (6.2)	5.6 (12.2)	1.0 (6.0)
Total	24.7	24.9	11.2	9.6	46.0	16.1
Total per capacity ton km	12.2	12.3	7.1	6.4	21.5	9.4

Source: ICAO Digest of statistics No. 180, Financial data.

Annex E - The freedoms of the air

In 1944 a conference was held in Chicago which, amongst other work, established the International Civil Aviation Organization (ICAO) and defined the nature of treaties concerning flights between contracting States in the form of five 'Freedoms of the Air' as follows:

- First Freedom. The privilege of innocent transit over the territory of another nation. This was later formalized as the International Air Transit Services agreement of 1945, and has been ratified by many African countries. Example: A German flag carrier (Lufthansa) flying over Ethiopia en route to Kenya.
- Second Freedom. The privilege of a technical call in another nation's territory, with no commercial rights to embark or disembark traffic. Example: The Lufthansa aircraft above lands in Ethiopia to take on fuel or to repair a mechanical malfunction.
- Third Freedom. The privilege to set down on the territory of another State traffic taken on in the State whose nationality the aircraft possesses. Example: A Zambian flag carrier (Zambia Airways) takes on traffic in Zambia destined for Kenya.
- Fourth Freedom. The privilege to pick up traffic destined for a carrier's own territory from another territory. Example: Zambia Airways takes on traffic in Kenya destined for Zambia. In effect Third and Fourth freedoms are almost always combined.
- Fifth Freedom. The privilege to pick up and set down traffic between the territories of second and third States. Example: An Italian flag carrier (Alitalia) carrying traffic from Kenya to Zambia or vice-versa.

Since 1944, further, 'unofficial' freedoms have become generally recognized, the main ones being as follows:

- Sixth Freedom. Combining Third and Fourth freedoms into Fifth freedom by carrying traffic through the carrier's home territory. Example: East African Airways carrying traffic from the United Kingdom to Zambia via Kenya.
- Cabotage. Carrying traffic as flag carrier between two countries formally existing under the same flag, or carrying traffic on domestic services in a foreign territory. Example: A French flag carrier (Air France) carrying traffic between France and TFAI (Djibouti). The second type of cabotage is rarely granted - the best example is that of British (British Airways) and USA (Pan American) carriers operating certain domestic German routes as a hangover from the occupation at the end of World War II.

## Annex F - Guidelines for air freight statistics

This annex has been included in order to show the possibilities of various sources and forms of data. The needs of individual countries will undoubtedly differ, and in many cases basic airport statistics will be sufficient. Thus the information below shows progressive developments that can be made as traffic grows and data requirements become more complex.

There are in general two major sources of data for an individual country, its customs statistics and its airport statistics, and these are discussed under separate headings below, followed by a discussion of data collation for specific purposes.

### F.1 Customs statistics

All countries record imports, and most African countries, many of which apply export taxes, also record exports. Data is usually collated and published monthly and annually in trade or statistical digests. While data is recorded by station (i.e. by point of arrival or departure) it is not often collated by station. Thus, while raw data on air trade is available, as the international airport or airports are recording stations, it is not collated separately. Collation of air trade data separately, then, is a basic requirement, which involves little additional processing. Since customs data is usually recorded country by commodity (and/or vice-versa), value, weight and duty payable, the following analyses may easily be made:

(1) Determination of the penetration by value and by weight for the air mode, preferably for each country and group of commodities, in order to determine how far total distribution is being used as a measure, and how much latent air potential is available from existing trade. The availability of duty payments means that the potential effect of modifying the base on which duties are assessed in the case of air shipments can be expressed in financial terms.

(2) Comparison of recorded volumes with airport statistics to establish conformity.

(3) Evaluation of true origin and destination traffic as opposed to the uplift and discharge traffic which is available from airport statistics, enabling optimum routing patterns to be established.

(4) Analyses of commodity flows with a view to developing marketing strategy.

Table 10 shows part of a fairly sophisticated summary chart providing sufficient information to enable fairly detailed analyses to be carried out.

