Doc 9161/3

MANUAL ON AIR NAVIGATION SERVICES ECONOMICS

THIRD EDITION — 1997

Approved by the Secretary General and published under his authority

INTERNATIONAL CIVIL AVIATION ORGANIZATION

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11/97

Manual on Air Navigation Services Economics

(Doc 9161/3)

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AMENDMENTS

The issue of amendments is announced regularly in the *ICAO Journal* and in the monthly *Supplement to the Catalogue of ICAO Publications and Audio-visual Training Aids*, which holders of this publication should consult. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

AMENDMENTS			
No.	Date applicable	Date entered	Entered by

CORRIGENDA			
No.	Date of issue	Date entered	Entered by

FOREWORD

OBJECTIVE AND ORIGIN

The purpose of this manual is to provide practical guidance material to assist those responsible for the management of air navigation services in improving the efficiency and finances of these services.

The ICAO Air Transport Committee decided in October 1992 that the ICAO *Manual on Route Air Navigation Facility Economics* (Doc 9161) should be revised and expanded in scope. Underlying the Committee's decision was that while most of the material in the manual was current, developments since the last revision in 1985 necessitated extensive additions. Some of these developments related to recommendations and comments of the 1991 Conference on Airport and Route Facility Management (CARFM) and the need to make the revised document more comparable in scope to the ICAO *Airport Economics Manual* (Doc 9562) published in 199 1. Of particular importance was the need for addition of guidance on financial and organizational aspects of multinational facilities and services including the ICAO communications, navigation, and surveillance/ air traffic management (CNS/ATM) systems, as well as guidance on organizational structures at the national level. So as to reflect better that the coverage of the manual extends to services provided during the approach and aerodrome control as well as the en-route phases of operations it has been retitled the *Manual on Air Navigation Services Economics.*

SCOPE

The guidance in the manual is not presented in the form of specific recommendations but is intended for use as appropriate, taking into account the wide range of different circumstances faced by providers of air navigation services in the various regions of the world. It is, however, based on the international policies and principles on air navigation services cost recovery States have developed through ICAO and describes procedures and practices that are in conformity with them The basis for these policies and principles is set out in Article 15 of the *Convention on International Civil Aviation*, the charter of ICAO. Extensive policy guidance in this area was subsequently developed by the ICAO Council and is contained in the *Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services* (Doc 9082).

The guidance material in this manual is presented in six chapters and seven associated appendices, including a glossary of terms and a glossary of abbreviations as used in the manual. Chapter 1 addresses ICAO policy on air navigation services charges and Chapter 2 focuses on organizational structures of air navigation services. Chapter 3 deals with accounting and financial control of air navigation services. Chapter 4 provides guidance on determining the cost basis for air navigation services charges, while Chapter 5 deals with air navigation services charges and their collection. Finally. Chapter 6 provides guidance on financing air navigation services infrastructure.

SOURCES

This edition of the manual was developer 1 with the assistance of a panel of experts, the Air Navigation Services Economics Panel. The principal sources were the second edition of the manual, the Council Statements referred to above, the 1991 *Report of the Conference on Airport and Route Facility Management* (Doc 9579) and the *Airport Economics Manual* (Doc 9562). Additional ICAO source documents included various Annexes to the *Convention on International Civil Aviation* , manuals, circulars and studies. In addition, valuable input was provided from States and international organizations directly or through the ICAO programme of regional Workshops on Airport and Route Facility Management (WARFM) and from individual consultations by the Secretariat.

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Chapter 1

ICAO POLICY ON AIR NAVIGATION SERVICES CHARGES

INTRODUCTION

1.1 This chapter focuses on ICAO policy on air navigation services charges with particular attention given to certain fundamental aspects of that policy. The chapter is divided into two sections. The first addresses the basic policy principles expressed in Article 15 — Airport and similar charges — of the *Convention on International Civil Aviation*, usually referred to as the Chicago Convention, which is the charter of ICAO. (The "similar charges" referred to in the title of Article 15 include air navigation services charges). The section refers to the three fundamental principles set forth in Article 15 and discusses certain other aspects raised in that Article as well. It also explains the status of this Article and the Convention.

1.2 The chapter's second section focuses on the additional policy guidance provided in the Statement by the Council on Charges for Air Navigation Services, which is reproduced in Appendix 3. This is the second of two Statements contained in Doc 9082/4 — *Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services.* The section describes how the Statement was developed and its status vis-à-vis the Chicago Convention, and then discusses principles which States have found of particular interest as well as the application of the Statement with regard to the ICAO communications, navigation and surveillance/air traffic management (CNS/ATM) systems. It should be noted that Chapter 5 — *Air Navigation Services Charges and their Collection* — is also based on this Council Statement, but focuses on the practical aspects of implementing the policy and practices concerning charges and charging systems. References to ICAO policy as it applies to guidance material provided in this manual can be found throughout the text.

1.3 It should also be noted that States may define general policies concerning air navigation services charges which take account of the respective interests of the users and providers of air navigation services. These general policies should be in conformity with the principles set out in Doc 9082.

A. ARTICLE 15 OF THE CONVENTION ON INTERNATIONAL CIVIL AVIATION

1.4 The basic policy established by ICAO in the area of airport and air navigation services charges is expressed in Article 15 of the Chicago Convention as follows:

"Airport and similar charges

Every airport in a contracting State which is open to public use by its national aircraft shall likewise, subject to the provisions of Article 68, be open under uniform conditions to the aircraft of all the other contracting States. The like uniform conditions shall apply to the use, by aircraft of every contracting State, of all air navigation facilities, including radio and meteorological services, which may be provided for public use for the safety and expedition of air navigation.

Any charges that may be imposed or permitted to be imposed by a contracting State for the use of such airports and air navigation facilities by the aircraft of any other contracting State shall not be higher,

(*a*) As to aircraft not engaged in scheduled international air services, than those that would be paid by its national aircraft of the same class engaged in similar operations, a ad

(*b*) As to aircraft engaged in scheduled international air services, than those that would be paid by its national aircraft engaged in similar international air services.

All such charges shall be published and communicated to the International Civil Aviation Organization: provided that, upon representation by an interested contracting State, the charges imposed for the use of airports and other facilities shall be subject to review by the Council, which shall report and make recommendations thereon for the consideration of the State or States concerned. No fees, dues or other charges shall be imposed by any contracting State in respect solely of the right of transit over or entry into or exit from its territory of any aircraft of a contracting State or persons or property thereon."

1.5 In summary, Article 15 sets out the following three basic principles:

a) uniform conditions shall apply to the use of airport and air navigation facilities in a Contracting State by aircraft of all other Contracting States;

b) the charges imposed by a Contracting State for the use of such airports or air navigation facilities shall not be higher for aircraft of other Contracting States than those paid by its national aircraft engaged in similar international operations; and

c) no charge shall be imposed by any Contracting State solely for the right of transit over or entry into or exit from its territory of any aircraft of a Contracting State or persons or property thereon.

While the first two of these principles do not appear to have given rise to misunderstandings, the third has in some instances been interpreted to mean that no charges are to be levied when an aircraft flies into, out of or over a State. That, however, is not the intent of this principle since all States are fully within their rights to recover the costs of the services they provide to aircraft operators through charges. The substance of this principle is in fact that a State should not charge solely for granting an authorization for a flight into, out of or over its territory.

1.6 Two other aspects are also addressed in Article 15. The first is that States shall publish all their airport and air navigation services charges, and also communicate them to ICAO. This information is collected and published by ICAO in the *Manual of Airport and Air Navigation Facility Tariffs* (Doc 7100). The only other publication known to provide similar information is the IATA *Airport and En Route Aviation Charges Manual.* The publication or communication of charges by States to aircraft operators and other interested parties is discussed in Chapter 5.

1.7 Article 15 also provides for ICAO, upon representation by an interested Contracting State, to review charges imposed and make recommendations thereon to the State or States concerned. It should be observed that the Article specifically refers to representation by an interested Contracting State, not by an aircraft operator.

1.8 As to the status of the principles in Article 15 and, for that matter, all the articles of the Chicago Convention, an ICAO Contracting State cannot exempt itself from applying any of the principles expressed therein since by signing the Chicago Convention the signatory State binds itself to adhere to all its Articles without exception.

B. STATEMENT BY THE COUNCIL ON CHARGES FOR AIR NAVIGATION SERVICES

Basic aspects

1.9 Additional and more detailed policy guidance in the area of air navigation services charges is provided in the Statement by the Council on Charges for Air Navigation Services found in Doc 9082/4 and reproduced in Appendix 3. The contents of the Statement have been revised periodically by the Council following major international conferences on airport and air navigation services economics and management, with amendments published when required. The basic philosophy and principles expressed in the Statement, however, that is, fairness and equity in the determination and sharing of air navigation services costs, have remained unchanged over the years.

1.10 The Council Statement differs in status from the Chicago Convention in that an ICAO Contracting State is not bound to adhere to the Statement's provisions and recommendations, unlike the articles of the Chicago Convention. Since the recommendations in the Council Statement have been developed by major international conferences, however, there is a strong moral obligation for States to ensure that their air navigation services cost recovery practices conform to the policies

and philosophy set out in the Council Statement. This appears to be the general practice amongst ICAO Contracting States.

1.11 The principles contained in the Council Statement address such subjects as the cost basis for air navigation services charges, allocation of air navigation services costs among aeronautical users, air navigation services charging systems, approach and aerodrome control charges, route air navigation services charges, charges for air navigation services used by aircraft when not over the provider State, and consultation with users regarding charges and air navigation services planning. It is not the intention to discuss here the substance of each of these principles since they are available for further examination in Appendix 3, and some will also be referred to in the following chapters when they have a direct bearing on the subject matter being addressed. However, a few of the principles and policies advocated in the Council Statement which have attracted particular attention are discussed below.

Balance of interests of providers of air navigation services and users

1.12 An important recommendation in the Council Statement is that States exercise caution in their general policy on charges for air navigation services and take into consideration the effect on users, in particular air carriers which may need to adjust their tariffs to deal with or absorb increased costs arising from new or higher charges. Also, the Statement observes that there should be a balance between the respective interests of providers of air navigation services and airlines and therefore States should encourage a greater level of co-operation between them (Doc 9082/4, paragraph 29).

Consultation with users regarding charges and air navigation services planning

1.13 The Statement attaches much importance to providers of air navigation services giving advance notice to and consulting with principal users directly or through their representative bodies when any significant review of existing charges or the imposition of new charges is contemplated. Consultation, the Statement further advises, implies discussions between users and providers in an attempt to reach general agreement on any proposed charges, and that failing such agreement governments would continue to be free to impose the charges concerned. The Statement also observes that when major new air navigation services are being planned, it is desirable that the regular users or their representative organizations be consulted as early as practicable and that users, particularly airlines, should either directly or through their representative bodies provide advance planning data relating to their aircraft and to the special facilities they desire, on a 5- to 10-year forecast basis (Doc 9082/4, paragraphs 44 to 46).

Proliferation of charges on air traffic

1.14 Concern is expressed in the Council Statement (paragraph 30) over the proliferation of charges on air traffic, and the retaliatory effects this could lead to, it being recommended that States should (i) impose charges only for services and functions which are required for international civil aviation; and (ii) refrain from imposing charges which discriminate against international civil aviation in relation to other modes of international transport (paragraph 30). Subparagraph ii) addresses situations where charges would be levied on international civil aviation for certain services provided, while other modes of international transport would not be charged for the same type of services. It should be noted that subparagraph ii) does not refer to the granting of subsidies.

The cost basis for air navigation services charges, charging systems and collection of charges

1.15 A general principle expressed in the Statement is that where air navigation services are provided for international use, the providers may require the users to pay their share of the related costs, but international civil aviation should not be asked to meet costs which are not properly allocable to it (paragraph 32); also that the cost to be shared is the full cost of providing the air navigation services, including interest on capital investment and depreciation (paragraph 34 (i)).

1.16 Other principles and recommendations of particular relevance in the context of the cost basis for air navigation services charges, charging systems and the collection of charges are:

a) that States are encouraged to maintain accounts for the air navigation services they provide in a manner which ensures that air navigation services charges levied on international civil aviation are properly cost-based (paragraph 32); also, that for

the purpose of consultation users should be provided with adequate financial information (paragraph 45 (ii));

b) that air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets to contribute towards necessary capital improvements (paragraph 34 (iv));

c) that the allocation of air navigation services costs among aeronautical users should be carried out in a manner equitable to all users, and the proportions of cost attributable to international civil aviation and other utilization of the facilities and services (including domestic civil aviation, State or other exempted aircraft, non-aeronautical users) should be determined in such a way as to ensure that no users are burdened with costs not properly allocable to them according to sound accounting principles (paragraph 36);

d) any charging systems should, so far as possible, be simple, equitable and, with regard to route air navigation services charges, suitable for general application at least on a regional basis. The administrative cost of collecting charges should not exceed a reasonable proportion of the charges collected (paragraph 37 (i));

e) that the charges should not be imposed in such a way as to discourage the use of facilities and services necessary for safety or the introduction of new aids and techniques (paragraph 37 (ii));

f) any charging system should take into account the cost of providing air navigation services and the effectiveness of the services rendered. The charging system should be introduced in such a fashion as to take account of the economic and financial situation of the users directly affected on the one hand, and that of the provider State or States on the other (paragraph 37 (v));

g) the charges levied on international general aviation should be assessed in a reasonable manner having regard to the costs of the facilities needed and used and the goal of promoting the sound development of international civil aviation as a whole (paragraph 37(vii));

h) that approach and aerodrome control charges, whether a part of the landing charges or levied separately, should as far as possible be a single element of the landing charge or a single charge per flight and could take aircraft weight into account but less than in direct proportion (paragraph 39);

i) that route air navigation services charges should essentially be based on distance flown and aircraft weight but that weight should be taken into account less than proportionately (paragraph 40); and

j) that all users may be required to pay their share of the costs of providing air navigation services regardless of whether or not the utilization takes place over the territory of the provider State (paragraph 42).

Currency aspects

1.17 On this important issue the Council Statement recommends that under normal circumstances, user charges should be expressed and payable in the local currency of the State concerned, but that under special circumstances, for example where economic conditions are not stable, when user charges are denominated in other than local currency, airlines could apply the currency of denomination using the same exchange rate for their local ticket sales; the Council also recommends that remittance problems be resolved. It is also recognized that when route air navigation services charges are billed on a regional basis (i.e. on behalf of several States or by a jointly operated agency), it may be advantageous to both users and providers to denominate and pay charges in a single convertible currency (paragraph 38).

Search and rescue services — cost recovery

1.18 Attention is also invited to the observation made with regard to search and rescue services in the Council Statements (Doc 9082/4), Appendix 2 — *Guidance to the facilities and services to be taken into account by providing authorities in determining the total costs of air navigation services.* The Appendix (under Other ancillary aviation services) refers to the search and rescue services concerned in this context as being any permanent civil establishment of equipment and personnel maintained for the purpose of providing search and rescue. The thrust of this guidance is that costs attributable to the provision of search and rescue services provided by a permanent civil establishment can be included in the cost basis for air navigation services charges but that such service';

provided by parties or entities that do not fall within that category (for example military forces) should not.

The ICAO communications, navigation and surveillance/air traffic management (CNS/ATM) systems — charges policy aspects

1.19 The Council Statement refers to the CNS/ATM systems in the context of facilities and services for which additional resources will be needed (paragraph 28). No specific reference, however, is made to particular cost recovery principles that apply exclusively to these systems which represent a major technological evolution. They will of course require special considerations in so far as organizational, managerial and co-operative aspects are concerned, as well as with regard to financing, and costing and cost recovery mechanisms. These issues will be addressed in subsequent chapters of the manual.

Chapter 2

ORGANIZATIONAL STRUCTURES OF AIR NAVIGATION SERVICES

INTRODUCTION

2.1 This chapter addresses various aspects of organizational structures of air navigation services. It contains eight subsections: After the first, — *General comments,* and the second — *Basic organizational characteristics of air navigation services provision* — subsection three — *Organizational forms at the national level* — describes the three basic forms i.e. government department, autonomous public sector organization and private sector organization. The fourth subsection — *International operating agencies* — focuses on various relevant aspects of such agencies and provides brief descriptions of three examples, while the fifth subsection — *Joint charges collection agencies* — deals with the scope, functions and financial aspects of this type of agency. The sixth subsection — *Multinational facilities and services* — reviews background developments relevant to such facilities and services and other pertinent aspects, including provisions to be addressed in an agreement covering their establishment. It also provides an example of specific guidelines on this subject developed by ICAO for inclusion in ICAO regional air navigation plans. The seventh subsection — *Joint financing arrangements* — describes two such arrangements and their real and potential application in other circumstances; and the eighth subsection — *Specific organizational aspects pertaining to the ICAO communications, navigation and surveillance/air traffic management (CNS/ATM) systems* — considers these in the context of the various major CNS/ATM systems components.

A. GENERAL COMMENTS

2.2 Considering the diverse circumstances involved it is not the intent in this manual to recommend one organizational form over another but rather to provide guidance to States by describing relevant aspects of each form. The decisions made by individual States as to the organizational form under which their air navigation services should operate will depend on the situation in the State concerned and will often be strongly influenced by government policy. Regardless of the organizational form under which air navigation services are provided, according to Article 28 of the Chicago Convention, it is the State that is ultimately responsible for the provision and operation of air navigation facilities and services. In this chapter reference is frequently made to a "State" as being the entity providing the air navigation services or participating in various related international or multinational activities. In many instances, though, these services are not provided by the State itself but by a separate autonomous authority or entity to which the State has delegated that function.

B. BASIC ORGANIZATIONAL CHARACTERISTICS OF AIR NAVIGATION SERVICES PROVISION

2.3 Air navigation services and airports are two of the three major components (the third being aircraft operations), which form the aviation infrastructure. The basic characteristics of air navigation services operations differ fundamentally from those of airport operations in two respects. Firstly, unlike airports, air navigation facilities and services provided by a State extend over the whole territory of the State concerned or even beyond, and are frequently also dependent on facilities and services provided in other States. Secondly, in most States all or most of the air navigation services are not provided by a single entity. Instead, several entities may be involved although only a few are major service providers.

2.4 Air navigation services have traditionally been classified into the following five major categories: air traffic services (ATS); telecommunications service

(COM), which in turn is basically classified into aeronautical fixed service (AFS), aeronautical mobile service (AMS), and aeronautical radio navigation service (radio navigation aids); meteorological services for air navigation (MET); search and rescue services (SAR) and aeronautical information services (AIS). (With the implementation of CNS/ATM systems the ATS and COM categories are expected to be replaced by components that are broader in scope i.e. ATM and CNS). All five major categories will be defined and described in greater detail in Chapter *4 — Determining the cost basis for air navigation services charges,* Section A — *Inventorying the facilities and services.*

2.5 As to the provision of services within the individual categories ATS is usually provided by the civil aviation administration, although in a growing number of States autonomous authorities also referred to as operating agencies have been assigned this function. In such instances the same authority may also be responsible for providing certain communications services, for example, some or all AFS and AMS, and even radio navigation aids. Unlike radio navigation aids, however, AFS and AMS are frequently provided partially or wholly by postal and telecommunications branches of government although use is also made of privately owned communications organizations in some instances. Radio navigation aids are usually provided by the civil aviation administration, although the communications branch of government or an autonomous authority may also be involved.