### F.2 Airport statistics

All countries record statistics of international uplift and discharge, usually by airport, for passengers, baggage, commercial freight and mail. Such data is particularly useful for planning airport and aircraft requirements, although further information, such as yield is also necessary for the latter. Transit traffic is usually recorded separately for both passengers and freight. In the latter case this causes problems of ambiguity as transshipment traffic (i.e. handled at the airport, as opposed to transit traffic which merely passes through on an aircraft) is sometimes included with uplift and discharge traffic and sometimes with transit traffic. It is important to record transshipment traffic separately, in order to distinguish it from the true traffic generation of the airport in question. In fact transit traffic is of lesser interest, as it

Table 10: Country X - Imports from country Y, 1975

SITC (or BTN) Classification	Commodity description	FOB Value			CIF Value			Weight			Duty paid +		
		Surface		Air Pen <sup>n</sup>	Surface		Air Pen <sup>n</sup>	Surface		Air Pen <sup>n</sup>	Surface		Air Pen <sup>n</sup>
		000 \$	000 \$	%	000 \$	000 \$	%	Tons	Tons	%	\$	\$	\$/kg
Carried over	-	27,342	2,543	9.3	30,163	3,184	10.6	39,063	509	1.3	4,532	414	0.7
Division 71	Machinery, non-electric	6,534	892	13.6	7,247	1,327	18.3	5,947	99	1.7	543	83	1.1
Division 72	Electrical machinery	3,229	763	23.6	3,714	1,011	27.2	1,397	50	0.4	278	67	2.3
Division 73	Transport equipment	10,279	54	0.5	11,624	72	0.6	11,424	6	0.1	1,162	6	0.9
Section 7	Machinery & transport equipment	20,042	1,709	8.5	22,585	2,410	10.7	18,768	155	0.8	1,983	156	1.1
Division 89	Miscellaneous manuf. articles, nes	534	217	40.7	572	283	49.5	445	35	7.9	103	45	1.2
Rest													
Section 8	-	619	237	38.3	663	294	44.3	617	15	2.4	119	48	1.0
Section 8	Miscellaneous manuf. articles	1,153	454	39.3	1,235	577	46.7	1,062	50	4.7	222	93	1.1
Section 9	Miscellaneous, nes	1,079	50	4.6	1,192	64	5.4	347	4	1.2	275	13	3.1
Total	-	49,616	4,756	9.6	55,175	6,235	13.3	59,240	718	1.2	7,012	676	0.8

+ Based on c.i.f. values for surface, f.o.b. + 50 per cent transport costs for air/nes. = Not elsewhere specified.

does not affect handling requirements at the airport, although it is useful to have at hand when negotiating bilateral agreements or planning sixth freedom services.

Also important is the need to distinguish freight traffic on all-freight scheduled and charter aircraft from that on combination aircraft in order to be able to determine the level of specialized freight operations. Difficult to obtain, but also useful along these lines is the proportion of freight carried in the bellyholds of wide-bodied or palletised combination aircraft as opposed to that carried in the limited space of narrow bodied aircraft.

Monthly data should be produced if possible in order to establish the seasonality (and varying imbalances) of carriage, both on individual routes and for the airport as a whole.

As the airport data is collected from the individual airlines, the national carrier is often able to deduce how well it is doing in relation to other carriers on a specific route. Obviously such data is usually not published. An example of part of an analysis carried out for this ECA Study is shown in table 11. The share obtained by EAAC (of true uplift and discharge traffic plus transshipment traffic in this case) to and from its main base of Nairobi is clear. Of course market share is but one factor in the overall picture of the airline's economics - the table does not show the yield or the profitability on the routes, or even the share of capacity as opposed to carriage, and in fact even if the number of services is listed, the opposition could be using different aircraft with many times the capacity.

One further point that has been unearthed during the ECA Study is that the difference between normal passenger baggage (usually unrecorded), excess baggage and unaccompanied baggage (classified as freight) is not always made clear in recording forms, causing confusion to the authorities filling in the forms.

Since mail has priority over freight (and passengers), along with normal baggage, analysis of mail and baggage data can lead to evaluation of the theoretically available capacity on combination aircraft for freight (which is often constrained, despite volumetric space being available, by the uplift capability of the aircraft; or conversely by space limitations when weight capacity exists).

### F.3 Special analyses

Availability of data such as the above, combined with that of the national airline on commodities carried and yield, should be sufficient for general monitoring and planning (those countries without a national carrier may wish to require foreign carriers to provide additional data as part payment for their privileged position). Obviously, only summaries need to be published as long as the data is available for analysis if required.