2.6 MET is usually provided by a separate meteorological entity which in many States reports to another branch of government than do the civil aviation administration or the telecommunication services branch. While aeronautical SAR activities are often co-ordinated by the civil aviation administration, in most States the aircraft, vehicles, vessels and personnel utilized in the actual SAR operations are provided by the military, civil defence or other similar forces. AIS on the other hand tends to be provided by the civil aviation administration. As to their relative significance in financial terms, indications are that ATS, COM and MET may on average account for over 90 per cent of States' total air navigation services costs. ATS and COM each tend to account for proportionally more than MET.

2.7 The implications of these organizational aspects with regard to cost recovery are addressed in subsequent chapters. From an organizational viewpoint, however, it is important that where air navigation services costs are to be recovered, the State concerned should assign to one entity the responsibility for ensuring that the costs attributable to the provision of air navigation services by the different entities in the State all be included in the cost basis for any cost recovery programme or mechanism. The absence of such an approach has had the effect of, for example, MET costs not having been taken into account at all in some instances, thereby resulting in the States concerned not even partially recovering these costs. Also of importance is that the costs attributable to the provision of air navigation services must have been accurately and properly determined, and that transparency be maintained in financial presentations.

2.8 As to the selection of the entity that would collate the costs of the different air navigation services providers, the entity providing the ATS services does, apart from providing a major air navigation service, also possess the information required to identify the flights to be charged. It would therefore in most circumstances be best for that entity or branch of government to be assigned the collating function. With that would go the responsibility of ensuring that the revenue from charges be shared among the different entities providing air navigation services. Such sharing of revenue among the different entities concerned would normally be in proportion to the costs incurred by each in providing air navigation services. In the large majority of States this co-ordinating function would in light of the above best be assigned to the civil aviation administration.

C. ORGANIZATIONAL FORMS AT THE NATIONAL LEVEL

General comments

2.9 The principal objective for all providers of air navigation services is to plan and operate safe and efficient services in the airspace for which the State is responsible. These services should be provided in the most effective and efficient manner possible and be focused on the needs of the users. Although a State is ultimately responsible for their provision, it is recognized that they can be delegated to a specific body to provide them on behalf of the State concerned. These bodies can cover a wide range of forms at the national level from a government department, autonomous public sector agency, through corporatization to full privatization. Alternatively, the provision of these services could be delegated to a multinational entity, as described later in this chapter (2.22 to 2.69).

2.10 The decisions made by individual States as to the organizational form at the national level under which their air navigation services should operate will depend on the situation in the State concerned, the organization of airspace and whether provision is delegated to other States. These decisions will often be strongly influenced by government policy but each State may need to have regard to the following factors:

a) the over-all framework of government and system of administration followed by the State;

b) the legal and administrative arrangements to ensure that the State's responsibilities to uphold the relevant articles of the Chicago Convention are maintained;

c) forecast industry activity and the sources and cost of funds required to meet related infrastructure investment needs. The options for financing capital investment will include:

1) government finance;

2) equity finance;

3) debt finance; and

4) leasing.

The choice of financing option may have a bearing on the organizational form. For example, should public sector bodies not have access to private finance markets because of public sector borrowing restrictions, access may only become possible with a change of organizational form;

d) the requirement of the aviation industry, both international and domestic, to promote increased efficiency of their operations by the safe and efficient provision of air navigation services; and

e) the importance of civil aviation to the State's economic and social objectives and the extent to which civil aviation has been developed to meet those needs.

Organizational forms

2.11 There are three basic or core forms of organization for providing air navigation services at the national level. These are as follows:

a) a *government department* that is subject to government accounting and treasury rules; its staff are employed under civil service pay and conditions;

b) the *autonomous public sector organization* that is separate from an executive arm of government but the government has total ownership of the organization; and

c) *the private sector organization* that is owned by private interests either totally or with the government holding a minority share.

A government department

2.12 Key features of this organization are:

a) the head of the organization reports directly to the executive level of government;

b) as an organization within government it is funded by the government, sometimes from general taxation. User charges levied for air navigation services could be retained either by the government for general purposes or by the organization:, and

c) the organization may not *be* subject to taxes as paid by private business.

2.13 Other factors that may be relevant are:

a) the organization provides all types of air navigation services and may also provide related services such as search and rescue co-ordination,. It would normally be responsible for the safety regulation of the aviation industry;

b) if the government accounting system is inadequate to provide the necessary accounting information, as specified in Chapter 3, separate accounts following commercial accounting standards and practices will be necessary;

c) capital expenditure is subject to the government's approval process and treasury rules, and must compete with other claims for government funds:, and

d) the organization would normally not have a formal agreement regarding the provision of services to military aircraft.

The autonomous public sector organization

2.14 This type of organization would normally have the following key features set out below:

a) the government, as owner of the organization, is responsible for setting the organization's objectives and monitoring its performance;

b) a Board of Directors oversees the activities of the organization. It is appointed by the government to whom the board reports;

c) the organization is self-financing and may be required to achieve a financial return on capital employed;

d) the organization charges for its services and uses revenue from these charges to fund operating expenses and to finance capital expenditure. Some prescribed operations (e.g. military or services to remote localities) may be exempted from charges and the cost may be borne by government;

e) the organization applies commercial accounting standards and practices; and

f) the organization may be subject to normal business taxes.

2.15 This model encompasses a range of organizations depending on the extent to which the organization is meant to behave like a private sector company. The following additional factors may be relevant:

a) public sector bodies operating closely along private sector lines could still be subject to government directions or pressure to take account of wider public issues;

b) the organization may be responsible for the safety regulation of its services and in some cases for aviation safety in general;

c) the staff of the organization are not likely to be civil servants and may therefore not have public sector pay and conditions of service;

d) the government would normally provide finance capital for the organization by direct loan, loan guarantee or leasing arrangements. The organization may also have access to the private capital market, although because of its public sector status, government may limit access; and

e) the organization may be subject to the government's approval process for major capital investment.

The private sector organization

2.16 Currently there is no known example of a wholly private sector organization. Setting up such an organization will require consideration of a number of factors. Air navigation services are generally provided by a monopoly and consequently a number of safeguards would need to be implemented to protect users against overcharging and to ensure that obligations are met such as freedom of access, non-discrimination between categories of users and conformity with international agreements and obligations. In particular there is an obligation to observe ICAO policies and principles, notably those contained in the Chicago Convention and its Annexes and in the *Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services* (Doc 9082/4). In setting up a regulatory system to oversee these safeguards, a sensible balance between the needs of the State, the users and the organization itself would need to be achieved.

2.17 Expected key features of a wholly private sector organization are likely to include the following:

a) the organization is subject to the obligations of States under the Chicago Convention;

b) there is a Board of Directors for the organization appointed according to its charter;

c) the organization is self-financing, charges for its services, obtains funds from the capital market and aims to achieve a financial return;

d) the organization applies commercial accounting standards and practices; and

e) the organization is subject to normal business taxes.

2.18 Other factors that may be relevant are:

a) the organization is required to comply with aviation safety regulation standards set by the responsible government body;

b) where there is no competition in the provision of air navigation services, charges for these services would need to be subject to independent economic regulation;

c) the organization charges for its services and uses revenue from these charges to fund operating expenses and to finance capital expenditure. Some prescribed operations (e.g. military or services to remote localities) may be exempted from charges and the costs for these prescribed services may be borne by government;

d) arrangements for the co-ordination of civil/military traffic including common use of facilities and services, and associated financial issues, would need to be formalized and agreed with the ministers concerned; and

e) the government represents the State at the international level. Any involvement by the private sector organization in that representation would need to be decided by the parties concerned.

Transitional arrangements

2.19 The general direction of change is likely to be from a government department towards autonomous organizational forms. Before an autonomous organization can become operational its charter, or a document of a similar nature, needs to be formulated. The charter should describe the scope of the services that the organization will be responsible for providing and operating. A change of organizational form should be made in consultation with all the parties concerned.

2.20 The process of transition will depend on the circumstances and practice of each State but, in general, the transitional issues that may arise when moving from a government department are:

a) establishment of formal relationships between the Government and the autonomous organization, including financial reporting requirements;

b) establishment of formal relationships between the autonomous organization and the aviation safety regulation and accident investigation organizations;

c) establishment of economic regulatory framework;

d) identification, valuation and transfer of assets;

e) initial financial structure;

f) conditions of employment including pension arrangements;

g) staffing including maintaining good labour relations during the transition period; and

h) consultation with users and other interested parties.

Over-all comments

2.21 The above forms of organization are not mutually exclusive and a State may draw on features from one or more of them. Whichever form is chosen, an organization providing air navigation services should adhere to the *Statements by the Council to Contracting States on Charges for Airports and Air Navigation Services* (Doc 9082/4) and the guidance provided in the following chapters of this manual and should provide information on their properly calculated costs for consultation with users.

D. INTERNATIONAL OPERATING AGENCIES

General

2.22 An important characteristic of some autonomous authorities operating air navigation services is that the scope of their functions has an international dimension not found in authorities operating airports only. This development has been evidenced in circumstances where problems have arisen in the provision of air navigation services, in particular route facilities and services, because of technical factors and operational constraints that could not be adequately solved without international co-operation. This has led to the establishment of autonomous international authorities, usually referred to as international operating agencies, to which the operation of air navigation services, notably route facilities and services, has been assigned.

2.23 The international aviation community has followed these developments with interest which is reflected by the Council as it "encourages international co-operation in the provision and operation of air navigation services where this is beneficial for the

providers and users concerned." (Council Statements in Doc 9082/4, paragraph 27 refers). Also, operating agencies are referred to in ICAO Assembly Resolutions A22-19 "Assistance and advice in the implementation of Regional Plans" and Al 6-10 "Economic, financial and joint support aspects of implementation".

Scope and functions

2.24 An international operating agency in this context is a separate entity assigned the task of providing air navigation services, principally route facilities and services, within a defined area on behalf of two or more sovereign States. The services they provide are usually in the categories of ATS, COM (AFS, AMS and radio navigation aids), SAR (essentially rescue co-ordinating centres) and AIS, but can extend to MET as well. These agencies are also responsible for the operation of charges collection systems for services provided.

2.25 Examples of international operating agencies are the Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar (ASECNA) in Africa (which however, operates airports as well as air navigation services), Corporación Centroamericana de Servicios de Navegación Aérea (COCESNA) in Central America and the European Organization for the Safety of Air Navigation (EUROCONTROL). A brief description of these three agencies is provided in Appendix 4.

Advantages

2.26 Experience indicates that international operating agencies have contributed, often significantly, to improved efficiency in the provision of facilities and services at lower cost to both providers and users. Among the advantages offered are more efficient use of personnel, facilities and equipment, as well as savings in research and development, given the avoidance of duplication at the national level, and through achievement of economies of scale. This has special relevance for States with less advanced economies where trained personnel and financial resources are scarce and where aviation must compete with other sectors of the economy. Operating agencies levying route facility charges may usually be more successful in the collection of amounts due for overflights owing to the larger geographical areas usually covered by their activities. Moreover, since such agencies represent a number of States, they tend to be in a stronger negotiating position in their financial and commercial dealings and may therefore be able to secure more advantageous terms.

Establishing the agency

2.27 The size and composition of an agency's membership, and hence its geographical scope of operation, will primarily depend on political, economic, demographic and geographic considerations The scope of its activities will also be influenced by these factors and the extent to which new and improved facilities may be required in some States to serve present and future traffic.

Organizational arrangements

2.28 The circumstances that lead to the creation of an international operating agency, as well as many other factors, will influence its structure. Since these will differ significantly from case to case, it is not practicable to prescribe any specific pattern of organizational arrangements for such agencies in general. Certain basic common features, however, have normally emerged. For example, the over-all policies governing the agency's functions, operations and financial affairs, as well as decisions on fundamental matters such as capital investments and the appointment of key staff, are likely to be the responsibility of a board of management composed of representatives of the Member States. Similarly, the chief executive will usually be responsible to the board ultimately responsible for the general administration of the agency. From the outset, sound and well-defined financial and economic policies and practices need to be established relating to cost recovery and financial control, including accounting and budgeting procedures. Recruitment of agency personnel will also require careful consideration. (Reference should also be made to the text on agreement(s) between States and related contractual aspects in Section F of this chapter.)

E. JOINT CHARGES COLLECTION AGENCIES

Scope and functions

2.29 Another effective but less encompassing means for States to benefit from inter national co-operation in their provision of air navigation services is to participate in the operation of a charges collection agency. This is because States individually operating route facilities and charging for the services rendered will be involved in considerable accounting work and

may also encounter collection difficulties where there is a substantial volume of overflying traffic. In such circumstances, a group of adjoining States might benefit significantly from the formation of a joint charges collection agency. This agency would collect route air navigation services charges on behalf of all of the participating States, including those which are overflown. Since the majority of aircraft are likely to land in the territory of at least one of the participating States, this would tend to ease the collection of air navigation services charges. The agency would then transfer to each participating State the charges revenue collected on its behalf. Added to each charge levied for each participating State would be a small fee or percentage to cover the State's share of the agency's costs. A joint charges collection agency should also benefit the users (or aircraft operators) because the collection costs attributable to each participating State should be lower than it would otherwise incur itself and need to recover from the users. Another factor to be considered is the additional prospect of further economies resulting from the employment of better trained staff and improved procedures.

2.30 In view of their potential benefits, regional collection agencies may have particular appeal to States wishing to carry out technical functions (i.e. air traffic control, etc.) themselves. Such agencies are also much less complex to establish in terms of equipment, staff and other requirements than an international operating agency. As to personnel, the agency would be staffed by nationals from States contracting to the agency thus allowing them to develop new expertise and employment.

Financing aspects

2.31 The costs involved to the participating States should be minimal. In fact, start-up funds required for the acquisition of premises and data processing and other necessary equipment as well as pre-operational training, co-ordination and administration should normally not pose a major problem since they could be obtained through a financing institution, including commercial banks. The loan would be repaid over a few years, with instalments and interest being included in the agency cost element that would be added to and recovered through the route air navigation services charges billed and collected by the agency on behalf of the Contracting States. It is important to note, though, that for the agency to be cost-effective a few States would need to join in its establishment. Separate agencies could be established in different regions.

Importance of States controlling collection of their charges

2.32 Considering that route air navigation services charges are an essential source of revenues, it is important that the States concerned remain fully in control of the charges collection function and be in the position to immediately dispose of the funds collected as they themselves deem necessary. Such control is exercised not only when a State bills and collects the charges itself but also when it joins forces with other States to establish a collection agency serving all the participating States. Also to be considered is that some of the data collected are a valuable asset, to be treated as confidential and which the States concerned alone should dispose over and control. Similarly, confidentiality should apply to amounts of charges billed to individual operators or amounts outstanding.

2.33 The situation may arise where a State would consider contracting the collection of route air navigation services charges to an agent or organization that is not government controlled or operated. In such circumstances the State should ensure that the contract with the agent stipulates that the agent's fees and costs *not* be deducted from the charge collected on behalf of the State but *added to* each charge levied on the users (aircraft operators concerned). This ensures that the State receives the revenue from charges collected without any deduction, instead of an amount reduced by the agent's fees and costs which cannot be quantified in advance, and which thereby impede proper financial planning and budgeting by the State. The collecting agent or organization is reimbursed not by the State concerned, but by the users who are the essential beneficiaries of the air navigation services being charged for. This is also the practice recommended in 2.29 above with regard to covering the costs of joint charges collection agencies, and is in fact the practice applied in the case of existing State owned and controlled joint collection activities. The costs attributable should be transparent.

Currency aspects

2.34 With a joint collection agency the funds collected can be transferred immediately to an account of the participating State which it could hold either at a bank (or another similar financial institution) in its own territory or in any other State it may designate. This collection approach may also ease access by the participating State to convertible currency. Although the Council Statements in Doc 9082/4 recommend in

paragraph 38 that under normal circumstances user charges should be expressed and payable in the local currency of the State concerned, the Council also "Recognizes that when route air navigation services charges are billed on a regional basis (i.e. on behalf of several States or by a jointly operated agency), it may be advantageous to both users and providers to denominate and pay charges in a single convertible currency." (Council Statements in Doc 9082/4, paragraph 38 (iv) refers).

F. MULTINATIONAL FACILITIES AND SERVICES

Background developments

2.35 Over the years, States have provided one another with various services such as air traffic control, communications and meteorological information. As regards charging for these services, States have usually not charged one another, because the service flow has essentially been bilateral and generally considered to be in balance. Even where there were imbalances, the effort involved in determining the cost share to be charged to a neighbouring State was considered disproportionate to the costs involved. Instead, the provider State concerned would normally include that cost share in its cost base for route facility or other similar charges levied on the users (aircraft operators) flying within the airspace for which it is responsible.

2.36 This approach continues to be the general practice, but technological developments and the high levels of investments involved are bringing about a fundamental change reflected in a growing interest in and need for multinational facilities and services. These are being introduced where certain functions that States now carry out themselves can be provided more efficiently and at a lower cost by a single multinational unit operated by one or several States. Indeed, in certain situations, such as in the implementation of the communications, navigation and surveillance/air traffic management (CNS/ATM) systems, a multinational facility may largely be the only feasible alternative. With regard to multinational facilities and services in general it remains important, however, to avoid the duplication of services and the associated higher charges on users which would occur if a State participated in the provision of a multinational service while also duplicating that service at the national level.

Definition and examples

2.37 A multinational ICAO navigation facility/service could be defined as a facility or service included in an ICAO regional air navigation plan for the purpose of serving international air navigation in airspace extending beyond the airspace serviced by a single State in accordance with that regional air navigation plan.

2.38 Elements of the satellite communications systems required to implement the CNS/ATM concept operated for groups of States represent examples of prospective multinational air navigation facilities/services. Other examples are an integrated central data bank for air traffic flow management purposes and an integrated automated aeronautical information services (AIS) system, in Europe; and aeronautical fixed telecommunication network (AFTN) communication centres and air traffic services (ATS) direct speech switching centres, in Africa. An earlier global example of multinational facilities/services is the world area forecast system (WAFS). (In this case cost sharing was originally envisaged but it was eventually concluded, following careful study by ICAO, that the marginal costs involved for the provider States did not justify the establishment of a global WAFS cost sharing scheme.)

Equity aspects

2.39 Equity in the sharing of the cost,. of a multinational facility or service and in the recovery of the costs through user charges is important. A multinational facility operated by one State but providing services used by two or more States at costs considerably over and above those that would be incurred solely to meet the requirements of the State operating that facility, may give rise to inequity in two areas if some form of cost sharing is not arranged. To the State providing and operating the facility, there is inequity from having to defray capital and running costs in excess of those that State would otherwise incur to meet its own requirements. Secondly, where that State would seek to recover its costs through user charges, users within the airspace for which this State is responsible would be asked to pay for costs of services not properly attributable to them. These users would, in effect, be required to subsidize services provided for other traffic by another State. This would be contrary to the following principle expressed in the Council Statements (Doc 9082/4), in paragraph 36: "The allocation of air navigation services costs among aeronautical users should be carried out in a manner equitable to all users. The proportions of cost attributable

to international civil aviation and other utilization of the facilities and services (including domestic civil aviation, State or other exempted aircraft, non-aeronautical users) should be determined in such a way as to ensure that no users are burdened with costs not properly allocable to them according to sound accounting principles."

2.40 It should be added that any State sharing in the costs of operating a multinational air navigation facility or service can include the relevant costs involved in the cost base for charges, such as air navigation services charges, that it levies on the final users of these services, namely the aircraft operators. The right of any Contracting State to proceed in this manner is confirmed in Article 15 of the Chicago Convention, with supporting policy guidance provided in the Council Statements in Doc 9082/4.

Implications for States and ICAO technical planning bodies

2.41 Because of the financial and managerial implications involved, the approach by technical planning bodies to the possible implementation of multinational facilities and services may be expected to differ from that applied to facilities or services to be implemented by a single State. Regarding the latter, technical planning bodies essentially focus on the technical aspects of the facilities and services the State concerned must implement to meet its obligations under the respective regional air navigation plan, to serve international civil traffic within the airspace for which it alone is responsible. Provided these facilities or services meet international standards, aspects relating to their financing and management remain an internal matter for that State.

2.42 A different approach is required in the case of multinational facilities and services because the primary reason for their establishment is to enable two or more States to carry out the services each has accepted responsibility for under the regional plan more efficiently and in a more cost effective manner than each of them could achieve on its own. Consequently it is to be expected that the States concerned will wish to evaluate, at least in broad terms, the financial aspects of such facilities before agreeing to their incorporation in the regional plan and before committing themselves to using them.

2.43 For this reason, basic financial implications will need to be considered by technical planning groups at such a stage in their deliberations when it is believed that the best or even only solution to a problem involves recommending the establishment of a multinational facility or service. To leave aside basic financial implications until after these groups have finalized their recommendations could lead to delays if one or more of the States expected to participate in the operation of the multinational facility concerned raises objections (for example, to the financial share it would be expected to pay for). Such delays in implementing technical solutions while new financial solutions acceptable to all the States involved were being sought, could possibly compromise safety or efficiency in the area concerned.

Guidance material developed

2.44 The European Air Navigation Planning Group (EANPG) as well as the AFI Planning and Implementation Regional Group (APIRG) have recognized the need for financial and managerial considerations to be addressed in the development and processing of a proposal for a multinational facility or service in their regions. So as to assist States each group has developed guidance material entitled "General Guidelines on the Establishment and Provision of a Multinational ICAO AFI ("EUR" in the case of the EANPG guidelines) Air Navigation Facility/Service", which appears as an attachment to the introduction of both the African and the European regional air navigation plans. The EANPG guidelines are presented in Appendix 5. (The ICAO Council has since decided that such guidelines should be attached to the introduction to all ICAO regional air navigation plans.)

2.45 The first three parts of both sets of the guidelines are similar in structure but each set focuses on aspects specific to the region being addressed. The fourth part is identical in both sets of the guidelines and could also be considered to be equally applicable in other regions of the world. The fourth part contains guidelines on the financial, managerial and other contractual aspects that should normally be considered in respect of the operation of a potential multinational facility or service. This part outlines the basic provisions that would need to be considered for inclusion in an agreement between the States participating in the establishment and operation of a multinational facility or service. While reference should be made to Part 4 in Appendix 5 for a complete description of these particular guidelines, relevant portions addressing issues related to the agreement as well as an outline of the basic provisions involved, are reproduced in the following paragraphs.

Agreement

2.46 The participation of States in the provision of a multinational facility/service is based on the assumption that any State having supported and agreed to the implementation of such a facility/service and making use of it, should also shoulder its share of the costs involved. Having done this, the participating States would need to formalize in an agreement the terms under which the multinational facility/service is to be provided. A primary aim of the agreement should be to ensure that the costs involved are shared amongst the participating States in a fair and equitable manner.

2.47 An agreement covering the development, implementation, operation and maintenance of a multinational facility/service could either take the form of a formal international treaty or an "administrative agreement". Both forms establish an international obligation but a treaty requires the signature of the head of state or government and will also require the ratification or approval of the national legislative assembly, which, as a rule, is a time-consuming process. An "administrative agreement", on the other hand, is at a lower level of requirement in respect of formalities and procedures than a treaty, can be signed by a minister or director of civil aviation or some other authorized person, and could be concluded by an exchange of letters or notes.

2.48 It is recommended that, whenever possible, the agreement be established in the form of an "administrative agreement" rather than a formal international treaty because this would allow the agreement to come into force with minimum delay and also permit greater flexibility in incorporating any subsequent modification required. It is recognized, however, that in some States constitutional or legal circumstances may require the approval of the legislative assembly for financial obligations to be accepted by the State, particularly if these are of a substantial magnitude and/or extend over a period of time. Whatever form is used, the agreement(s) should be structured to provide for easy subsequent amendments as developments may require. To this end, material of detail which is more likely to require modifications, and which will not affect the basic provisions of the agreement, should be contained in annexes or appendices.

2.49 It is further recommended that whenever possible only one general agreement (be that a treaty or an administrative agreement) be adopted covering all aspects of the facility/service concerned through all its phases. However, this may not always be possible. In certain circumstances it might be necessary o . preferable to have more than one agreement differing in scope and content. In those circumstances the aim should be to cover as many aspects as possible in the administrative agreement and limit the use of the treaty to those aspects for which this form of agreement is essential for the States concerned. For example, one agreement might cover the activities, including prefinancing, to be undertaken by those States that accept the responsibility for bringing the facility/service up to operational status, with another agreement to be concluded between all the States (including the first group of States mentioned above), which would use or be served by the facility/service once it became operational. In such circumstances the former agreement would be important because the first group of States would have to ensure the implementation of the facility/service, since no inflow of revenues from charges on users (aircraft operators) would take place until the multinational facility/service becomes operational.

2.50 Another possible approach, if required by circumstances, would be for all the participating States to conclude an agreement *covering*, in general terms, their commitment to participate in the provision of the multinational facility/service, and then developing a separate agreement covering all aspects relating to the financing and operation of the multinational facility/service.

Basic provisions

2.51 The various basic provisions that would normally have to be covered in an agreement covering multinational facility or service provision and operation include the following: objective of the agreement; obligations of States party to the agreement; definition and description of the facility/service; establishment and operation of the facility/service; legal responsibility; liability aspects; managerial aspects (including governing bodies and decision making arrangements, organization, and staffing and consultation); financial aspects (including cost determination, cost sharing, budgeting, authority to approve the budget and financial auditing); taxation and other government levies; procedures for settlement of disputes; and accessions, withdrawals, amendments to and termination of the agreement.

2.52 With regard to the provision addressing the establishment and operation of the facility/service, it should be added that the agreement should specify who will establish and operate the facility/service concerned,

namely whether this is to be done by one State, two or more States, an existing international organization, an existing national or international agency, or a new agency to be established specifically for this purpose. The decision as to who should provide the facility/service could be influenced, in particular, by the anticipated capital investment and annual costs involved, as well as the extent to which the alternative providers (i.e. a participating State or States, international organization or agency) have been engaged in the function(s) concerned.

Status of guidelines

2.53 It should be stressed that Part 4 of the guidelines in Appendix 5 does not constitute a draft model agreement nor clauses since circumstances related to the planning, implementation and operation of individual multinational facilities/services may vary considerably. It should be added, however, that this part of the Guidelines has been given careful review by legal experts within and outside ICAO. Consensus of legal opinion is that there were no insurmountable legal obstacles to the implementation of multinational air navigation facilities and services as defined in the Guidelines.

G. JOINT FINANCING ARRANGEMENTS

THE DANISH AND ICELANDIC JOINT FINANCING AGREEMENTS

Basic aspects

2.54 Joint financing of air navigation services is provided for under Chapter XV of the Chicago Convention. Two such agreements, with Denmark and Iceland, are presently in existence and they are administered by ICAO on behalf of the Contracting Governments concerned.

2.55 These Agreements, which are linked, provide certain air navigation services (ATS, COM and MET services) in Greenland and Iceland for the safe operation of flights by civil aircraft across the North Atlantic north of 45°N latitude.

2.56 The required services are reviewed from time to time (usually by conferences of the 23 Contracting Governments which jointly finance the services), amended as necessary, and specified in detail in Annex I to each of the two agreements. All requests for capital expenditures have to be approved by the Council of ICAO, in accordance with the agreements, and inventories of the various items of equipment, buildings, etc. are updated annually and shown in Annex II to the agreements. Annex III to the agreements contains details on certain financial matters, such as authorized staffing levels for the different services and stations, how operational and maintenance expenses are to be treated, limits on depreciation and interest, etc.

2.57 The Agreements themselves basically set forth how the services are to be financed. Because of special benefits derived from operation of the services, Denmark and Iceland bear 5 per cent of the costs of the services under the respective Agreements. The remaining 95 per cent is financed by user charges and assessments on all the Contracting Governments, including Denmark and Iceland (see also below).

2.58 The Council of ICAO established a special body, the "Committee on Joint Support of Air Navigation Services" to assist it in carrying out its responsibilities under the agreements. A section in the ICAO Secretariat serves that Committee and the Council and carries out the day-to-day administrative functions.

2.59 The methods of financing the operation of the services and cost-sharing between participating Governments are set forth in the agreements. They are basically the same for both agreements and are briefly described in the following paragraphs.

E&mates of the costs of providing the services

2.60 Each year, Denmark and Iceland provide detailed estimates of the costs of providing the services during the following year. These estimates are thoroughly scrutinized by the Secretariat. The estimates, with necessary explanations, particularly concerning requests for authorization to incur new capital expenditures, are then presented to the Committee on Joint Support of Air Navigation Services. If the Committee is satisfied with the estimates, it recommends their approval to the Council. If the Committee has some reservations and requires further clarification, it may recommend provisional approval to Council, subject to further investigation and report.

2.61 When the Council approves the estimates, it subsequently authorizes advance payments to Denmark and Iceland of amounts up to 95 per cent of the estimates, provided they do not exceed the cost limit provided for under Article V of the Agreements. The advance payments come from two sources: a) user charge revenues; and b) assessments on Contracting Governments, as described below.

User charges

2.62 The methodology for determining user (en-route) charges under the two Joint Financing Agreements was laid down by Joint Financing Conferences of the Contracting Governments to these Agreements. The calculations are done by the Secretariat and presented to the Committee on Joint Support of Air Navigation Services. If the Committee is satisfied that the calculations are correct, it recommends their approval by the Council. These user charges are separately calculated under each Agreement and are levied on all civil flights across the North Atlantic, north of 45°N latitude.

2.63 The user charges are based on the estimated costs approved by the Council and include only those costs which are necessary for civil aviation purposes. Such costs are then divided by the actual number of flights of the previous year to determine a single user charge under each Agreement. When the actual costs and revenues (as opposed to the estimates) allocable to civil aviation are subsequently audited, the under or over recovery is included in the calculation of the user charge for the subsequent year. By agreement, the user charges are collected by the United Kingdom (for a small administrative fee) and the revenues collected are remitted monthly to Denmark and Iceland. These revenues, billings, etc., are audited annually under ICAO auspices.

Assessments on Contracting Governments

2.64 Assessments on Contracting Governments are also based on 95 per cent of the estimates and apportioned among those Governments in proportion to the number of their operators' actual flights for the previous year. When the actual costs (audited under ICAO auspices) and flights for the year are known, the necessary adjustments, upwards or downwards, are made in subsequent assessments. Also in the assessments, Contracting Governments are credited with their share, based on flights, of the estimated user charge revenues, and again, when the actual revenues and flights are known, the necessary adjustments are made in subsequent assessments. It should be noted, however, that under both agreements the major share of the costs involved are recovered through user charges.

Payments to the provider States

2.65 As indicated above, advance payments, based on estimates, are made to Denmark and Iceland through monthly user charge revenues and quarterly payments by ICAO from funds received from Contracting Governments in the form of assessments on those Governments. When the actual costs of the services for the particular year are known and audited, an adjustment is made by ICAO in future payments to Denmark and Iceland to take account of any difference between the total amount of money paid to them (by user charge revenues and advance payments by ICAO) and what they are actually entitled to receive, i.e. 95 per cent of the audited actual costs.

Supervision of the services

2.66 Denmark and Iceland are responsible for operating and maintaining the services without interruption and in an economic manner. These States also provide ICAO annually with reports on the operation of the services. These reports are analysed by the pertinent technical experts of ICAO and explanation: sought, as necessary, before the reports are published for the information of all concerned. The Secretary General of ICAO is responsible for generally supervising the operation of the services and, in addition to the annual reports mentioned above, he also sends from time to time technical experts of the ICAO Secretariat to Greenland and Iceland to make "on-the-spot"' inspection of the services and their operation.

ANOTHER APPLICATION OF THE JOINT FINANCING CONCEPT

2.67 Six States providing air navigation services for the North Atlantic (Canada, Iceland, Ireland,

Portugal, the United Kingdom and the United States) have requested ICAO to assume the responsibilities associated with administering a height monitoring system programme. This programme has been designed to monitor 1 000 feet reduced vertical separation minima prior to its implementation scheduled for January 1997. The joint financing concept used for the Danish and Icelandic agreements has been adapted to take into account the modalities inherent to this programme, bearing in mind that the participating provider States requested an effective and flexible joint financing arrangement.

POSSIBLE APPLICATION OF THE JOINT FINANCING CONCEPT TO CNS/ATM SYSTEM IMPLEMENTATION

2.68 Joint financing-type arrangements would lend themselves well to the implementation of a number of CNS/ATM systems components in situations where it is, for example, very costly for a State to act alone or where an existing regional organization (ASECNA, COCESNA, EUROCONTROL, etc.) does not act on its behalf. Such components include integrity monitoring and wide area augmentation systems required in connection with the GNSS, and could also include ground earth stations (GES) and sharing in the use of communications satellite transponders.

2.69 Under a joint financing-type arrangement actual provision and operation of the CNS/ATM components concerned could be carried out by one State on behalf of other participating States or contracted to a commercial operator or service provider. Alternatively a group of States could jointly operate and provide the facilities and services concerned. In the first two instances, ICAO's role in joint financing would be similar to that under the Danish and Icelandic Joint Financing Agreements as described above. Where a group of States would operate the facility jointly, ICAO's role could, however, be expanded, particularly during the implementation phase, for example to include organizing the recruitment of staff, such construction as may be required, and various associated activities. Regardless of who actually provides and operates the facilities or services concerned, in all instances the participating States under each scheme would exercise full control through a governing joint support-type committee to whom the ICAO joint financing Secretariat would report.

H. SPECIFIC ORGANIZATIONAL ASPECTS PERTAINING TO THE ICAO COMMUNICATIONS, NAVIGATION AND SURVEILLANCE/AIR TRAFFIC MANAGEMENT (CNS/ATM) SYSTEMS

Background

2.70 The CNS/ATM systems or individual components of these systems are probably the most significant multinational facilities or services the aviation community will have access to in the immediate future. This applies with regard to both the service potential of the systems and the costs involved. For these reasons certain organizational aspects specific to these systems are being addressed in the following paragraphs.

2.71 Implementation of the CNS/ATM system will require considerable investments in the area of air traffic management (e.g. automation and support systems) as well as on the communications and navigation side. The latter involves space segment components as well as associated ground-based components of the systems (e.g. satellites or satellite transponders ground earth stations, etc.). Different factors though will need to be considered depending on the means chosen to meet communications requirements or navigation requirements. Common to both, however, is that the magnitude of the investments involved and the capacity that will be provided are such that, with extremely few exceptions it is not possible, feasible or practical for a State to implement such systems for its own sole use.

2.72 In so far as the satellite components are concerned, two different types of satellite constellations will be involved, i.e. the satellites required to serve mobile communication needs and those required to serve navigation needs i.e. the global navigation satellite systems (GNSS). A major effect of both, however, is that once they are fully implemented on a global scale the need for States to provide and operate conventional communication and navigation systems will be significantly reduced. From an organizational point of view. this in turn will mean that the staff and facilities required to operate the associated facilities and structures would largely become redundant although some could be redirected towards work associated with the provision of the new satellite-based communication services. The extent of the redundancy would also be influenced by the technical solution and implementation option chosen (see below). But because of the centralization inherent in satellite operations, redundancies would occur in most

States in staff and facilities previously devoted to serving aeronautical communication needs if the economies of satellite application are to be realized.

Communication satellite services — implementation and option selection

2.73 The satellite system serving CNS/ATM communication needs will require an extensive network of ground-based facilities, including ground earth stations and associated communication links to area control centres, etc. As there are different means of system access, States will have different implementation options. Depending on requirements and circumstances, different States or groups of States may choose different options. Relevant to the selection of an implementation option and the resulting organizational structure are also such economic factors as achievable economies of scale, scope for competition and requirements for economic regulation. But it should be stressed that the specific framework a State or group of States may select cannot be established nor can the appropriate legal instrument covering its establishment be drawn up, until the States concerned have themselves determined what approach best meets their requirements.

2.74 While many States may operate some elements of the ground-based facilities themselves (e.g. ground earth stations), access to satellites or satellite transponders will primarily be through so called service providers that will provide satellite access either directly or by acting as co-ordinators for satellite operators. From an organizational point of view, though, a State has a number of implementation options or a combination of options. These cover a wide range according to which a State can:

a) contract with certified service providers;

b) commission existing multilateral State organizations such as ASECNA, COCESNA, EUROCONTROL, etc., to act on their behalf in dealing with service providers;

c) join other States to form an ad hoc group of States or a new international organization which would negotiate for service; and/or

d) use a mechanism within ICAO (for example along the lines of the Danish and Icelandic Joint Financing Agreements) to act on behalf of States in dealing with service providers.

2.75 Further to what was stated above, the selection of the implementation option a State may wish to apply is likely to be strongly influenced by at least two factors, namely the cost-effectiveness of the alternatives, and the extent to which the State concerned will continue to maintain the control it presently exercises over the provision of communications services to civil aviation. The latter also includes the extent to which existing facilities and personnel can continue to be utilized in the provision of CNS/ATM system services as opposed to being made redundant by the implementation option(s) selected.

GNSS

2.76 The GNSS will, at least initially, be composed of the satellite systems which provide the standard positioning service (SPS)* and system augmentation which may either have wide area (hemispheric) coverage or local area coverage (often referred to as up to 240 km or 150 miles). System augmentation is required for meeting the performance criteria imposed by aviation. The standard positioning service satellite systems are being offered free of charge by the two provider States concerned, up to the year 2010 by the Russian Federation (the GLONASS system), and for the foreseeable future with six years advance notice of any change to that policy by the United States (the GPS system). Both these systems are military systems, which are being made available for civilian use. Until these systems are replaced by (civilian) systems requiring financial commitments from the civil establishment world-wide, the provision (as opposed to the use) of the standard positioning service does not appear to be dependant on organizational issues needing to be addressed by States other than the two provider States.

2.77 Systems augmentation gives rise to somewhat different considerations. For example, augmentation with wide area or hemispheric coverage could be provided by the same State(s) or entity that operate a satellite constellation providing global standard positioning service. A group of States or a regional organization might also undertake to operate the augmentation satellite service required, either by itself or by contracting with a

* Standard positioning service (SPS) is, in this document, used as a common term applicable both in the context of the GPS as well as the GLONASS systems, although the positioning service offered to the civil aviation community in the GLONASS system technically is referred to as the channel of standard accuracy (CSA).

commercial or government organization to do so on its behalf. Thus the same type of options as outlined in 2.74 apply. In each instance costs would be incurred that presumably would need to be recovered. From an organizational point of view such augmentation would in fact be a multinational facility or service to which the guidance material on the provision and operation of multinational facilities and services, addressed earlier in this chapter, could apply if the augmentation is to serve civil aviation only or primarily. On the other hand, if civil aviation is only going to be one and a minority user of the augmentation services provided, and the same operator would provide augmentation services worldwide, a joint concerted approach through, for example, ICAO, a regional air navigation services providers association or an international aviation user association in dealing with the service provider may be the best approach.