One area in which airlines in Africa are particularly deficient, partially due to the problems associated with 'hot and high' conditions, is that of capacity control. Allocation of space is usually controlled from base or flight origin, but only a small proportion of the available space is offered initially to stations en route in case anticipated passenger demand (for combination aircraft) is exceeded, and this or weather conditions limits the uplift of freight.

**Table 11: Uplift (U) and Discharge (D) of International freight and mail in tons at Nairobi airport by selected destination/  
origin**

Destination/ origin	Mode	1973										1974									
		Mail					Freight					Freight									
		Annual		Qr. 1		Qr. 2		Qr. 3		Qr. 4		Qr. 1		Qr. 2		Qr. 3		Qr. 4		Qr. 1	
		U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D	U	D
Addis Ababa	Scheduled total	7.2	12.3	135.6	35.1	184.6	20.9	181.1	37.2	273.1	57.3	147.5	21.9	159.1	83.3						
	EAAC	1.3	2.1	32.3	2.7	32.0	6.8	27.1	6.4	67.8	13.3	25.0	3.6	23.7	7.3						
	EAAC Share (%)	18.1	17.1	23.8	7.7	17.3	32.5	15.0	17.2	24.8	23.2	17.0	16.4	14.9	8.8						
	Charter total	-	-	-	-	12.0	-	-	-	-	-	-	-	-	-						
Athens	Scheduled total	0.8	35.6	143.7	12.2	41.7	16.7	35.9	67.6	126.5	66.0	268.3	22.4	204.9	13.9						
	EAAC	0.4	0.1	4.9	1.3	3.6	0.1	3.1	17.1	4.2	24.6	1.4	8.2	1.0	4.2						
	EAAC Share (%)	50.0	0.3	3.4	10.7	8.6	0.6	8.6	25.3	3.3	37.3	0.5	36.6	0.5	30.0						
	Charter total	36.1	44.9	91.8	66.0	43.2	122.9	43.8	150.1	59.8	154.7	32.1	135.7	46.8	156.0						
Bombay	Scheduled total	23.0	12.3	49.3	33.0	28.7	40.2	26.9	61.9	25.0	69.9	17.1	58.5	24.7	71.8						
	EAAC	63.7	27.4	53.7	50.0	66.5	32.7	61.4	41.2	41.8	45.2	53.2	43.1	54.1	46.0						
	EAAC Share (%)																				
	Charter total	1.5	2.6	33.8	1.1	21.2	0.6	26.6	2.0	48.1	45.4	50.5	1.0	28.1	3.7						
Bujumbura	Scheduled total	1.5	-	0.6	0.1	2.4	0.0	8.5	0.0	7.6	41.7	0.7	0.1	1.0	0.1						
	EAAC	100.0	0.0	1.8	9.1	11.3	0.0	31.9	0.0	15.8	91.7	1.4	10.0	3.6	2.7						
	EAAC Share (%)																				
	Charter total	-	-	-	-	12.0	-	-	-	-	-	-	3.2	-	-						
Der es Salaam	Scheduled total	32.3	24.0	116.6	17.4	109.1	28.1	59.4	25.4	60.4	14.9	59.0	14.9	96.5	16.7						
	EAAC	32.3	21.9	116.4	17.0	108.0	26.8	59.1	22.9	56.9	14.0	58.4	14.5	96.2	16.4						
	EAAC Share (%)	100.0	91.3	99.8	97.7	99.4	95.4	99.4	90.2	94.2	94.0	99.0	97.3	99.7	98.2						
	Charter total	-	-	-	-	-	-	-	-	10.0	-	60.4	-	-	1.8						
Entebbe	Scheduled total	20.7	5.9	23.3	15.1	56.7	18.8	33.5	5.8	42.9	16.8	22.5	2.5	16.8	0.5						
	EAAC	20.7	5.9	20.4	15.0	56.5	12.7	33.1	5.6	41.2	16.8	19.9	2.5	16.8	0.5						
	EAAC Share (%)	100.0	100.0	87.5	99.3	99.7	67.5	98.8	96.5	96.0	100.0	88.4	100.0	100.0	100.0						
	Charter total	-	-	-	-	-	-	7.7	0.1	21.8	-	-	-	-	-						
Simbair	Scheduled total	20.7	5.9	23.3	15.1	56.7	18.8	33.5	5.8	42.9	16.8	22.5	2.5	16.8	0.5						
	EAAC	20.7	5.9	20.4	15.0	56.5	12.7	33.1	5.6	41.2	16.8	19.9	2.5	16.8	0.5						
	EAAC Share (%)	100.0	100.0	87.5	99.3	99.7	67.5	98.8	96.5	96.0	100.0	88.4	100.0	100.0	100.0						
	Charter total	-	-	-	-	-	-	7.7	0.1	21.8	-	-	-	-	-						



This problem is discussed in Section 10.1 of the main text. Improvements will, however, be limited without a good recording system of loads uplifted from each station, freight offloaded or not loaded, and estimated capacity available (in terms of weight and volume).