2.78 Augmentation with local coverage would probably not require international involvement provided that the facility would meet the specifications and standards required for it to be listed as an international civil aviation facility. The facility itself could be provided by the national or local government or under contract by a commercial entity.

Air traffic management

2.79 With regard to organizational aspects, implementation of the ICAO CNS/ATM systems concept is perhaps of special relevance to air traffic management. This is because the advanced communication, navigation and surveillance technology involved offers the possibility to expand the capacity of individual area control centres (ACCs) in many parts of the world and particularly over the high seas, both in terms of geographical coverage and the more efficient technical means by which control functions could be carried out. As a result it would be possible and technically and economically feasible to merge many flight information regions (FIRs) into what could be termed a (single) air traffic management region and correspondingly reduce the number of ACCs. It should be assumed that the decision made by individual States as to whether or not to proceed in this manner would not so much be taken principally on technical or economic grounds, but would instead depend on the situation in the State concerned and would often be strongly influenced by government policy.

2.80 It should be added that even without an ACC a State may still need to incur costs associated with providing CNS/ATM systems services as well as other air navigation services for overflying traffic and during the en-route phase of traffic landing on or departing from its territory (e.g. participation in GNSS augmentation schemes, COM fixed links with one or more ACCs, and MET costs). Such costs together with the costs of closing an ACC would continue to be recoverable by the State(s) concerned. This would call for co-operation or agreement between that State and the entity operating the ACC serving the air traffic management region covering the State concerned. The entity could be an international or regional body, a joint operation by a few States, or another State. In essence the agreement or scheme would call for all costs attributable to the provision of air navigation services to air traffic during the en-route phase of flight, that would be borne by the State which has closed its ACC to be included in the cost base for and recovered through the charges levied through the ACC serving the air traffic management region (i.e. the expanded FIR). CNS/ATM costs attributable to services provided during the approach and/or departure phase of flight would, like the costs of other air navigation services attributable to this phase of operations, be recoverable through approach and aerodrome control charges. These cost recovery issues will be discussed further in Chapter 4 — *Determining the cost basis for air navigation services charges,* and Chapter *5* — *Air navigation services charges and their collection.*

Chapter 3

FINANCIAL CONTROL OF AIR NAVIGATION SERVICES

INTRODUCTION

3.1 This chapter describes the scope, relationship and purpose of accounting and financial control in the management of air navigation services. (The practical application of financial data for the particular purpose of determining the cost basis for air navigation services charges is the subject of Chapter 4.) This chapter is divided into *three* main sections. *The* first section -*Basic aspects of accounting and financial control* — addresses certain principal functional aspects of accounting and financial control, as further described in six subsections. The first of these subsections contains general comments on basic characteristics of air navigation services that affect their accounting and financial control, the second defines the purposes of accounting and financial control, the third describes the scope of these two functions and the fourth explains the relevance of budgeting and business planning in this context. The fifth subsection focuses on financing and cash management while the sixth subsection describes the scope and purpose of internal and external auditing. (The nature of the organizational form may influence the type of accounting system used. For example, a government department may have different requirements from that of an autonomous public sector organization. The organizational forms and their features are described in Chapter 2.)

3.2 The second main section — *Accounting* — gives broad descriptions of accounting systems designed to meet requirements for certain specific functions. No attempt is made to describe in detail any specific accounting scheme or how it should be organised and managed. For this purpose the reader is invited to consult the extensive reference material available in the field of accountancy. The section is divided into five subsections. The first provides general comments on accounting while the second and third focus on systems for identifying revenues and expenses. The fourth and fifth subsections address the presentation of assets, liabilities and capital, and the statement of cash flows.

3.3 The third main section — *Means of measuring performance and productivity* — describes several possible ways of measuring the performance and productivity of air navigation services, and refers to factors to be taken into account in that context.

A. BASIC ASPECTS OF ACCOUNTING AND FINANCIAL CONTROL

General

3.4 One basic characteristic of air navigation services referred to in Chapter 2, under *Basic organizational characteristics of air navigation services provision,* is that they are, as a rule, not all provided by one entity alone. Thus, the three major components i.e. air traffic services (ATS), telecommunications service (COM), and meteorological services for air navigation (MET) are usually provided by two or three different entities. Consequently, all the costs to a State attributable to all the air navigation services it provides may not be fully accounted for together because the costs incurred by every entity involved may not be included. This tends to apply in particular to MET. Also to be noted is that there are circumstances where major air navigation services such as meteorological services are provided on a contractual basis. (The remaining two categories of air navigation services i.e. search and rescue (SAR) and aeronautical information services (AIS) usually account only for a minor share of total air navigation services costs). Because of these organizational characteristics, the exercise of proper financial control over the provision of air navigation services is essential.

3.5 These characteristics, however, may also limit the applicability of some of the guidance material in this chapter such as that pertaining to assets, liabilities and equity, and of cash flow. The bulk of the chapter will be

applicable to the financial control of those major air navigation services components which constitute a large part of the functions of the providing entity involved (for example ATS in the case of a civil aviation administration, etc.). With the emergence of autonomous air navigation services authorities and the growing attention being given to this organizational form, this type of guidance material is likely to become more relevant. (The different kinds of organizational structures are addressed in Chapter 2.)

3.6 Where the operation of the air navigation services is only one of many functions performed by a civil aviation administration, or another branch of government, a separate or supplementary system of accounts should be established for the air navigation services involved which may be based on an itemization such as that described in Section B below. This is because the accounts of the civil aviation administration or government branch concerned may not be kept in a format that is responsive to the requirements of air navigation services management and the transparency of consultation with users. Further reference should also be made to the text on the implications of organizational structure on financial control and accounting in Chapter 4.

Purposes of accounting and financial control

3.7 Financial accounting refers to the system according to which income and expenses are recorded and summarized so as to present an aggregate financial picture of the provision of air navigation services. How elaborate and detailed the financial accounts are depends on the extent of detail required and the scope of the air navigation services concerned. It is, however, essential to ensure from the outset that all accounting procedures are applied in accordance with generally accepted accounting rules, standards or conventions. The importance of good internal as well as external auditing must also be emphasized.

3.8 Financial accounts may usefully also be supplemented by management accounts which apply accounting techniques for the purpose of assisting all levels of management in planning and controlling the provision of air navigation services.

3.9 The basic purpose of financial control is to ensure that the resources used to provide air navigation services are spent in an effective, timely, reliable and accountable manner. This involves the monitoring of service provision in financial terms to ensure that the magnitude of expenses and income flows incurred in a particular year (and when and at which location they are incurred) are in accordance with a previously approved budget to achieve an agreed service level for that year

3.10 Financial control and accounting, although separable as concepts, are of course interrelated, since management cannot exercise financial control effectively without having at its disposal the data provided by a sound financial accounting system. It is therefore essential that any procedure being established to provide financial control be accompanied by a thorough examination of the accounting system to ensure that the latter can adequately provide the financial data necessary for this purpose.

Scope of accounting and financial control

3.11 During an accounting period management will be monitoring and controlling operations in financial terms. Financial control essentially involves three steps: firstly, a comparison of actual income and expenses with those planned; secondly, where the two differ significantly, a determination as to whether the cause lies within the budget itself or in the management of the air navigation services or is the result of external factors outside management's control; and thirdly, what corrective measures need to, or can be taken.

3.12 Any substantial divergence from the original budget for a major specific income or expense item may also call for a review of the forecast outcome, to determine the extent to which any other items and the over-all financial situation of the entity or entities providing the air navigation services concerned are likely to be affected. This will be particularly beneficial in cases where the shortfall could ultimately affect the operating efficiency of the air navigation services.

3.13 At the end of an accounting period, which as a rule covers 12 months, the entries in all individual financial accounts are totalled for presentation in two complementary forms or tables, namely the revenue and expense statement (also referred to as an income statement) and the balance sheet. The former summarizes all revenues and expenses arising during a specified period, with the difference between the two totals being either a profit or a loss. The balance sheet, on the other hand, summarizes assets and liabilities at a point in time. The

change in the net worth depends on whether a profit or loss was made during the accounting period, in which case the balancing item on both the revenue and expense statement and the balance sheet will be identical.

3.14 A revenue and expense statement or a balance sheet, in isolation, do not identify the movements in assets, liabilities and capital which have taken place during the accounting period. A statement of cash flows can be prepared to highlight movements in cash flows for the period concerned. This statement also provides information on the entity's liquidity position. This is further explained in Section B of this chapter. It should be noted that a statement of cash flows, when provided for a number of years, is of particular relevance and assistance when financing is being sought, because it shows the changes in the cash position of the entity providing the air navigation services concerned, and can thereby influence the size and terms of the loan or financing being sought.

The business plan and budget

General

3.15 The quality of planning has a considerable influence on the successful outcome of an organization's management. Efficient and effective planning procedures will also meet the needs of users and the supervisory authority or regulator. These planning procedures will involve preparation of a business plan and a budget. The effectiveness of planning depends not only on the active participation of senior management but of staff at all levels in the organization.

3.16 The business plan and budget have different time scales but should relate to each within the following hierarchical economic and financial framework:

a) a *strategy* should outline the long-term objectives which underlie the business plan;

b) a *business plan* is normally set for a period of 3 to 5 years and identifies the projects to be carried out during this period and sets the business environment for the budget; and

c) a *budget* is normally set for 1 year and represents the first year of the business plan in financial and operational detail.

3.17 Setting a business plan and budget is an important part of the planning process and makes possible the following objectives regardless of organizational structure:

a) planning to ensure that future requirements are anticipated and provided in time;

b) co-ordination of the components of the provision of air navigation services to provide an effective service;

c) efficient management of the factors of production involved in providing air navigation services; and

d) financial control over the provision of air navigation services to ensure that the cost of provision is efficiently and effectively incurred.

The business plan

3.18 Business planning is one of the key tasks of an organization. The purpose of the plan will be to specify the actions to be followed over the plan period by the organization to achieve its long term strategies and should prescribe specific objectives through which the goals will be achieved. In so doing the plan should outline the business environment in which the organization is forecast to operate and its implications. Consideration will need to be given to political, legal, economic, social and technical factors as well as regional and global developments that may affect the organization and in addition the plan will need to highlight assumptions made which particularly affect the forecast plan outcome. Specific objectives can be broken down into the level and costs of services and the recovery of costs associated therewith, highlighting who is responsible and accountable for carrying them out. The plan will also identify key objectives against which performance will be monitored. Such planning will not only be financially orientated but will include goals concerning safety, the nature and level of services, the forecast demand for such services and the requirements of users.

3.19 The plan should identify the capital investment projects to be carried out together with their financial implications. It is important that new projects included in the business plan should meet an operational requirement and be accompanied by an appraisal setting out the economic and financial justification of the project. (This is covered in more detail in Chapter 6.) A

compromise between the cost of technical solutions to meet operational requirements and the financial implications for users may need to be made. Forecast changes in numbers and type of staff over the plan period should also be included. The business plan should demonstrate that the organization is well managed by reference to relevant performance indicators, including unit costs and quality of service (as described in Section C). These should cover the recent past and show future projections based on the outcomes in the plan being achieved.

3.20 The plan will set out the infrastructure requirements for the plan period. Requirements should reflect the priorities as influenced by safety, user needs and other considerations and can be analysed over principal headings, for example air navigation services requirements can first be broken down over broad headings such as communication, navigation and surveillance. These could be further broken down such as:

Communications
- Fixed services
- Mobile services

Navigation
- Ground-based systems
- Satellite-based systems

Surveillance
- Radar systems
- Automatic dependent surveillance

Note.— A third category of navigation aids is self-contained systems (e.g. INS). As they do not require any investments by air navigation services providers they are not included in the business plan.

3.21 The plan should take account of the following parameters:

a) forecast air traffic;
b) external economic assumptions (e.g. exchange rates, inflation, GNP and interest rates);
c) staff numbers and changing qualifications, training and work skills required of staff;
d) limits on expenditure and/or air navigation charges;
e) changing institutional arrangements;
f) changes in costs (salaries, operating expenses);
g) income; and
h) operating result (as measured by the difference between forecast revenues and costs).

3.22 Planning is a continuous process and the business plan needs to be updated annually to reflect substantial amendments. In order that plans maintain continuity and do not become simply a series of "wish statements" it is recommended that a review of the progress forecast in the previous year's plan be mace and that changes from it be identified and explained. Some flexibility should, however, be provided in order that the plan is not easily blown off course by being too rigid. The main uncertainties affecting the result';, particularly in the later years, should be discussed (e.g. the effects on capital investment of lower than forecast traffic) and contingencies in the event of different outcomes could be indicated (e.g. prioritizing investment projects in the event of a constraint on borrowing for capital investment). The effect of different cost assumptions (e.g. higher staff costs) might also be assessed.

The budget

3.23 The budget should be based on the first year of the business plan and usually covers the period corresponding to the annual financial year. It should t e revised only exceptionally when unusual and unforeseeable circumstances arise during the budget year. The expected actual income and expenditure, however, should be regularly forecast during the year.

3.24 A budget is composed of two parts:

a) a budget that forecasts income and expenses including depreciation and interest; and

b) a capital budget that forecasts capital expenditure detailing proposed investment in upgrading existing assets or acquiring new assets during the year.

3.25 The budget should be organized in line with the accounting system used to record income and expenses. For a budget to be a useful control device, it must provide guidance to operating units expending resources to produce service. Budget items should be consistent with various subaccounts in the accounting system. The budget should be formatted so that it is easy to compare the actual results with the budgeted results (account and budget), possibly on a quarterly basis as well as for the year as a whole. For this purpose, very detailed comparison (e.g. item by item in the various subaccounts) may not be necessary.

Financing and cash management

3.26 Financing and cash management refer to those practices that aim to maximize the return on the invested funds and the efficient procurement of funds. These tasks can be undertaken internally or externally, and sometimes by state treasuries. Cash management needs to be complemented by the management of foreign currency and interest rate exposure. The latter comprises the minimization of the risks associated with movements in market rates of interest to control the return on financial investment and the cost of debt.

3.27 Cash management usually involves forecasting cash needs and balancing these needs against expected cash inflows and outflows, i.e. receipts and payments. Typically, a 90-day forecast of these factors is maintained for this purpose. Decisions on when to borrow cash to cover expected cash deficits and when to invest surplus cash and the time periods relative to each of these circumstances completes the cycle of cash management events. The effective management of cash resources can make an important contribution to the over-all financial performance of air navigation services.

3.28 Policies, procedures and systems for cash management should be based on clear descriptions of authority. Reviews or audits at unscheduled times should be undertaken to guard against possible misuse of authority or abuse of trust implicit in the relationship necessary between the provider of air navigation services and the banking institutions concerned.

Internal and external auditing

3.29 Internal audit can be defined as an independent appraisal function within an organization, for the review of activities, as a service to all levels of management. It is a control which measures, evaluates and reports upon the effectiveness of the whole system of internal controls, financial and otherwise, which has been established by management to safeguard its assets, ensure reliability of records, promote operational efficiency and monitor adherence to policies and directives. Internal audit is most effective when independence is maintained, i.e. where the auditor is not engaged in any system which that auditor would normally review and appraise. The internal audit function is itself an integral part of the system of internal control, and an internal audit should not only report, for example, on the effectiveness of the system of internal controls but also make recommendations.

3.30 With independence and given adequate scope, authority and objectivity, internal audit will be able to exercise its responsibilities for reviewing, appraising and reporting upon:

a) the soundness, adequacy and application of internal controls;

b) the extent to which the assets and interests of the entity providing air navigation services are accounted for and safeguarded from losses of all kinds arising from fraud and other offences; waste, extravagance and inefficient administration, poor value for money or other cause;

c) the suitability and reliability of financial and other management data developed within the organization; and

d) the extent to which a particular activity contributes to the efficiency and effectiveness of the organization.

Independence must not affect the working relationship and co-operation with all the departments of the air navigation services organization before, during and at the conclusion of audit assignments. Co-operation must also extend to the relationship between internal audit and external audit.

3.31 External audit is an independent appraisal function performed by an outside entity which, for a State organization, could be done by the Sate auditor. The external auditor may have a statutory responsibility to report on the financial statements giving an account of management's stewardship. This independence will vary in relation to the method by which external audit is selected. Another factor to be recalled is that external audit provides a valuable service not only to the controlling body to which it reports but also IO users and others being served by the entity being audited. Care should be taken in the selection process of an auditor.

3.32 External audit differs from internal audit more in respect of emphasis than objectives. For instance, the internal auditor concentrates attention upon internal controls within the air navigation services organization concerned; the external auditor, while interested in internal control, will also want to ensure that the entity acts only within its powers (which may be statutory) and that its accounts present a true and fair view of its activities. External audit powers generally

stem from statute but the responsibilities arising from these powers are often extended and amplified, for example by standards and guidelines issued by professional accountancy bodies. An important difference between internal and external audit lies in the line of reporting. The internal auditor reports to management; the external auditor, while also submitting reports to management, has an external reporting line to the body ultimately controlling the provision of the air navigation services. This reporting aspect manifests itself at the end of the external audit, when an external auditor will be required to provide a certificate for the accounts. If the external auditor is not satisfied with any aspect of the organization's accounts, the report may be qualified. Even in the case of an unqualified certificate, the external auditors may provide a "management letter" drawing attention to matters requiring attention but which do not require a qualification to the certificate.

3.33 Co-operation between internal and external audit needs to take account of their differing roles and responsibilities as touched upon in the preceding paragraphs. Since internal audit is part of the control structure of the provider of air navigation services, its effectiveness will need to be reviewed by external audit. This review will cover, for example, the quality and planning of internal audit coverage. Conversely, internal audit must be satisfied as to the ability and efficiency of external audit. Co-operation can involve information exchange (such as audit plans, statement of systems and procedures, flow charts and audit reports), regular meetings (covering, for instance, audit priorities, financial irregularities, fraud, etc.) and joint training programmes.

3.34 Both internal and external audit have roles to play with respect to air navigation services charges which may be collected for an air navigation services organization by another entity. Both audits will need to be satisfied with the control measures in place in the entity collecting the charges and in the entity providing the air navigation services, to ensure that all revenue due to the latter is collected and paid over to it promptly.

3.35 The external auditor will be required to certify the financial statements of the entity providing air navigation services. Timely completion of the external audit in respect of the end-of-year financial statements is essential to the efficient publication of that entity's annual report concerning its financial position.

B. ACCOUNTING

General

3.36 It was noted in the introduction to this chapter that a basic characteristic of air navigation services provision is that it may not be provided by one entity alone and, in so far as the three major components, ATS, COM and MET are concerned, two or three different entities may be involved. This may add to the task of accounting for air navigation service costs since where the above is the case, separate entities will need to maintain the accounting information required. It is incumbent on ATS, COM and MET providers in these circumstances to ensure that any charges reflect solely the costs attributable to the respective air navigation services they provide. (Guidance on determining the cost basis for charges is set out in Chapter 4). As already noted, because of these organizational characteristics the exercise of proper financial control over the provision of air navigation services is essential.

3.37 Accounts need to be kept for the entity which provides the central function of ATS (and often limited or even extensive associated communications services as well as SAR co-ordination and AIS) because it is also the entity that as a rule imposes and collects such air navigation services charges as may exist in the State concerned. Moreover, the charges levied may not be set at the level required to recover only the costs of the entity providing ATS (and any other associated air navigation services) but may include an additional element or elements for recovering the costs of one or more other entities providing other such services.

3.38 ATS is most frequently provided by a civil aviation administration as are many other air navigation services, although in a growing number of instances an autonomous authority has been established to provide such services. In the former instance, the provision of air navigation services should be considered a separate activity within the civil aviation administration concerned and a separate set of accounts should be established for this activity. The autonomous authority referred to in the second instance would of course have its own separate accounts. Regardless of the organizational form employed, the accounts required in both instances should be based on common principles and contain common features which are the subject of the remainder of this section. The guidance outlined should primarily be considered in the context of the entity or body providing ATS and other air navigation services.

3.39 The first step in establishing a basic understanding of the financial situation of any major provider of air navigation services is to develop a system for identifying various types of financial outlays and receipts. This involves establishing individual accounts, each showing a specific type of revenue, expense, asset or liability and cash flow. The number of accounts established for the accounting system of a specific provider will depend on the degree of detail sought, i.e. the more elaborate the system, the greater will be the subdivision of accounts established.

3.40 The introduction of electronic data processing and computerization can be used not only to improve the quality of information provided but also to improve the productivity and cost effectiveness of the accounting system itself. All accounting systems will need to meet the basic criteria required for stewardship, governance and financial control. Although the level of sophistication required will depend on the needs of the organization and its management and its decision making processes, it should not be assumed that an elaborate and highly sophisticated accounting system is always the most desirable. In establishing or developing the system primary emphasis should be on its ability to generate the information deemed essential.

3.41 Accounts recording income and expenses can be maintained on an accrual accounting basis or a cash accounting basis. Under accrual accounting, income is accredited to the period (usually the financial year) in which it is earned and expenses charged to the period when they are incurred. On the other hand, under cash accounting, income is accredited to the period when it is received and expenses are recorded when paid. Accrual accounting systems better reflect the financial position of the entity concerned and reflect standard accounting practice.

3.42 Accounting data have two primary uses. The first, and generally the better known, is to present to interested parties pertinent financial data regarding the financial position of the air navigation services organization, i.e. to show the revenues and expenses and the profit or loss situation during a given period, as well as the status of the providing entity regarding its assets and liabilities. The second use is to provide a factual historical framework for financial control. In addition, the accounting system provides management with data to enable it to manage its operation as well as providing a source of data for determining the cost basis for air navigation services charges.

3.43 The identification and subsequent recording of items is usually more easily accomplished for revenues than for expenses. This is chiefly because revenue sources tend to be fewer in number than expense items, and because each revenue item, with few exceptions, is often easily identifiable with only one type of source, whereas one expense item can frequently be identified with several major expense categories. The information required in an accounting system for air navigation services can vary considerably in detail and layout. The precise level of detail will depend on management requirements at the particular air navigation services providing entity concerned. However, there is a basic itemisation of revenues and expense: that may perhaps be considered a minimum and this is described in the following sections.

Revenues

3.44 Revenue items that may be #considered essential to meet the basic data needs of air navigation services management are outlined below as they might appear in a statement of revenues and expenses (the items shown are not intended to present an exhaustive list of the different sources of revenue):

Air Traffic Operations
- Route air navigation services charges . ----
- Approach and aerodrome control charges . . . . . ----
- Payments from airports for air navigation services provided . . . . . ----
- Revenues from airport charges allocated to air navigation services . ----

Total air traffic operations without deductions . . . . . ----

Less portion collected for other providers of air navigation services . ----

Net revenue from air traffic operations . ----
Revenues from ancillary activities . . . . . ----
Bank and cash management revenues . . ----
Grants and subsidies . . . . . ----
Other revenues . . . . . ——

Total revenues . . . . . ——

The following paragraphs indicate what should be included in the individual revenue items.

Air traffic operations

3.45 *Route air navigation services charges.* This includes charges and fees levied for the provision of route air navigation services.

3.46 *Approach and aerodrome control charges.* This includes charges and fees levied for the provision of approach and aerodrome control services.

3.47 *Payments from airports for air navigation services provided.* This includes payments received from airports for air navigation services provided (normally under contract).

3.48 *Revenues from airport charges allocated to air navigation services.* This includes any revenues from airport charges (e.g. landing or passenger-service charges) which are applied towards off-setting the costs of providing air navigation services.

Portion collected for other providers of air navigation services

3.49 This is a deduction of any such portion of the charges collected which represents the amount collected on behalf of and transferred to one or more other providers of air navigation services and applied by them to defray their costs of service provision.

Revenues from ancillary activities

3.50 This refers to all revenues that may be derived from activities ancillary to the provision of air navigation services such as the rental of premises, payments received for such services as heating, air conditioning, lighting, water, cleaning and telephone use provided they are not included in the rental fees, and for any services provided to non-aviation entities.

Bank and cash management revenues

3.51 This includes any revenues derived from bank and cash management such as interest on bank accounts, treasury bills, short term debentures and bonds, or from trading in discounted notes and other similar revenues. Interest received may be deducted from interest paid to arrive at a net interest cost which is then shown as an expense item.

Grants and subsidies

3.52 This covers any payments received and not requiring the transfer of assets or provision of services in return. This may entail a payment by the State to cove services that are exempted from charges or to cover th full cost of providing services to some users.

Expenses

General

3.53 Accounting for air navigation service: expenses would normally be a two-step procedure. Firs accounting by category of expense (salaries, supplies, etc.) and then accounting by activity, e.g. en-rout services, and approach and aerodrome control services, and/or location (in simpler accounting systems), e.g. are control centre, approach control office and individual airports, to which the expenses relate. Depending on th accounting system in use it may be more appropriate t complete these two steps separately, recording expens items in a general accounting system and allocatin expenses by activity and location in a separate costin system.

3.54 Accounting by category of expense is simple since each expense incurred can as a rule be entere under one item, e.g. the purchase of paper can be entere under supplies. However, the shortcoming of this metho is that it does not permit management to be aware of th costs incurred for each of the major activities (are control, and approach and aerodrome control) carried ou by the entity providing the air navigation services, b that for example a civil aviation administration or a autonomous authority. This is even more important whe considered in the context of cost recovery for ai navigation services (for example through route ai navigation services charges, approach and aerodrom control charges and/or charged to an airport).

3.55 Accounting for expense by activity and location is more complex where each expense i allocated to the air navigation activity and location, e.g the cost allocation of an air traffic controller's salary would depend on where the individual worked and/or th nature of the activity performed (such as in an are control centre; an approach and departure control offic or at a specific airport).

Accounting by category of expense

3.56 Basic financial accounting is performed by category of expense and usually follows professiona accounting standards and statutory requirements. Th

detail will vary according to local practice but the following are likely to be the minimum required for published accounts.

Staff expenses . . . . . ----
Other operating expenses . . . . . ----
Depreciation . . . . . ----
Interest . . . . . ----
Extraordinary/abnormal expenses . . . . . ----
Taxes . . . . . ----

Total expenses after tax . . . . . ___

Further particulars on what should be included in individual expense categories are contained in the following paragraphs.

Staff expenses

3.57 This would include all categories of direct remuneration (including overtime and allowances). In addition it would include social security costs, pension contributions and other staff-related expenses. Depending on the practice in individual States, training may be included in this category or as part of the other operating expense category.

Other operating expenses

3.58 This would include general and administrative expenses such as the cost of utilities (e.g. electricity, water), legal fees and insurance, rent and rates, telecommunications services, contracts for purchased services, including where applicable meteorological services as well as repairs and maintenance, research and development, leasing charges, other third party services and contributions to relevant international organizations which may also need to be recorded. Depending on the practice in individual States, major items of expense in this category might be separately identified in published accounts.

Depreciation

3.59 Depreciation is the decrease in the value of an asset due to wear and tear through use, action of the elements, inadequacy or obsolescence normally over a predetermined period of time (depreciation period/book life of the asset).

3.60 The term "depreciation" is often used interchangeably with the term "amortization". The terms have the same meaning although depreciation is generally used in relation to tangible fixed assets while amortization is generally used in relation to intangible fixed assets, e.g. a patent or copyright.

Interest

3.61 This would refer to interest on all debt used for the funding of the entity's working capital and investment programme. In some States accounting conventions may require the deduction of interest received from interest paid to arrive at a net interest expense.

Extraordinary/abnormal expenses

3.62 Extraordinary expenses are attributable transactions or events of a type outside the ordinary operations of the entity and are not of a recurring nature. Abnormal (or exceptional) expenses are those considered abnormal by virtue of their size and effect on the operating result and are separately identified in order to give a "true and fair" view of the entity. Depending on the practice in individual States abnormal expenses may be shown before or after tax.

Taxes

3.63 This category generally includes direct taxes payable on operating profit. Indirect taxes such as property taxes, license fees and stamp duties will normally be included in the "other operating expenses" category.

Expenses by activity and location

3.64 An advanced accounting system designed to allocate the costs of providing air navigation services requires that every category of expense (such as those just described) be reviewed and attributed to clearly defined activities and locations, taking account of the structure of the air navigation services organization and the way that the services are provided to users. Such activity-based costing may be undertaken within the general accounting system or may be done in a separate system which draws on (or is linked to) the recording of expense items in the general accounting system. A simpler accounting system would allocate costs at a more aggregate level. (Such an approach is described at 3.69 and 3.70). Cost allocation is undertaken to assist the management of the air navigation services organization to understand and monitor costs and to establish the costing of services for the purpose of recovering those costs from users. Care must be taken to define and

maintain appropriate criteria for allocating costs to activities and locations. For example, the expense item for salaries paid to maintenance staff (as recorded in the general accounting system as part of staff expenses), needs to be allocated both by activity (e.g. maintenance of navigation aids, radar or communication facilities) and the location where the maintenance work is undertaken (e.g. an airport). Categories of expense can relate to more than one activity or location (e.g. the salary for air traffic controllers serving more than one location or activity will need to be allocated between those locations and activities on a proportional basis using operational criteria such as staff hours or aircraft movements). Allocation criteria should be reviewed periodically to reflect changes in the way that air navigation services are undertaken. Cost allocation can be done at the same time that categories of expense are recorded in the general accounting system or can be done periodically (e.g. monthly or six monthly) as required. (Further details on cost allocation are in Chapter 4.)

3.65 An example of classifications which could be used for recording the costs by air navigation service activity is as follows (this list is not intended to be exhaustive, the number and definition of categories should be determined with the needs of the air navigation service organization in mind):

Air Traffic Services
- aerodrome control services
- approach control services
- en-route services
- flight planning and flight information services

Engineering and Maintenance Services
- communication facilities
- navigation aids
- radars
- flight calibration

Administrative Services
- executive management
- finance management
- human resource management

The initial allocation of costs by activity may be geared to internal management requirements. Some costs, such as administrative services costs, and even engineering and maintenance costs, may need to be further allocated to the broader categorization of activity which is used by the air navigation service organization to determine the revenue targets it will use for the purpose of recovering costs from the users. This higher level categorization of activity could be, for example, en-route, approach control or aerodrome control services.

3.66 Allocation of costs by location would depend upon the deployment of facilities and staff by the air navigation services organization and the way that the organization provides services to users. Location-based costs may need to reflect the location at which a service is provided and not always the location at which the costs were incurred.

3.67 Cost allocated by activity and location will need to capture the more significant elements of operation and maintenance, and administrative costs so that, in broad terms, they include all related costs, including in particular staff expenses, the expense of power and any spares consumed by radars, receiving and transmitting stations, precision approach and landing aids (not applicable with regard to ACCs or FICs), VORs, NDBs and other equipment and facilities employed to provide air navigation services. Also, any payment made to any other organization for providing such or other services will need to be allocated.

3.68 Not mentioned in the preceding paragraph, but dealt with above under the heading "Accounting by category of expense", are depreciation, indirect taxes and possibly interest, and it should be understood that these costs will also need to be redistributed by activity and location. Moreover, an asset register should be kept (see also 3.76 below). This would not only provide a link between the physical assets and accounts but would also facilitate the allocation of depreciation to activities and locations.

Cost allocation by functional location

3.69 For the purpose of cost allocation an accounting system and supplementary financial information should, in line with the Council Statements in Doc 9082/4, paragraphs 32 and 33, record costs by the functional locations under which it is intended to redistribute the costs recorded in the main accounts, including those costs mentioned in 3.67 and 3.68. Thus, for example, salaries paid to maintenance staff would be entered both in the main account for staff costs and in the subsidiary accounts for different functional locations on a prorated basis, according to the hours of maintenance devoted to each. Entries in the main and subsidiary accounts would best be made at the same time in cases where any cost is of a non-recurring nature, but where

particular costs are repetitive, such as salary payments, and are attributable to more than one functional location, the necessary cross-entries to subsidiary accounts may be made periodically, say monthly, to economize on the work of prorating.

3.70 A useful classification of subsidiary accounts for an accounting system recording costs by air navigation services functional location, would be as indicated below:

Area Control Centre
(or Flight Information Centre) A . . . . . ----
Area Control Centre
(or Flight Information Centre) B . . . . . ----
Approach Control Office A . . . . . ----
Approach Control Office B . . . . . ----
Airport A — Air traffic services . . . . . ----
Airport B — Air traffic services . . . . . ----
Airport c — Air traffic services . . . . . ----

Total expenses . . . . . ——

The area control centre costs would generally correspond with en-route services; the approach control unit costs generally with approach control services; and airport costs generally with aerodrome control services.

Other aspects of expense accounting

3.71 From the foregoing explanations it will be clear that the two expense recording systems described may be regarded as complementary and progressive steps in the development of an accounting system, the accounting for expenses by functional location being in essence a regrouping of an accounting system recording expenses by category. In the case of the latter, the individual accounts referred to under category of expense above represent a basic minimum and where greater accounting detail is called for, as will generally be the case, their further subdivision into sub-items will be necessary. Staff expenses, for example, may be subdivided into direct remuneration, social and medical insurance, pension fund payments, etc., and further subdivided by employee group or functional location, etc. Similarly other main items may be broken down into numerous other accounts.

3.72 Purchases give rise to special questions since they can be treated either as capital assets or as expenditure. The choice of treatment is normally found in national accounting standards or possibly in guidelines and policy decisions of the entity providing the air navigation services. In reality there are two basic reasons for capitalizing expenditure: firstly to enable a charge to be made against future income for the use of the asset and secondly to arrive at a reasonable value for assets with unexpired lives after one year. The policy decision is normally framed in terms of a statement to the effect that at a certain level of expenditure an item will be capitalized. It could state that it is a policy that expenditures on a durable item will be capitalized at a certain level of expenditure and where the asset life of the item concerned extends over a certain specified period of years. This is normally followed by a list of examples to guide administrators in the application of the policy statement. With this type of policy statement, all expenditure is predetermined as either asset account or expense account items.

Monitoring financial performance

3.73 If the entity providing air navigation services is an autonomous authority it will not only prepare a revenue and expense statement and balance sheet to meet statutory requirements but is also likely to analyse the financial results of the different parts of its activities represented by smaller self-contained operating units such as cost centres or profit centres. For example a provider of air navigation services may wish to analyse the extent to which its operating results are attributable to continental and/or oceanic en-route services, approach control and aerodrome control services. In addition the entity concerned is likely to present its operating results on a regular basis throughout the year e.g. monthly or quarterly, to enable managers to review the financial performance of their operations. As far as the revenue and expense statement is concerned the entity will probably need to show how an excess of income over expenditures (or expenditures over income) from the operations of the air navigation services provider is treated in its accounts.

Assets, liabilities and equity

3.74 The systematic presentation of assets, liabilities and equity (including retained earnings) in the form of a balance sheet is a less common practice among providers of air navigation services than the preparation of statements of revenues and expenses. An important reason is that most entities providing air navigation

services are not operated as autonomous authorities or private companies, but rather as part of a government department or agency whose accounting requirements normally do not call for preparation of a formal balance sheet. However, when public or other autonomous bodies provide air navigation services, they would be expected to provide this type of information, and in many instances there would in fact be a statutory requirement for them to do so.

Assets

3.75 An asset is a resource from which future economic benefits over several years are expected to flow to the air navigation services organization that owns or controls it. It is held by an organization for use in the production or supply of goods and services or for administrative purposes on a continuing basis and is not intended for sale in the ordinary course of business.

3.76 While information on assets and liabilities may not generally be as readily available as revenue and expense data, any management of an entity providing air navigation services should have certain basic compilations of such data at its disposal. In order to identify and value correctly the fixed assets used for providing air navigation services it is necessary to maintain an asset register. This will contain such information as date of purchase, asset category, commission date, cost and depreciation period, method and rate of depreciation and location and type of service provided e.g. en-route, approach control or aerodrome control service. The register should provide the essential link between the balance sheet of the financial accounts and the physical location of the assets. It will also provide an audit trail and a control over the depreciation charge calculated.

As far as assets are concerned, the most significant items would generally be as follows:

Current assets . . . . . ----
Investments and other special funds . . . . . ----
Depreciated value of fixed assets . . . . . ----
Other assets . . . . . ----

Total assets . . . . . ___

Further particulars on what should be included in individual asset items are provided in the following paragraphs.

Current assets

3.77 These refer to those assets that can be realised within one year and are therefore readily available to discharge liabilities. Current assets less current liabilities represent the working capital of the entity (see working capital below).

3.78 Current assets include cash and bank balances available; accounts and notes receivable due within one year (less reserves provided for bad debts); notes and short-term investments also due within one year; interest and dividends receivable; grants due from public funds; the cost of all tools, materials, supplies, etc. in stock; and any amounts expended on uncompleted work for others; prepayments of salaries, insurance, interest and taxes; and other current and accrued assets.

Investments and other special funds

3.79 Special funds include any funds that may be specifically set aside (in special bank accounts, investments, etc.) to provide for such future commitments as additions and improvements to existing fixed assets.

3.80 Investments include any investment (e.g. bonds and long-term notes) other than those already included under "special funds".

Depreciated value of fixed assets

3.81 This refers to the aggregated book value of all fixed assets as depreciated up to the end of the current year. It refers to items that are permanent in nature and generally held for a period greater than one year.

Liabilities

3.82 As to liabilities (defined as a future financial obligation to be extinguished by the organization), the most significant items would usually be the following:

Current liabilities . . . . . ----
Long-term debt:
owing to governments (federal, provincial, municipal, etc.) . . . . . ----
owing to others . . . . . ----
Other liabilities . . . . . ----

Total liabilities . . . . . ___

Further particulars on what should be included under current liabilities and long-term debt are provided below.

Current liabilities

3.83 These include accounts and notes payable due within one year; salaries and wages accrued and unpaid; interest, dividends, insurance and taxes accrued and unpaid; other current and accrued liabilities. They represent any account which an organization is legally bound to pay and are claims by outsiders on the assets of an entity. They are part of the working capital of the organization (see working capital below).

Long-term debt

3.84 Long-term debt includes the value (excluding accrued interest) of mortgages, bonds, trust certificates, debentures, notes and other long-term debt (i.e. contracted for a term exceeding one year) issued or taken on by the air navigation services organization, but held by others.

Capital

Equity

3.85 For both a public sector organization adopting commercial accounts and a private sector company, the equity of the air navigation services organization including the reserves (e.g. retained earnings) that have not been distributed is equal in amount to the sum of total assets minus total debt.

Working capital

3.86 Working capital facilitates the working or running of the organization and is the difference between current assets and current liabilities. It is also known as net current assets. The amount of working capital and its nature can vary according to the type and nature of the business.

Capital employed

3.87 In the case of an autonomous air navigation service organization, which has a comprehensive balance sheet, it is possible to determine a value for capital employed. There is no single generally accepted definition of capital employed because its composition depends on the use to which it is put. It may be defined in terms either of the capital invested in the air navigation services organization or of its assets. The alternatives are shown in the table below. In some cases the total cost of fixed and current assets can be reduced by non-interest bearing liabilities.