Specialized analyses may be carried out for particular requirements, such as the detailed planning of a new freight terminal. Table 12 lists the sources and uses of some such analyses. None of these is likely to be required regularly, with the possible exception of data for capacity control.

Table 12: Some special statistical analyses

Source		Analysis	Use/comments
(1)	Airway bill	(a) True origin and destination versus flight uplift and discharge	Routing patterns, transshipment requirements (see also customs and airport statistics above)
		(b) Directional imbalances	Routing patterns, costs and rate structures (see also airport statistics above).
		(c) Consignment weight	Processing costs, handling requirements, rate evaluation
		(d) Consignment density	As above
		(e) Number of packages per consignment	As above
		(f) Package shape	As above
		(g) Special commodity proportion	Requirements for livestock handling, cold/cool store, radioactive store, strong room.
		(h) Airport charges	Revision.
		(i) Commodity proportions and value	Rate evaluation, marketing. Note: IATA commodity codes differ from SITC and BTN commodity codes and are extremely difficult to correlate with them.
		(j) Names of shipper/forwarder/consignee	Marketing.
(2)	Other shipping documents	Supporting/complementary evidence for the above	
(3)	Cargo manifests	(a) Carriage by aircraft type	Ground handling equipment requirements.
		(b) Flight uplift and discharge	Produces airport statistics (see table 11 above).
(4)	Customs bond register	(a) Daily breakdown for imports and exports	Facilities planning. Note: This is not demand, and can be affected by changes in aircraft schedules, rates, etc.
		(b) Dwell times	Improving clearance procedures, planning storage requirements.
(5)	Physical survey	(a) As 1c - 1g above	Increased load factor through improved capacity control procedures.
		(b) Capacity versus load on aircraft	Total distribution cost analyses. Rates for surface transport are far more complex than for air transport and it is best to obtain the data via the experts.
(6)	Forwarders' proformas	Surface transport costs	Marketing, rate evaluation (particularly related to elasticity of demand).
(7)	Shippers	Shipper surveys	

Annex G - A brief history of relevant civil aviation co-operation in Africa

The recommendations and reports mentioned below are listed in G.1 for reference purposes.

In 1964, ICAO and the ECA, following a request by the Eastern African Transport Conference in November, 1962, confirmed by ECA at its Fifth Session in March 1963, carried out a study on air transport in Africa, with a view to developing and co-ordinating the economic aspects of all African air transport facilities. This report, relying heavily on a preliminary Air Transport Study carried out by ECA in 1963, concluded that there was a large unsatisfied demand for air transport in Africa, and that intra-African services and freight services remained undeveloped. The report emphasized the need for regional and subregional planning and organization in the fields of route structures, fares, training and pools.

Following this report, a conference on African air transport was convened by ICAO and the ECA in Addis Ababa in November 1964, and attended by 26 member States of ECA. The conference recommended that individual States undertake subregional discussions on the development of airline groupings, that studies be carried out on training development in Africa, that national facilitation committees be established in member States, and that an African civil aviation organ be established.

The above conference led to a joint work programme between ECA and OAU, which culminated in a further conference in January, 1969, establishing the African Civil Aviation Commission (AFCAC), discussed in Section 7 of the main text. AFCAC already has a wide-ranging work programme. One current item is of particular relevance to this Report apart from the freight and mail aspects mentioned in Section 7. AFCAC has convened two meetings on Airline Co-operation and Integration, the first being held in November, 1974, in the North African subregion, the second in the West African subregion in December 1974. The possibility of an exclusive freight multinational company was considered at the North African meeting, which instructed the AFCAC Bureau to convene further subregional meetings and, in conjunction with OAU, ECA and AAFRA, draw up a plan of action on the question of airline co-operation and integration. Note was taken of the work already carried out by the Maghreb Air Transport Committee. The West African meeting decided to appoint a technically competent standing committee to deal with the procedure of establishing one or more multinational airlines, but decided that it was too early to consider an all-freight airline. Nevertheless it established a Freight Working Group. The AFCAC Plenary, in April 1975, instructed the Bureau to proceed with further subregional meetings, and to co-ordinate the results in conjunction with ECA, OAU and AAFRA. The preliminary ECA paper, 'Towards an African Multinational Freight Airline' was considered at the AFCAC Plenary in April, 1975, and member States were asked to comment upon this, and to submit their own working papers on air freight and air mail. Some textual comments have already been received by the ECA and incorporated in this Report.