3.88 Some autonomous organizations are required to achieve a financial return. This can be expressed as a percentage of capital employed and is sometimes referred to as the return on capital employed (ROCE) or return on assets (ROA). When used in this way it is usual to measure the return as profit before interest and tax. As the return relates to a period of time (e.g. ore year) it is also more appropriate to define capital employed as the average over this period rather than at a particular point of time (e.g. end of the year). It is usually adequate to use the average of the opening and closing figures of capital employed over the period.

Capital definition	*Equivalent asset definition*
Total capital share capital reserves long-term debt current liabilities	Fixed assets plus current assets
Long-term capital share capital reserves long-term debt	Fixed assets plus net current assets (i.e. current assets minus current liabilities)
Equity/shareholders' capital share capital reserves	Fixed and net current assets minus long-term debt

Cash Flow

3.89 As in the case of a balance sheet, where public or other autonomous bodies provide air navigation services they would be expected to provide a statement of cash flows and in many instances there would be a statutory requirement for them to do so.

3.90 The statement of cash flows helps to measure the financial performance of the air navigation services organization by showing its ability to provide services whilst generating sufficient funds or cash inflows to cover its cash outflows including payments for interest on borrowings and, when applicable, payments made to shareholders. This information is not provided by the revenue and expense statement or the balance sheet on their own, since they are usually prepared on an accrual accounting basis which adopts the principle of matching income generated against the liability for expenditure in the period concerned. This is normally achieved through adjusting the cash flows. Any net gains or losses for the period can also be defined in terms of changes in assets and/or liabilities thus representing a movement in the net financial worth of the air navigation services organization.

3.91 There is a requirement for information on the liquidity, viability and financial adaptability of the air navigation services organization concerned. This can be measured by a statement of cash flows in conjunction with the balance sheet. The balance sheet provides information about an organization's financial position at a particular point in time including assets, liabilities and long term debt and their relationship with each other at the balance sheet date. Information concerning the organization's liquidity is usually incomplete because the balance sheet is drawn up at a particular point in time. A statement of cash flows on the other hand shows information about the reporting organization's cash flows in the reporting period, the objective being to show the organization's cash generation and cash absorption for the period concerned. It is not a replacement for the revenue and expense statement and balance sheet and indeed when assessing future cash flows it is prudent to use all three statements in order to ensure that likely cash flows generated from earlier transactions are accounted for.

3.92 The statement of cash flows analyses the cash flows under standard headings such as operating activities, returns on investments and servicing of finance, taxation, investing activities and financing. The objective is to ensure that cash flows are reported in a form that highlights the significant components of cash flow and facilitates comparison of the cash flow performance with other entities. A suggested layout for a statement of cash flows is shown in Table 3-1.

3.93 It is worth noting that the term "cash equivalent" includes financial instruments that are highly liquid and convertible into known amounts of cash without notice and do not have any significant risk of changes in value owing to changes in interest rates. Statements of cash flows have largely superseded working capital-based sources and application of funds statements. This is because cash flow is more widely understood and is more transparent in identifying movements relevant to the liquidity and viability of an entity. An example of this is that a decrease in cash available may be masked by an increase in stock or debts.

C. MEANS OF MEASURING PERFORMANCE AND PRODUCTIVITY

Introduction

3.94 Performance and productivity factors are an important management tool not only for the use of air navigation services providers but also for the regulator and the user.

3.95 It is widely recognized that there is a need for organizations providing air navigation services to have a means of measuring performance in order to achieve higher levels of productivity and cost effectiveness and to permit senior management to analyse changes in performance over time, to identify areas needing attention and, where necessary, to take remedial action. It also assists in preparing realistic financial and operational plans in order to meet future capacity requirements and in setting specific targets for individual managers. It should be stressed, however, that the primary purpose of such measures is the assessment of performance over time within an air navigation services organization.

3.96 In choosing parameters for measuring performance, emphasis should be placed on measures which indicate productivity changes — that is, measures which relate output to input. Recognition should also be given to the paramount importance of air safety in seeking productivity improvements.

3.97 Precautions must be taken if comparisons are to be made between systems or organizations, be they

Table 3-1. Suggested layout for a statement of cash flows

YEAR:

ENTITY

Statement of cash flows for the year ended:

Net cash inflow from operating activities	-----	
Returns on investments and servicing of finance:		
Finance lease liabilities paid (a)	-----	
Interest received	-----	
Interest paid	-----	
Dividends paid (b)	-----	
Taxation		
Corporation tax paid (c)	-----	
Other tax paid	-----	
Investing activities		
Payments to acquire intangible fixed assets	-----	
Payments to acquire tangible fixed assets	-----	
Receipts from sale of tangible fixed assets	-----	
Net cash outflow from investing activities		-----
Net cash outflow before financing		-----
Financing		
Issue of ordinary share capital (d)	-----	
Repurchase of debenture loan (e)		
Proceeds from long-term borrowings		
Net cash inflow from financing		-----
Increase/(decrease) in cash and cash equivalents		-----

(a) Rental payments over the term of a finance lease.
(b) The payment, made usually at least annually, to the holders of equity in the organization.
(c) As payable by an autonomous organization
(d) This will only apply to an organization that is a publicly incorporated company.
(e) Relates to changes in the levels of equity by the owner of the organization.

international or regional. Performance and productivity indicators (PPI) are primarily intended for monitoring developments within one given organization. If comparisons are to be made between different organizations or States, the differences in operational, structural and organizational situations must be adequately reflected. It is therefore of major importance to first create a level field for comparison by means of indicators reflecting system and airspace complexity. Only clearly defined qualifications such as those outlined in 3.106 below would allow any degree of system comparisons.

Choice of measures

3.98 The basic parameters for a choice of performance measures should be that:

a) the data can be easily obtained within a reasonably short time after the event;

b) the data be simple enough to be readily understood by non-experts, who may not be engaged in the day-to-day management of air navigation services but who are involved in the making of key decisions affecting them;

c) the data be as immune as possible to the influence by factors which are not central to the operation of the air navigation services as a business; and

d) as wide a coverage as possible of the various aspects of the air navigation services be provided.

3.99 The performance measurements system should be an integral part of the over-all management system — not something imposed after the system has been established. Individual managers should be aware that it is their areas of responsibility that are being measured. Thus performance measuring should be specific to main functions within each cost centre.

3.100 This section addresses means of measuring productivity of ATS and COM. It also addresses to a lesser degree means of measuring productivity for AIS and aeronautical MET services. Clear definition of terms and abbreviations used, and guidelines on how they should be applied are an absolute necessity and should be developed in consultation and co-operation with users.

3.101 For services provided by a third party (e.g. MET), performance indicators should also apply. Where appropriate, performance measurements should reflect the concerns of the regulator, and be included as part of any contractual liabilities.

Factors to be considered

Measurement of quantity

3.102 The main ATS/COM units of production are distance travelled between designated points in the airspace or time in the system and number of aircraft movements. This can be affected by system sophistication (e.g. type of navaids, radar), automation and staffing levels.

3.103 Main AIS and MET units of production are the specific products and services provided (e.g. forecasts, NOTAM) and thus are more tangible than the ATS/COM units of production.

Measurement of quality

3.104 One way of measuring ATS quality would be to consider the number of Air Traffic Incident Reports (ATIR) involving controlled traffic in a designated system over a certain period of time. In addition, deviation from standard or optimum times for a certain distance can provide information on operational efficiency (although it should be noted that delays can be caused by many factors other than and unrelated to ATS). These data can be obtained as a byproduct if the structure of performance measuring is based on time in the system or distance travelled.

3.105 Measuring the performance of aeronautical fixed services (AFS), aeronautical mobile services (AMS) and navigation aids could be related to the reliability and availability of the facilities while AIS quality could be measured by the number of reported errors in charts, NOTAM issued, etc. MET quality could be measured through standard verification procedures for certain services.

Complexity indicators

3.106 ATS systems can differ considerably in the level of their complexity. To express this variation, complexity indicators or factors have to be developed to reflect the effect of the nature of traffic, traffic volume

and density, the route network and the number and location of airports. Other relevant elements such as traffic mix, traffic flow and peaks, airspace utilization and organization, and co-ordination procedures should also be taken into account. Complexity indicators can then provide valuable input to management for overview of ATC system requirements and functionality as well as data for evaluating performance. They are an absolute prerequisite for comparisons between organizations and/or States.

Units of measurement — Output

3.107 ATS/COM, AIS and aeronautical MET units of output or production all consist of interrelated quantitative and qualitative components. In the case of AIS, both quality and quantity can be measured with relative ease, e.g. AIP pages, NOTAM, maps, etc. In the case of ATS/COM and MET, quantity can be measured easily, e.g. number of flights and forecasts. For ATS/COM, however, the qualitative output incorporates flight safety and operational efficiency of a system and thus is more difficult to measure. Similarly, qualitative output of MET services is often difficult to measure in terms of accuracy and timeliness.

3.108 The other major items of "output" are financial. They comprise revenue, which should be divided between revenue from route air navigation services charges, approach and aerodrome control charges and other ATS charges (e.g. for charts, etc.). Where possible, these should be subdivided into their components in order to be able to isolate those items that are susceptible to short-term change as a result of management action.

Units of measurement — Input

3.109 The major units of input are capital, operating costs and staff numbers. Capital can be measured through value of assets. Operating expenditure and staff numbers are straightforward to measure. All monetary measures, when viewed over time, should be adjusted for inflation.

Performance measures

3.110 In order to maintain management control and to enable the reasons for changes to be identified and remedial action to be taken if necessary, regular management accounts should be kept which analyse performance in detail. The degree of detail required will vary according to the size and complexity of he organization but the objective should be for each individual manager to have access to information that enables him or her to monitor the performance of those aspects of the operation that are his or her responsibility.

3.111 An important point to make is that it is not essential to have very sophisticated information systems in order to start performance measurement. Virtually any organization can provide data on a sufficient number of items for a start to be made. Refinement can then be added as required. Formal performance measurement systems should be sufficiently general in scope to enable observation and analysis over periods of time in order to obtain clear trends.

3.112 Having assembled the relevant items of input and output, performance can be measured by means of ratios such as those in Table 3-2 below. It should be emphasized that these measures are not exhaustive and will not all necessarily be relevant for all ATS providers. They are given as guidance only.

Table 3-2. Performance measurement ratios

	Over-all ratios		*Complementary ratios*	
En-route related	total costs	per 100 km flown	cost	per aeronautical MET product/service
	total revenue	per air traffic controller (ATCO) and/or unit		
	km of IFR traffic	per ATCO	cost	per AIS product/service
	total investments	per 100 km flown	number of AIS reporting errors	per month or year
	ATS/COM costs	per 100 km flown	MET verification scores	per month or year
	MET costs	per flight	number of ATIRs	per month or year
	AIS costs	per departing flight or per 100 km flown	actual versus optimal time	per defined distance or city pair
	other costs (test, training, administration, etc.)	per 100 km flown		
Approach and aerodrome control	total costs	per ATCO and/or movement	MET briefing and flight document costs	per departure
	total revenue	per ATCO and/or movement		
	departures + arrivals	per ATCO	MET costs	per airport
	total investments	per ATCO and/or movement	TAF/TREND message cost	per airport
	ATS/COM costs	per departing/arriving flight	AIS costs	per product/service
	MET costs	per departing/arriving flight	number of AIS reporting errors	per month or year
	AIS costs	per departing/arriving flight	MET verification scores	per month or year
			number of ATIRs	per month or year
			actual versus optimal time	per defined distance or city pair

Chapter 4

DETERMINING THE COST BASIS FOR AIR NAVIGATION SERVICES CHARGES

INTRODUCTION

4.1 This chapter describes the practical application of financial data for the particular purpose of determining the cost basis for air navigation services charges, the itemization of which was addressed in Chapter 3 in the context of accounting. The chapter is divided into five main sections. *The* first — *Inventorying the facilities and services* — focuses on the inventory that needs to be drawn up of all the air navigation facilities and services that directly provide services for aircraft en route as well as approach and aerodrome control. The second main section — *Determining costs* — provides general comments on the approach to this task with respect to air navigation services charges and outlines factors to be taken into account in establishing the cost basis for such charges.

4.2 The third main section — *Allocation of costs* — deals with the allocation of costs of air navigation services to non-aeronautical in addition to various aeronautical functions focusing in the case of the latter on such functions as airport and en-route utilization, service location, and categories of users, for which it also outlines parameters that could be considered relevant. The fourth main section — *Cost basis for individual air navigation services charges* — addresses the establishment of individual air navigation services charges i.e. route air navigation services charges and approach and aerodrome control charges, as well as the basis for the contractual payments for approach and aerodrome control provided for an airport. The fifth main section — *Special costing considerations pertaining to CNS/ATM systems* — refers to a number of issues which are pertinent in that context.

A. INVENTORYING THE FACILITIES AND SERVICES

General

4.3 The first step in determining the costs of air navigation services is to draw up an inventory of all facilities and services that directly provide services for aircraft en route as well as during the approach and aerodrome phases, whether exclusively, or in addition, to any service provided for non-aeronautical purposes. Some facilities may serve more than one function, that is aerodrome and/or approach and/or en-route control functions. If possible, a methodology should also be developed to classify or group sections of the inventory identifying them with the civil aviation units providing the services (e.g. area control centre, communications station etc.). Where any of the facilities and services being listed are provided for and implemented under the ICAO Regional Air Navigation Plans, supplemented where necessary pursuant to the recommendations of relevant ICAO Regional Air Navigation Meetings and as approved by the Council, these should be so identified as should any other facilities and services provided at the request of aircraft operators. This is because the Council Statements advise that when the cost basis for air navigation services charges are being established the costs to be taken into account should be the costs assessed in relation to these facilities and services. (Doc 9082/4, paragraph 34 (ii) refers). The Statement!, also recommend that "The costs of air navigation services provided during the approach and aerodrome phase of aircraft operations should be identified separately" (Doc 9082/4, paragraph 34 (iii)). It is also important, however, that when facilities cease to be provided for in the relevant ICAO Regional Air Navigation Plan, the costs of such facilities should no longer be included in the cost basis for charges.

4.4 The administrative and common services associated with the provision of air navigation services, although not suited for inclusion in the inventory, are also to be taken into account in the costing process, as indicated in the following Section B — *Determining costs.*

4.5 The more important components to be included under each of the five broad categories of facilities and services, i.e. ATS, COM, MET, SAR and

AIS, are described below. With regard to the description below of the ATS and COM categories, it should be noted that they are addressed within the framework of ATM and CNS, which are broader in scope than ATS and COM (see Chapter 2, 2.4). However, unless addressing the CNS/ATM systems specifically, the guidance in the manual is based on the traditional classification of ATS and COM because cost determination is expected to continue to be based thereon for some years to come in the large majority of States. With regard to the actual provision of facilities and services it should be noted that the same authority or entity may often provide two or more major categories of facilities and services e.g. ATS, COM and AIS.

Air traffic management (ATM)

4.6 ATM is divided into air traffic services (ATS), air traffic flow management (ATFM) and airspace management (ASM), with ATS being the primary component. The functional integration between airborne and ground-based ATM system elements is not relevant in the context of this manual and consequently not further described below.

4.7 ATS comprises air traffic control service (area control service, approach control service, or aerodrome control service), flight information service (including air traffic advisory service), and alerting service.

4.8 ATS facilities for en-route operations consist primarily of area control centres (ACCs), including oceanic area control centres (OACs), or flight information centres (FICs) and their associated equipment and staff. Thus included are the premises of the centres, the equipment — including, where employed, flight and radar data processing equipment — and the air traffic services personnel used to carry out ATS functions. Communications equipment used by controllers for communication with centres located in adjacent FIRs, or with aircraft, should be listed under AFS and AMS respectively (see 4.13).

4.9 ATS facilities for approach and aerodrome control consist primarily of approach control offices, or working positions integrated in ACCs, and aerodrome control towers, their associated equipment, including any flight and radar data processing equipment and surface movement guidance and control equipment.

4.10 Implementation of the CNS/ATM systems will with regard to ATS principally require extensive use of computers and associated software.

4.11 ATFM is typically organized with a centralized flow management unit (CFMU) serving an extensive geographical area covering a considerable number of flight information regions (FIRs). A flow management unit (or flow management cell), with dedicated equipment and personnel resources, is established in each participating ACC to co-ordinate ATFM measures with CFMU.

4.12 ASM comprises both strategical and tactical functions. The tactical function is at some places operated from a special working position at an ACC. In other cases it may be a part of a team-leaders' job, requiring then negligible resources.

Communications, navigation and surveillance (CNS)

4.13 CNS includes communication facilities, navigation services and surveillance systems. The communication facilities may broadly be classified under two main categories: aeronautical fixed service (AFS) and aeronautical mobile service (AMS). The aeronautical telecommunication service (COM) category in the traditional classification differs in scope from the communication component of CNS in that navigation aids are included in COM.

4.14 AFS is a telecommunication service provided between two or more fixed points for the transmission of messages, intended primarily for the safety of air navigation and the regular, efficient and economical operation of air services. It comprises all facilities and personnel employed to provide this service. Examples of AFS are AFTN/ATS, the ground part of ATN and ATS direct speech and data circuits.

4.15 AMS provides a radiocommunication service between aircraft stations and ground stations, or between aircraft stations. For the purposes of determining the costs of providing air navigation services, AMS is assumed to comprise all ground-based facilities and personnel engaged in air-ground communications and radiotelephony broadcasts such as ATIS and VOLMET (i.e. VHF and HF transmitting and receiving stations). Implementation of AMSS, as well as other ATS air-ground links and other communications sub-networks of the future ATN, will add satellites or satellite transponders and associated ground earth stations and may in fact gradually replace some of the above-mentioned facilities and services.

4.16 Navigation services basically comprise ground-based radio navigation equipment (e.g. VOR, DME and NDB) and precision approach and landing aids (e.g. ILS equipment). Implementation of GNSS will add the satellite constellations providing the standard signal positioning service and the associated augmentation systems required, i.e. satellite-based (wide-area) and ground-based (local area) augmentations, which will eventually replace most of the above-mentioned equipment.

4.17 The surveillance systems comprehend primary surveillance radar (PSR), secondary surveillance radar (SSR), including SSR Mode S, surface movement radar (SMR) as well as automatic dependent surveillance (ADS), including the supporting network and maintenance personnel.

Meteorological services for air navigation (MET)

4.18 Meteorological services for air navigation comprise the services provided in accordance with ICAO provisions in Annexes, Procedures for Air Navigation Services (PANS) and Air Navigation Plan Publications (ANPPs). These include meteorological observations, reports and forecasts, briefing and flight documentation, SIGMET and AIRMET information, world area forecast system (WAFS) digital grid point data for computerized flight planning, meteorological information for inclusion in broadcasts (such as VOLMET and OFIS), aeronautical meteorological telecommunications (if not included in COM) and any other meteorological data required from States for aeronautical use. The facilities required to provide such services include world area forecast centres (WAFCs), regional area forecast centres (RAFCs), volcanic ash advisory centres (VAACs), tropical cyclone advisory centres (TCACs), meteorological watch offices (MWOs), aerodrome meteorological equipment for aeronautical purposes (including observational instruments) and telecommunications equipment for aeronautical meteorological purposes. Additionally, it may be appropriate to include in the inventory various supporting facilities and services which also serve meteorological requirements in general, among these being surface and upper-air observation networks, meteorological telecommunication systems, data processing centres and supporting core research, training and administration. In the case of such general-purpose facilities and services an appropriate allocation of the costs involved between the aeronautical and non-aeronautical needs served will have to be determined.