Complementing the above work, a conference was convened jointly by ECA and the Nigerian Government in April 1965 to evaluate the possibility of establishing a multinational West and Central African airline. The conference recommended that ECA undertake a study on such a project, but lack of resources hindered significant progress.

The East and Central African States (ECAS) have also been considering increased co-operation in civil aviation. In recent times, resolutions concerning the development of a multinational air services agreement and a study to evaluate a multinational airline company have been made at all the Annual Meeting of Heads of State from 1970 to 1974. In November, 1970, a meeting of the ECAS was held in Addis Ababa on these subjects, the culmination of a series of smaller meetings. This led to the publication of a draft multinational air services agreement in 1971. The draft agreement has, however, yet to be implemented, as do recommendations on development towards establishing a multinational airline company, the latter being hampered again by lack of resources to study the problems. ECAS has created a Sectoral Sub-Committee on Air Transport and Civil Aviation.

At the Twenty-Third Ordinary Session of the Council of Ministers of the OAU, held in Mogadiscio (6-15 June, 1974), a Resolution (361) was adopted calling for the establishment of an Inter-African Airline.

As mentioned in the Introduction, a preliminary paper arising from this ECA Study, 'Towards an African Multinational Freight Airline' was considered at the twelfth session of the ECA Conference of Ministers in Nairobi (24-28 February 1975) and a Resolution (277(XII)) calling for the establishment of an African multinational airline was subsequently adopted. The text of the Resolution is included in this annex.

In addition to their above work, ECA and OAU have jointly been organizing a series of subregional meetings on Combined Transport Arrangements. The object of these meetings has been to consider major multinational issues in the field of combined transport and to recommend to Governments priorities for multinational development. The first two meetings were held for East Africa (Nairobi, 4-15 February) and for West and Central Africa (Accra, 25 March-3 April), in 1974. A regional meeting to consider the subject of combined transport in African terms was held in Addis Ababa from 7-12 October 1974, under the auspices of the OAU. The third subregional meeting for North Africa, will be held in Tunis in October 1975. Air transport and its relationship to other modes is, of course, discussed at these meetings, and the first two subregional meetings have each recommended that permanent machinery be established for subregional transport co-ordination. ECA and OAU are organizing subregional meetings of Transport Ministers (those for Central Africa and West Africa are planned for June 1975) which amongst other work, will review the conclusions of the Combined Transport Arrangements meetings.

On a commercial, as opposed to strictly governmental level, the Association of African Airlines (AAFRA), discussed in Section 7, was founded in 1968, and has its headquarters in Nairobi while the study committees of AAFRA, namely Economics and Finance, Legal, Technical and Traffic, have carried out valuable work in the exchange of information and the establishment of common African positions at international conferences, the work of AAFRA has also been restricted by a shortage of resources. However, at the Plenary Meeting in March, 1974, it was agreed to extend the Secretariat to enable an expanded work programme to be carried out.

From the above, it will have been seen that finance and manpower shortages have hindered co-operative development. However, where specific proposals and programmes have been put forward, aid has often been forthcoming for aviation projects in Africa, both from bilateral and multilateral sources.

For reference purposes, apart from the text of ECA Conference of Ministers Resolution 277(XII) referred to above, those documents and resolutions of particular relevance to this annex are included below.