4.19 Furthermore there are additional services specified and agreed by the national aviation authorities, in consultation with the meteorological authority and users. Any additional special facilities or services provided at the request of a single or limited number of users are deemed to be outside these arrangements and should be charged to the user(s) concerned. Further guidance on the identification of facilities and services serving aeronautical MET is contained in Appendix 6 — *Guidance for determining the costs of aeronautical meteorological service.*

Search and rescue (SAR)

4.20 Search and rescue in the context of these guidelines refers to search and rescue services provided to aviation. Search and rescue services facilities comprise rescue co-ordinating centres (RCCs), rescue sub-centres (RSCs) if any, long, medium and short-range aircraft (including helicopters and ultra-long range or extra-long range aircraft), rescue boats and vessels, mountain rescue units and any other units, forces or facilities which are designated primarily or exclusively, or which are available to perform aeronautical search and rescue functions when required. In preparing the inventory it will be useful to identify clearly those particular SAR services which, in accordance with Doc 9082/4, paragraph 33 (see Appendix 3 of this manual) and Appendix 2, may appropriately be taken into account in arriving at the cost base for any related charges assessed against international civil aviation. Appendix 2 of Doc 9082/4 identifies the services concerned as being those associated with "any permanent civil establishment of equipment and personnel maintained for the purposes of providing such services". Moreover, note should be taken of paragraph 30 (ii) of Doc 9082/4 where the Council recommends that States should "refrain from imposing charges which discriminate against international civil aviation in relation to other modes of international transport".

Aeronautical information services (AIS)

4.21 Aeronautical information services have the objective of ensuring the flow of information necessary for the safety, regularity and efficiency of air navigation. Aeronautical information services comprise the staff, facilities and equipment employed to collect, collate, edit, publish, and distribute aeronautical information concerning the entire territory of a State as well as any

other areas for which it has undertaken to provide air navigation services. Included are the preparation and dissemination of Aeronautical Information Publications (AIPs), Notices to Airmen (NOTAM), Aeronautical Information Circulars (AICs) and the provision of plain language pre-flight information bulletins to flight crews as part of the pre-flight information service. As with the inventorying of SAR services, and for the same reasons, it will be useful to have the inventory identify clearly those items which are associated with a permanent civil establishment and thus fulfil the condition stated in Doc 9082/4, Appendix 2.

B. DETERMINING COSTS

Introduction

4.22 It is essential that all costs be determined in accordance with generally accepted accounting and costing principles (i.e. they must be based on recognized rules, standards or conventions) to permit the costs of service operations to be recorded and analysed in accordance with their nature and origin. It is recognized, of course, that practices and procedures will differ from State to State.

4.23 In order for civil aviation administrations, or the entities responsible for levying air navigation services charges, to establish the full costs of air navigation services, it will be necessary for them to include all the costs incurred. This includes not only the costs of such facilities and services that they provide themselves, but also the costs of those that may be provided, wholly or in part, by any other department or agency of the government or any other entity without any corresponding charge being made to the civil aviation administration or the charging entity.* The following guidelines are intended to apply equally to any facilities and services regardless as to which entity provides them, it being assumed that when they are not responsible for the provision of facilities and services, civil aviation administrations or the charging entities will take appropriate steps to ensure that the relevant cost data are made available to them for the costing task. Care will also be needed to ensure that the computation of total air navigation services costs attributable to en-route operations includes costs of any facilities and services located physically at an airport but serving en-route traffic (e.g. an ACC or radio navigation aid). Equally, it needs to be ensured that such costs are not counted doubly as an airport cost as well, and hence improperly also included in the cost base for charges levied for the use of facilities required for airport operations. The reverse of course applies to any services utilized during the airport phase of aircraft operations but provided by facilities or services that primarily serve aircraft during the en-route phase of operations.

4.24 In arriving at the cost base for air navigation services charges on civil aviation, the costs of any air navigation services provided exclusively for military or other State functions should be excluded. Where civil or military facilities serve both civil and military functions, the cost share allocable to civil aviation should be determined to ensure that no costs which are allocable to military functions are included in the cost base for air navigation services charges *on* civil aviation.

4.25 Once the costs of all the air navigation services provided have been established, the portions attributable to en-route utilization and approach and aerodrome control utilization may need to be identified. This would apply, in the interest of equity, where more than one type of utilization was involved and the intent was to recover the costs of the air navigation services from users. Furthermore if different route air navigation services charges are involved (different charges in different FIRs) the share of the en-route costs attributable to each of the FIRs concerned would need to be established. Similarly the total approach and aerodrome control cost portion may need to be allocated to each airport served. This is particularly relevant where the approach and aerodrome control services are being provided under contract with the airport(s) concerned.

4.26 The costing approach outlined in the preceding paragraph can also be summarized in a schematic manner such as that shown in Table 4-1. Each of the stages shown is further discussed below but it should be stressed that the identification of costs by each

* When any facilities or services are provided by another government agency or department on a rental or fee basis. the rental or fee charged will appear as an expense item in the accounts of the civil aviation administration and be taken into account, as appropriate. In such cases no separate additional calculation by that administration of the component costs (i.e. operation and maintenance, depreciation, etc.) will be involved, since these costs will be included in the rental or fee charged.

Table 4-1. An example of an approach towards determining the cost basis for air navigation services charges

Category of facility/service (a)	Costs incurred by entity providing ATS or levying charges before adjustments (b)	Transfers from/to others (government departments and/or commercial enterprises) (c)	Costs attributable to non-aeronautical utilization (d)	Costs attributable to State (incl. military) traffic (e)	Adjusted air navigation services costs attributable to civil aviation Total (f)	Costs attributable to en-route utilization (g)	Costs attributable to airport utilization			
							Approach control (h)	Airport A (i)	Airport B (j)	Airport C (k)
Air traffic services (ATS)		—	—	—	—	—				
Aeronautical telecommunications services (COM) (AFS, AMS and radio navigation aids)		—	—	—	—	—				
Meteorological services for air navigation (MET)		—	—	—	—	—				
Search and rescue (SAR)		—	—	—	—	—				
Aeronautical information services (AIS)		—	—	—	—	—				
TOTAL COSTS	=	=	=	=	=	=	=	=	=	=

*Notes.— 1. The extent **of** the breakdown **of costs** by category **of** facility or service will depend on the scope **of the** functions of the providing entity, the categories **of** users involved and the cost recovery system employed. Consequently no breakdown may be required in some instances.*

*2. Depending on the circumstances in the State concerned the best approach to determining the total costs **of** aeronautical telecommunications services (COM) may be to identify first and then add up the total costs **of** each **of** the three sub-categories involved i.e. AFS, AMS and radio navigation aids.*

category of facilities and services (ATS, COM, MET,etc.) may be a distant goal in many instances. For example, the entity providing ATS may also be providing certain COM services, notably mobile services and radio navigation aids as well as AIS. Considering the workload involved in identifying costs by category of facility or service, priority should not be given to that task but instead to ensuring that all costs incurred by the State concerned in providing air navigation services are included.

FACTORS TO BE TAKEN INTO ACCOUNT IN ESTABLISHING THE COST BASIS FOR AIR NAVIGATION SERVICES CHARGES

Difference between costs recorded in the accounts of an entity providing air navigation services and costs applied for determining the cost basis for charges

4.27 The accounts of an entity providing air navigation services constitute the basic reference for determining the cost basis for air navigation services charges. Where the accounts are very complete and where they cover all relevant categories of facilities and services, they can serve that purpose well. It may not be advisable, however, to rely only on the accounts when determining the basis for charges even when the accounts are very complete. This is because while the costs of operation and maintenance and administrative overheads would probably remain unchanged, the situation may be different with regard to depreciation and cost of capital. In the accounts, for example, assets may be depreciated according to government accounting standards which may not reflect the true operating life of the assets concerned, or they may not be depreciated at all. When the cost bases for charges are determined, it is necessary to ensure that a depreciation element reflecting the reduction in the value of the assets during the period concerned (usually the financial year) is included. This may result in the application of depreciation rates for charging purposes which differ from those reflected in the accounts. Also, cost of capital imputed on the net capital value of the assets of an entity providing air navigation services would normally not be reflected in its accounts but should be included in the cost basis for charges. The same practice should apply in those few instances when equity capital is involved.

Operation and maintenance costs and administrative overheads

4.28 Further to what was noted in the preceding paragraph, the descriptions provided in Chapter 3, Section B, 3.53 to 3.60, of the various items to be included in the published accounts, can also be used when the cost basis for charges are to be determined. Particularly where the entity providing air navigation services forms part of a civil aviation administration, however, it may be necessary to adjust these costs in circumstances such as those described below under *Implications of organizational structure*.

Depreciation and/or amortization and cost of capital

4.29 Further guidance on the inclusion of depreciation and/or amortization and cost of capital in the cost basis for charges on air traffic is presented in the following paragraphs. The text on depreciation is principally based on assets being recorded at historical costs.

Depreciation and/or amortization

4.30 The original value of an asset should be depreciated over its estimated useful life and such depreciation included in the annual costs of the service concerned. Land is not depreciated since, unlike other fixed assets, it does not deteriorate and its useful life is not limited. Depreciation charges should not commence until a facility is placed in service.

4.31 In calculating the amount of the costs chargeable for the depreciation of any item of equipment, it is appropriate to include in the figure established for this purpose the cost of installation and of any calibration and testing required to render the equipment operational. Similarly, cost of capital incurred on capital invested in fixed assets during their pre-operational phase should also be included, as should any non-refundable duties or taxes paid in conjunction with their acquisition.

4.32 While practices vary in the calculation of depreciation, the most commonly used methods are the straight-line method and the reducing balance method. The most common method used by national administrations, and also the simplest, is the straight-line method whereby depreciation is charged as a constant amount year by year during the book life of the asset concerned, the amount being determined by dividing the historical

cost of the asset (less its anticipated residual value, if any) by the expected number of years of its book life. The reducing balance method involves the application of a fixed percentage to the book value of the asset, i.e. the historical cost (see the following paragraph) less accumulated depreciation already charged, at the beginning of each accounting period. The actual amount of depreciation charged according to this method thus decreases each year. A third method used is the annuity method, where the depreciation charged to each year remains the same throughout the life of the asset concerned. It should be noted, however, that the amount charged when this method is applied includes cost of capital in addition to depreciation. Whatever depreciation method is used it should be consistently applied throughout the depreciation period of the asset.

4.33 The historical costs mentioned in the preceding paragraph refer to the cost of an asset at the time of its initial acquisition, to which should be added any subsequent improvements or additions thereto, less such proportion of this aggregate cost as is represented by any part of the asset disposed of since its acquisition. In those instances where the historical costs have not been recorded or are not available, an estimate of the cost of the asset concerned should be made. For example, in the case of equipment, this might be done by discounting the replacement costs of the equipment concerned over the period it has been in operation, or by using approximations based on the known costs of equipment with similar operational and technical characteristics, which performs the same or similar functions. Depreciation would then be regularly charged on the basis of that estimate during the remainder of the expected life of the asset concerned. Where depreciation is based on historical costs the total depreciation charged over time in respect of any asset should not, regardless of the depreciation method used, exceed 100 per cent of its historical cost. (See also 4.35 below.)

4.34 Sometimes a major improvement, involving significant investment costs, is made to a facility for such purposes as extending its operating life, increasing its capacity and/or widening its scope. When such an investment is made, particularly if it extends the operating life of the facility, it may be advisable to depreciate these costs separately. Alternatively, the costs could be added to the residual historical costs of the facility concerned and the new total depreciated over the new useful life of the facility concerned.

4.35 States experiencing high rates of inflation* may need to use alternative approaches to depreciation when, due to national legislation, such inflation cannot be compensated for by the application of internal cost of capital rates reflecting inflation. Such approaches should be based on general accounting practices and/or generally applicable legislation in the State concerned. An approach that may be used involves adjusting the undepreciated portion of the original book value of the asset concerned by increasing it by a percentage based on the rate of inflation, as measured by an official index, when calculating the annual depreciation charged.

4.36 If it becomes apparent, and only then, that the operating life of an asset being depreciated will be shorter than was anticipated when the original depreciation schedule was drawn up, an amount, in addition to the annual depreciation charge, may be added to compensate for such unexpected obsolescence or premature retirement. One of the following two methods may be adopted for this purpose:

a) the net book value of the asset may be written off over the remaining years of he revised operating life; or

b) the residual value of the asset (less any proceeds from its disposal if any) may be added in full, to the depreciation charged in the last year of the revised operating life of the asset.

In the context of premature retirement of assets, reference should also be made to the guidance on treatment of costs and cost recovery during GNSS implementation reproduced below in Section E, 4.91.

4.37 Because of the diversity of climatic and other physical, functional or economic factors determining the operating life of buildings and equipment in different geographical locations, it is not possible to suggest any specific rates of depreciation for general application. While individual States will need to decide on the most appropriate depreciation period(s) to be applied, available information indicates that major assets tend to be depreciated over the following range of depreciation periods:

Buildings (freehold)	20-40 years
Buildings (leasehold)** .	over the period of the lease

* Inflation is often defined as a general increase in prices and fall in the purchasing value of money.

** Buildings built on leased land.

Furniture and fittings	10-15 years
Motor vehicles	4-10 years
Electronic equipment (including telecommunications equipment)	7-15 years
General equipment	7-10 years
Computer equipment (hardware)	5-10 years
Computer software	3-8 years

Cost of capital

4.38 The cost of capital should be taken into account in the costing of the provision of air navigation services. This falls into two basic categories. The first is the interest paid to the providers of debt capital (other than equity; for equity see Chapter 3, 3.85), that is lenders for various financing purposes, usually in connection with the acquisition or provision of assets. The second is the appropriate cost of capital applied to equity. The cost of capital applied to equity to be used is a matter for the State (or other national economic regulator) to approve, taking into account the low financial risk of providing air navigation services. The government bond rate, or alternatively rates payable in financial markets by enterprises of comparable low risk, may be taken as a guide.

4.39 The cost of capital should be calculated annually on all capital invested in fixed assets, or other expenditures which should properly be written off over time, and on working capital. In the case of fixed assets, the cost of capital should be applied on net asset value. For other investments that are spread over a number of accounting periods, the cost of capital should be assessed annually on the net value; and in the case of working capital (net current assets) on the average value for the financial year.

4.40 In cases where depreciation has been adjusted for inflation (see 4.35 above), particular caution must he exercised in selecting the cost of capital to be applied. In such cases the rate should be a "net" rate which excludes any component reflecting the rate of inflation. This will avoid inequities resulting from compensation for inflation being included twice in arriving at total air navigation services costs.

4.41 In taking cost of capital into account care should be taken to ensure that the cost of debt is not counted twice.

Implications of organizational structure

4.42 The organizational structure within which air navigation services are provided has a direct bearing on their financial management and the approach taken in arriving at the total costs to be included in the cost basis for air navigation services charges. In that context, for example, the manner in which financial management is to be organized needs to be given special attention when an entity occupying the central role in the provision of' air navigation services is not operated as an autonomous authority but, like in the majority of instances, by a civil aviation administration (or another government department). In these circumstances, separate accounts should be established for such a department. Moreover, since the civil aviation administration's format of accounts may not be responsive to the requirements of air navigation services management, the department providing these services could establish its own supplementary internal accounting system that would meet these requirements.

4.43 Where the provision of air navigation services is operated as a separate entity or department certain factors need to be taken into account when the actual costs and revenues of that department are to be determined. For example, since it is part of a larger entity it is likely that certain other departments within that entity would provide services or perform function!; for the air navigation services department. This may involve technical services, such as maintenance of equipment and vehicles, or administrative or overhead functions such as accounting, personnel administration, or services of a legal department. In all these cases, the costs of the services or functions concerned must be determined and charged to the air navigation service:; department. If this is not done, the costs of providing the air navigation services will not be known and the air navigation services charges could be based on less than actual costs.

4.44 Various approaches may be taken to determine the costs of the services and functions to be charged to the air navigation services department. For example, concerning the costs of technical services, one approach is to calculate the costs per work-hour of the technical staff involved and then multiply the hours spent: on air navigation services work by that rate. Another approach is to allocate costs for services and functions using a percentage based on the share of the costs for the air navigation services department in relation to the total

costs of all departments involved in the services and functions concerned. To this the costs of material used should be added. An hourly rate should also be calculated for the costs of operation and maintenance of any tools and minor equipment used, including costs of power or fuel consumed, and an allowance for wear and tear. Moreover, depending on the extent of the technical services, an allowance should possibly be made for depreciation of building space and major equipment. Administrative overheads could be allocated by first establishing the total running costs as well as depreciation and cost of capital attributable to the departments concerned, and then estimating how much of their over-all time was attributable to work pertaining to the air navigation services department's operations, on the basis of which the air navigation services department's cost share would then be determined.

4.45 Conversely, the air navigation services department may be performing services such as those described in the preceding paragraph for other departments within the civil aviation administration or the branch of government concerned. In those circumstances the reverse applies, in that the costs to the air navigation services department of providing the services concerned would have to be estimated and allocated to these departments with a consequential reduction in the over-all costs of the air navigation services department. If this is not done and if the costs attributable to services performed for other departments were to form part of the cost basis for air navigation services charges, the users concerned would in fact be paying for costs not attributable to them.

4.46 Transfers of the type referred to above are not necessarily limited to air navigation services provided by a civil aviation administration or another branch or government but may also apply to an autonomous authority providing air navigation services. In some instances, however, air navigation services are provided by a government department without any corresponding charges being made either to the entity levying air navigation services charges or levied on air traffic directly. This applies in many instances to costs of meteorological services for air navigation and in some instances to certain telecommunication services provided by another government department, etc. Assuming it is government policy to recover such costs from the users to the extent possible, the costs concerned should be established and included in the cost basis for air navigation services charges.

Costs of individual facilities and services

4.47 The need for allocations of costs to be made in respect of any non-aeronautical and/or en-route and/or airport utilization of air navigation services is dealt with in Section C below. This requires the system of cost accounting to permit assessment of the total costs attributable not only to individual categories of facilities and services (MET, SAR, etc.) but also in some instances to individual facilities (e.g. radio navigation aids serving both en-route and airport operations). The manner and detail in which the various costs are recorded may differ considerably according to the level of sophistication of the accounting systems in use. Consequently, there will be instances when the extraction of precise figures from the accounts for such cost assessments proves too difficult and it will be necessary to rely on approximations of the costs concerned. Different administrations are likely to find different methods suitable for this purpose but one useful approach may be to take the costs recorded in composite form in one category of costs and to proportion these according to the ratio of costs recorded separately in other categories. Thus, for example, should the costs of operation and maintenance be recorded in composite form for all radio navigation aids and an approximation of such costs be needed for a radio navigation aid that serves both airport and en-route operations, this might be done by apportioning the composite costs of operation and maintenance costs in the ratio which the capital cost of the particular radio navigation aid concerned bears to the total capital cost of all radio navigation aids. Finally and on a more general note it should be recalled, as emphasized in 4.3 above, that when facilities cease to be provided for in the relevant regional air navigation plan, the costs of such facilities should not be included in the cost basis for charges.