G.1 Some resolutions concerning multinational co-operation in the region

- (1) ECONOMIC COMMISSION FOR AFRICA  
Twelfth session  
Third meeting of the Conference of Ministers  
Nairobi, 24-28 February 1975

RESOLUTION ADOPTED BY THE CONFERENCE OF MINISTERS

277(XII). Air transport

The Conference of Ministers,

Recognizing the growing role of air transport in the movement of cargo in international trade,

Aware of the possibilities of promoting intra-African and inter-regional trade through the development of air freight services and human contacts in Africa,

Taking note of the current study by the secretariat on air freight potential in developing countries in Africa and of preliminary proposals which could lead to the establishment of an African multinational freight airline,

1. Requests the Executive Secretary, with the co-operation of the Organization of African Unity and the African Civil Aviation Commission, to study the feasibility of establishing an African multinational airline;
2. Calls upon the Governments of member States to give assistance to the Executive Secretary for the implementation of these studies;
3. Further requests the Executive Secretary to report to the Executive Committee at one of its forthcoming meetings on progress in the implementation of this resolution.

183rd meeting,  
28 February 1975.

(2) Resolutions Adopted by Summit Meetings of Heads of State and Government at the Conferences of East and Central African States. Sixth Meeting, Khartoum, 26-28 January 1970, Resolution III. Seventh Meeting, Mogadiscio, 18-20 October 1971, Resolutions II, III, IV. Eighth Meeting, Dar es Salaam, 7-9 September 1972, Resolutions VII, VIII. Ninth Meeting, Dar es Salaam, 19-21 and 22-24 November 1973, Resolutions I, II. Tenth Meeting, Brazzaville, 21 August - 2 September 1974, Resolutions I, II.

(3) OAU Twenty Third Ordinary Session of Council of Ministers, Mogadiscio 6-15 June 1974. Resolution CM/RES 361(XXIII) on the Establishment of an Inter-African Airline.

Annex H - List of contributors on regional aspects

A. UNITED NATIONS FAMILY

Economic Commission for Africa

P.O. Box 3001, Addis Ababa, Ethiopia

Centre for Economic Co-operation

Industry and Housing Division

Joint ECA/FAO Agricultural Division

Statistics Division

Trade, Fiscal and Monetary  
Affairs Division

Africa Trade Centre

Transport and Communications Division

African Highways Bureau

World Health Organization

Liaison Bureau

International Bank for Reconstruction  
and Development

1818 H Street, New York,  
Washington DC 20433 - USA

P.O. Box 30577, Nairobi - Kenya

International Civil Aviation Organization

1080, University Street, Montreal 101,  
Canada

16, Hassan Sabri, Zamalek, Cairo, Egypt

UNCTAD

Eastern African Shipping Study,

P.O. Box 30218,

Nairobi, Kenya

B. OTHER INTERGOVERNMENTAL ORGANIZATIONS

African Civil Aviation Commission

B.P. 2356, Dakar, Senegal

African Postal Union

5, 26th July Street,  
Cairo, Egypt

Commonwealth Air Transport Council

16-20, Great Smith Street,  
London SW1P 3DB, England

International Peace Research Institute

P.O. Box 5052, Majorstua  
Oslo 3, Norway

Union africaine et malgache des postes  
et télécommunications

B.P. 44, Brazzaville, Congo

Universal Postal Union

Case postale 3000, Berne 15,  
Switzerland

C. MISCELLANEOUS

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B.P. 33, 31700 Blagnac, France

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P.O. Box 20116, Nairobi,  
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C. MISCELLANEOUS (cont'd)

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University of Sussex, Falmer,  
Brighton BN1 9RE, England

Japanese Embassy (Ethiopia)

Jet Age Services (International) Ltd.  
9-11, Queens House, Leceister Place,  
London WC2, England

Royal Netherlands Embassy (Ethiopia)

Shell Ethiopia Ltd.

USA Embassy (Ethiopia)

USSR Embassy (Ethiopia)

Sincere apologies are proffered to any organization inadvertently omitted from the listing above.

Annex I - References

A. UNITED NATIONS FAMILY

Economic Commission for Africa (some in conjunction with the organization of African Unity and/or the International Civil Aviation Organization)

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- (5) Air Transport in Africa. E/CN.14/TRANS/20. July 1964
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1975
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- (11) The Proposed Scheme of General Preferences Among African Countries. E/CN.14/WP.1/28  
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- (17) Register of New and Planned Industrial Projects in Selected African Countries,  
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- (18) Report of the First Meeting of the Follow-up Committee on Industrialization in  
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1/Rev.1, 6 June, 1972



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Economic and Social Council

- (1) Export Credit as a Means of Promoting Exports from Developing Countries E/5291, 9 May 1973

International Civil Aviation Organization

- (1) Air Freight and Air Mail (Africa), 1971. Circular 104 - AT/25
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- (3) Digests of Statistics : Airport Traffic  
Civil Aircraft on Register  
Financial  
Fleet and Personnel  
Non-Scheduled Air Transport  
Traffic Flow

UNCTAD-GATT International Trade Centre, Geneva

- (1) The Freight Forwarder in Developing Countries, 1968
- (2) Getting Started in Export Trade, 1970
- (3) Export Marketing Research for Developing Countries
- (4) The Market for Spices in North America, W. Europe and Japan, 1970
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- (6) Western European Markets for Frozen Foods
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- (11) Major Markets for Hides, Skins and Leather in W. Europe
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- (16) An Annotated Bibliography on Free Ports and Free Trade Zones, ITC/P/36/7, August 1971

World Health Organization

- (1) International Health Regulations, 1969 and 1974.

B. AFRICAN CIVIL AVIATION COMMISSION

- (1) Reports of the First (AFCAC/1, February-March 1971). Second (AFCAC/2, April 1973) and Third (in draft, April 1975) Plenary Sessions
- (2) Working Papers for Bureau Meetings (twice annually)
- (3) Circular No. 3. Policy of AFCAC Member States on Bilateral Air Transport Agreements.

C. AIR AFRIQUE

- (1) Documentation for 34th Council of Administration Meeting, 29 April 1974
- (2) Freight and Mail Activities, 1973-1974
- (3) Information Paper on Air Freight supplied for ECA Study of Air Freight Potential, 6 August 1974.

D. ASECNA (Agence pour la securité de la navigation aérienne en Afrique et à Madagascar)

- (1) Statistiques de trafic aérien. Various monthly and annual issues.

E. BOEING COMPANY

- (1) Airline Cargo Operational Concepts and Possibilities, March, 1974.

F. BROOKINGS INSTITUTION

- (1) Transport Research Team. The International Airline Industry. Mahlon R. Straszheim, Washington, 1969.

G. COMMONWEALTH AIR TRANSPORT COUNCIL

- (1) Leaflet on Constitution, January 1974.

H. INSTITUT DE TRANSPORT AERIEN

- (1) Aspects of Air Freight in New Countries, Théophile Komaclo
- (2) Traffic Rights and Air Freight Growth.

I. INTERNATIONAL AIR TRANSPORT ASSOCIATION

- (1) The State of the Air Transport Industry. Various Annual Issues
- (2) World Air Transport Statistics. Various Issues
- (3) Agreeing Fares and Rates. Second Edition, June 1974.

J. INTERNATIONAL CHAMBER OF COMMERCE

- (1) Co-operation by Users for the Development of Air Freight.

K. SHELL AVIATION SERVICES

- (1) Posted Airfiled Prices. Various Issues.

L. UNITED STATES CIVIL AVIATION BOARD

- (1) Aircraft Operating Cost and Performance Report. Various Issues.

M. UNIVERSAL POSTAL UNION

- (1) Statistics of Postal Services, 1972
- (2) Managing the Carriage of Air Mail, Lausanne, 1974.

N. INFORMATION FROM AIRCRAFT MANUFACTURERS AS FOLLOWS

- |                      |                                |
|----------------------|--------------------------------|
| (1) Airbus Industrie | A300B                          |
| (2) Antonov          | An 24b, An 26                  |
| (3) Beriev           | Be 30                          |
| (4) Boeing           | 707, 720, 727, 737, 747        |
| (5) Douglas          | DC8, DC10                      |
| (6) Fokker           | F27 Friendship, F28 Fellowship |
| (7) Hawker Siddeley  | 748                            |
| (8) Ilyushin         | Il 62                          |
| (9) Lockheed         | L-382B Hercules, 1011          |
| (10) Short           | Skyvan, SD3-30                 |
| (11) Tupolev         | Tu 154                         |
| (12) Yak             | Yk 40                          |

0. MISCELLANEOUS

- (1) Report on the East and Central African States Meeting on Civil Aviation and Air Transport, Addis Ababa, 25-28 November 1970
- (2) Flight International monthly magazine. Numerous issues
- (3) Interline and Air Travel News. Various fortnightly issues
- (4) ABC Air Cargo Guide. Monthly
- (5) ABC World Airways Guide, parts 1 and 2. Monthly
- (6) Airline Cargo Tariff, SAS and Swiss Air Transport Company. Various issues
- (7) Airline Passenger Tariff, SAS and Swiss Air Transport Company. Various issues.

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