C. ALLOCATION OF COSTS

Introduction

4.48 This section deals with certain aspects of the allocation of the costs of air navigation services, such an allocation being relevant in the context of the approach taken to charging in order to recover these costs. Once the total annual costs have been established allowance

will need to be made for any non-aeronautical purposes served by the facilities and services concerned in order to arrive at the actual annual costs properly attributable to their aeronautical utilization. Thereafter, where particular facilities and services serve airport purposes as well as serving aircraft en route, an appropriate allocation of costs in respect of each dual utilization will be necessary to ensure that airport and route facility charges are based on their respective costs. Moreover, the costs attributable to approach control may need to be allocated to the different airports concerned. Whether any allocation of costs is needed where facilities and services physically located in one FIR serve aircraft operations in a contiguous FIR is also a question that may need to be considered where applicable in so far as the costs attributable to en-route utilization are concerned.

4.49 To the extent that charges are to be levied on users for the air navigation services provided, the total costs attributable to route utilization and airport utilization will have to be allocated between different categories of users. Further to the principles contained in the Council Statements in Doc 9082/4, paragraphs 32 and 36, international civil aviation should not be asked to meet costs which are not properly allocable to it. Also, the proportions of costs attributable to international civil aviation and other users (including domestic civil aviation, State or other exempted aircraft, and non-aeronautical users) should be determined in such a way as to ensure that no users are burdened with costs not properly allocable to them according to sound accounting principles. Finally, wherever any allocation of costs is required, it is important to check that there has been no double counting and that the individual allocations do, in fact, add up to the total of the costs being allocated.

Non-aeronautical utilization

4.50 Certain facilities and services such as ATS, AIS and AFS essentially exist only to serve aeronautical requirements, while others, namely MET, SAR and sometimes AMS and radio navigation aids, also serve non-aeronautical functions to a varying degree.

4.51 National MET organizations, while they serve aeronautical requirements, operate to serve the non-aeronautical community as a whole by providing weather information for maritime and other surface transport, agriculture, fishing, hydrology, air pollution control, the press and other media, and the general public. Generally MET organizations engage in basic or core activities in fulfilment of a primary system requirement for meteorological information which is jointly used by all service recipients. Examples of core activities include general analysis and forecasting, automated data processing, surface and upper air observations and general telecommunications. Since no single user requirement determines the level and cost of core activities, the further allocation of core activity costs among user categories should be approached with considerable caution. The proportion of over-all MET costs that it is appropriate to attribute to the requirements of aviation will vary from State to State. Furthermore, there are States which do not allocate core costs to any specific user. It should also be recognized that aviation contributes to the core system by providing upper air observations of winds and temperatures. It is therefore not possible to indicate any specific percentage allocations that would have general validity for this purpose. The broad description of the MET facilities and services required for aeronautical purposes in 4.18 and 4.19 above gives general guidance in this field, with more specific advice being presented in Appendix 6.

4.52 SAR services, in performing maritime and other search and rescue missions, including missions overland and sometimes in patrolling territorial waters serve a variety of needs, not just those of civil aviation In most States, aircraft, vessels and operating personnel utilized in search and rescue operations for civil aviation will be provided by the military and other agencies of government that may be equipped to contribute such resources. The participation of the civil aviation administration or agency may accordingly be relatively limited (e.g. temporary assignment of ATS personnel, equipment and premises to SAR operations, including the possible provision of rescue co-ordination centres (RCCs)).

4.53 Costing the use of resources of the military or other government agencies which are provided for civil aviation SAR operations is a difficult task. It is especially complex when, as is commonly the case, the personnel and equipment so engaged are not assigned exclusively to SAR duties but tend to exist primarily to perform other functions and merely are seconded temporarily for SAR operations. With these difficulties in mind and because humanitarian considerations are involved in the provision of SAR services, the Council concluded that a simple and equitable way of dealing with the matter would be for the costs to be taken into account to be limited to the costs of any permanent civil establishment of equipment and personnel maintained for the purpose of providing SAR services, and for an appropriate share of such costs then to be allocated to civil. aviation. This is the basis for costing specified in Appendix 2 to Doc 9082/4.

4.54 The manner in which to determine civil aviation's allocable share of the costs of the civil SAR establishment concerned is for States to decide. One reasonably simple approach is an apportionment in the ratio that the work-hours devoted to civil aviation SAR operations bears to the total work-hours spent by the establishment in all of its activities, including SAR operations conducted for non-aeronautical activities such as shipping, and for military and State aircraft.

4.55 AMS (i.e. transmitting and receiving stations) frequently serve aeronautical as well as non-aeronautical functions, including maritime and general commercial and private message traffic. Considering the many factors involved, the cost share attributable to aeronautical utilization will inevitably have to be established by approximation. One method would be to base the allocation on the share constituted by aeronautical message traffic of the total message traffic of the station concerned, measured in terms of the number of messages handled.

Allocation where facilities serve both airport and en-route requirements

4.56 Where a specific service or particular facilities serve the requirements of aircraft during the airport phase of operations as well as those of aircraft en-route, consideration should be given to dividing the annual costs of providing the service or facilities concerned so as to reflect this dual utilization. Such a division is especially relevant where the costs involved are substantial and a considerable distortion of the costs attributable to airport or en-route operations would otherwise result.

4.57 *The Council Statements* in Doc 9082/4 (Appendix 2) specifically recommend that "the costs of all meteorological services provided to civil aviation should, where appropriate, be allocated between air traffic services provided for airports and air traffic services provided en route. In States where more than one international airport is involved, consideration could be given, where possible, to allocating the costs attributable to airport utilization between the airports concerned." Here again, the guidance material provided in Appendix 6 (referred to in 4.19 and 4.5 1 above), may be found useful in approaching this task.

4.58 Illustrative of other situations requiring cost allocations of this kind would be the case where ATS, both those providing approach and aerodrome control and those providing area control, are physically situated in one location, and the personnel and equipment costs have been determined for ATS as a whole but not separately for each of the two services. In such a situation an appropriate division between airport and en-route costs is needed and this could be made by apportioning the total costs in the ratio that the control positions (or actual work-hours) devoted to approach and aerodrome control bears to those devoted to area control. The depreciation and cost of capital of the premises provided as well as the related administrative and common costs, could be established on the same basis or, if considered more suitable, on the basis of the respective Boor areas devoted to the two separate control services

4.59 In circumstances where the use made of ATS for airport and en-route purposes cannot be allocated on a statistical basis or otherwise with any substantial degree of accuracy, and only in cases where the costs involved are low, the necessary cost allocations might be approximated as follows:

a) facilities mainly serving en-route operations (allocation of 75 per cent of the corresponding costs to en-route services and 25 per cent to airport use);

b) facilities serving en-route operations and airport operations (approach, landing and take-off) to virtually the same extent (allocation of 50 per cent of the corresponding costs to each); and

c) facilities mainly serving airport operations (allocation of 75 per cent of the corresponding costs to airport use and 25 per cent to en-route services).

4.60 Sometimes the costs of individual AFS facilities are known. This would be the case when, for example, landlines or radio channels are rented on a unit basis from another authority or entity, such as a postal and telecommunications authority, with the rental fee covering all the costs involved. In such instances, 100 per cent of the related costs should be allocated to en-route services where the link is between two area control centres, but normally only 50 per cent where the link is between such a control centre and an airport, the other 50 per cent being allocated to the airport concerned. The costs of individual links are frequently not known, however, for example, when a rental fee covers several links, or where the authority providing the route facilities and services operates a communications centre that serves en-route functions, alone or as is more common,

airport functions as well. In such cases, the allocation of costs between individual links may be made on the basis of utilization (e.g. by the number of messages sent or time of operation of each link), rather than simply by the number of links.

4.61 The same AMS facilities very often serve both en-route and airport functions, which requires that the cost share attributable to each function be estimated. As with the allocation between non-aeronautical and aeronautical utilization of AMS facilities, referred to in 4.55 above, the division of costs between en-route and airport utilization could be carried out on the basis of the number of messages attributable to en-route control as opposed to airport (i.e. approach and aerodrome) control. Another method would be to estimate the total number of hours air traffic controllers spend communicating with aircraft during the respective en-route and airport phases of flight, and allocate the costs between the two functions on that basis. Also, in some States the number of frequencies assigned for route and airport control respectively, may offer a suitable basis for the allocation of costs between the two functions. Finally, the approach suggested with respect to ATS in 4.58 (last sentence) and 4.59 above may also be applied when allocating the costs of these AMS facilities.

4.62 With radio navigation aids that have a dual utilization, for example, VORs which serve as approach aids in addition to serving aircraft en route, the costs involved are likely to be less significant, but might be allocated as between route and airport utilization in the ratio of estimated over-flights to landings and take-offs.

Allocation of total costs to service locations

4.63 Once the total costs by major item (that is operating and maintenance costs and administrative overheads, depreciation and cost of capital, and taxes) have been determined, they should, to the extent relevant be allocated to the various service locations of the air navigation services concerned, such as those referred to in Chapter 3, Section B above.

4.64 As to the allocation exercise itself, the costs would be allocated to the service location concerned using the same approach as described with regard to staff expenses, and other operating expenses in Chapter 3, Section B, but also including depreciation and cost of capital, and taxes. As to the allocation of taxes, these could be allocated in the same manner as other operating: expenses, except where the tax can be identified with a special service location. All costs that are directly attributable to service location services are allocated thereto. But for costs which are attributable to two or more locations, for example, administrative costs, allocation keys or parameters would need to be developed, Such costs would only be allocated where the amounts involved are considerable.

4.65 The type of allocation key applied to a specific cost item or items will depend on the nature of the item or items concerned. For example, the costs of staff working in more than one service location could be allocated according to time spent working in each of the service locations involved and costs of administrative staff could be allocated according to the total worktime of staff working in each service location. With regard to cost allocation based on worktime, it should be recognized that relevant time-recorded data for staff working in more than one service location are in most cases not available. Costs of power, electricity, water, heating or air conditioning could be allocated on the basis of measured or estimated consumption of these services or utilities in each area. Depreciation and cost of capital attributable to investments covering several buildings or areas could be allocated according to volume of space, floor area, and/or movement area within each of the service locations concerned.

Allocation of en-route costs between flight information regions

4.66 In the case where en-route services are provided by a State to aircraft outside the FIR in which the facilities concerned are physically located, separation of costs between FIRs may be desired where user charges are to be levied on an FIR basis. This separation should reflect costs incurred by that State in providing the en-route services to the flights operating through the respective FIRs. One approach to separation of costs of services covering two or more FIRs is to apply ratios based on the respective volumes of traffic for the adjoining FIRs. However, the task involved is considerable and it is considered that in general no gross inequity would result if the exercise were only undertaken if the costs of the facilities concerned and their use in one (or more) adjoining FIRs are substantial (e.g. where facilities located in one FIR primarily serve traffic in an adjoining oceanic FIR).

Allocation of en-route costs among categories of users

Introduction

4.67 The Council Statements in Doc 9082/4 (paragraphs 32 and 36) specifically call on States to ensure that no users are burdened with air navigation services costs not properly allocable to them according to sound accounting principles. However, any required allocation of costs between different categories of users will depend on the circumstances involved, which are likely to differ, and it may often only be necessary to identify costs attributable to international civil aviation. A general principle, though, is that where cost allocation needs to take place the total costs should be allocated equitably among the different categories of users served by the route facilities and services concerned. This is of particular relevance in the case of State, including military traffic which is often exempt from charges. The Council therefore encourages States to maintain accounts for the route facilities and services they provide in a manner which ensures that route facility charges levied on international civil aviation are properly cost based.

4.68 In many situations it will be of prime importance to exercise sound economic judgment about the primary need for establishment of the facilities and services and to allocate costs to user categories accordingly. In that regard, it is particularly important to recognize that the major part of the air navigation facilities and services infrastructure has been established to serve the requirements of commercial air traffic, and that some users receiving extensive service could not, by reason of the nature of their activity, have called for the provision of service on such a scale on an economic basis. The prime beneficiaries among the users should therefore be carefully identified to ensure that realistic allocations of costs to the various user categories are made.

4.69 Within this broad judgmental approach to allocation of costs of services to categories of users, which may only be required in certain circumstances, the use of certain operational parameters will assist to refine and to give more precise measurement to the allocations. Naturally, in those circumstances where they are to be applied, the parameters selected for route facility cost allocation purposes, either singly or in combination, should appropriately relate to the flight operations of all user categories, reflect the extent to which service is provided to each category, and be readily and objectively measurable.

4.70 The cost allocation may be approached in various ways. One option is to make an overall allocation of total costs. Alternatively, total costs may be broken down into running costs and depreciation and costs of capital relative to the various service s or service locations before they are allocated separately to different user categories. This latter approach facilitates the cost allocation exercise because it assists in identifying those costs that are directly allocable. Costs which are not directly allocable would be allocated using appropriate parameters.

Categories of services and users

4.71 The first step in allocating costs among categories of users is to define the categories of users as a function of the services provided, and/or the traffic concerned. In this context it is recognized tha users may be categorized differently according to the type of airspace and air traffic services involved, ar d that the approaches adopted by States will vary accor ding to circumstances. Certain categories of users may either be exempted, for example VFR flights, or handled in a different way, for example military flights which are exempted from route facility charges but may pay for their services through other means. In the interest of transparency the costs for these service: to these categories of users may need to be identified.

4.72 A schematic presentation of user categorization is provided in Figure 4-1.

4.73 The extent to which user categorization for cost allocation purposes can be pursued in individual cases will depend on a number of factors. Important amongst these are likely to be the main user categories involved, and the extent of the requirement for cost allocation in government accounting, and the resources available for route facility cost accounting.

Parameters for cost allocation to user categories

Introduction

4.74 The second step in allocating costs among categories of users is to apply appropriate parameters to those costs which are found to be attributable to two or more categories of users. If services and facilities have been provided to serve only one user category, the related costs should, of course, be allocated o that user

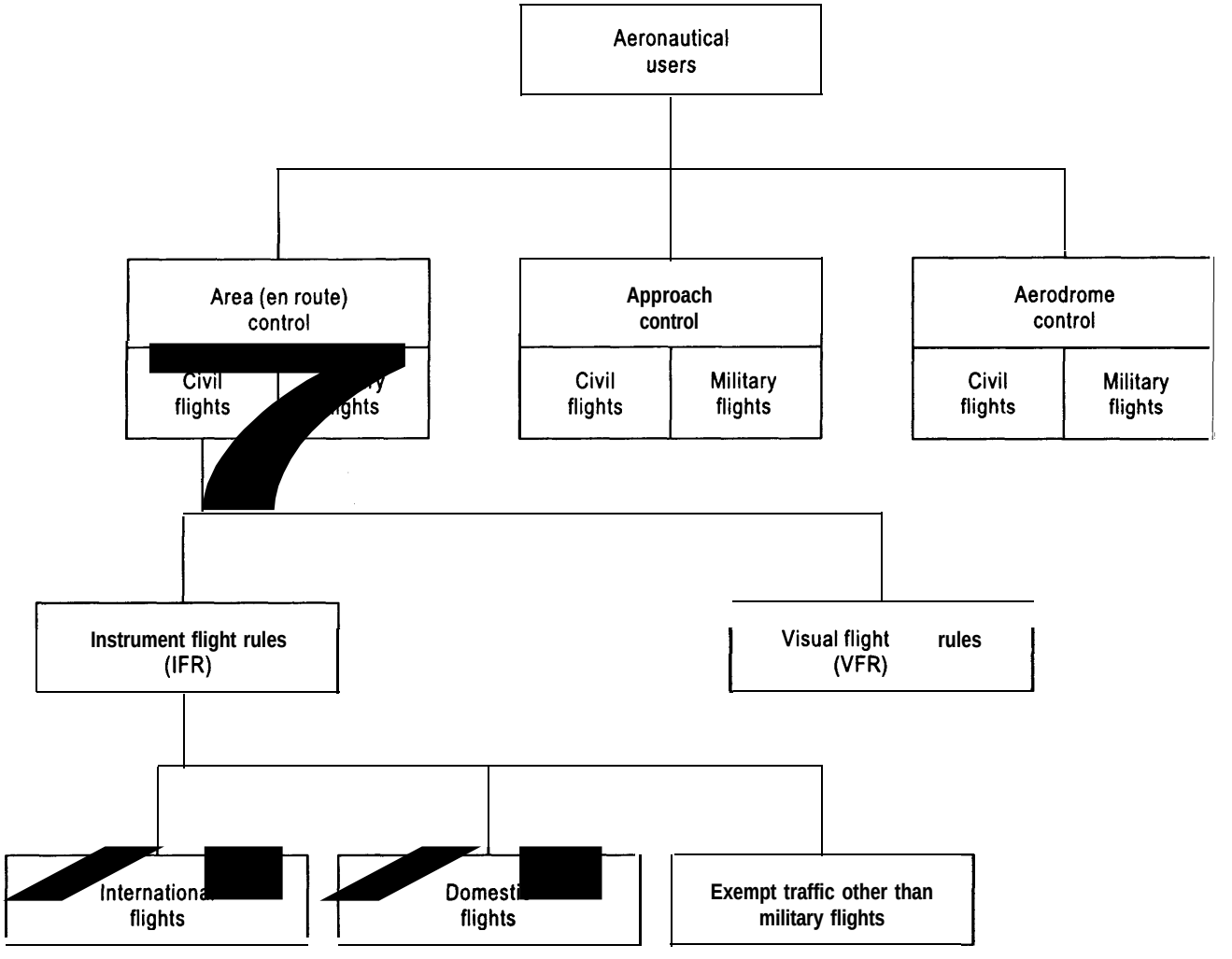

Figure 4-1. An illustration of categorization of aeronautical users of air navigation services

category only, but if more than one user category has been identified, it may be necessary to establish and develop appropriate parameters for cost allocation between these user categories.

4.75 As indicated in 4.69 above, a parameter selected for route facility cost allocation purposes should, ideally, be common to all user categories, reflect the extent to which en-route services are provided to each category, and be readily and objectively measurable.

4.76 There are a number of parameters which, at first glance, appear to be suitable for application in the allocation of costs to categories of users but after closer examination of the particular circumstances concerned, lead to an inequitable allocation of the costs involved. Each parameter should be carefully considered on its own merits, as indicated below.

Number of flights

4.77 The number of flights meets the requirements of being readily and objectively measurable and will usually be a basic parameter for cost allocation. The number of flights by itself, however, generally does not indicate sufficiently accurately the extent of the provision of route facilities to categories of users because other factors, in particular distance flown within the airspace concerned, are also important in determining the extent of service provided. Nevertheless, in cases where these other factors are reasonably homogeneous, the number of

flights may represent a satisfactory parameter for the allocation of costs among categories of users. (A method of applying this parameter is outlined in Appendix 7.) It also needs to be borne in mind that some costs are not directly related to distance flown but relate to routine tasks such as sector co-ordination; these may be more suited to allocation on the basis of numbers of flights.

Distance flown

4.78 Distance flown by each flight within an airspace appears to be a sufficient approximation of the extent of the provision of route facilities to be a satisfactory parameter for cost allocation among categories of users when used in combination with the number of flights in each category. Such a combination would involve determining the distance flown for each flight through the airspace concerned, identifying the number of flights by each user category, then adding together the distances flown by each user category, and finally attributing to each category the proportion of the costs allocable to it. (Appendix 7 outlines a method of applying number of flights and distance flown for cost allocation among user categories.)

Time in the system

4.79 The time a flight spends in the system is another indication of the duration of the services provided to it and could be used for cost allocation purposes, in combination with the number of flights in each user category. Where a significant proportion of flights operate at speeds different to the bulk of the traffic, however, additional facilities and procedures may be required, the costs of which may not appropriately be allocable to the different categories of traffic in the same way. Another factor which dilutes the usefulness of time in the system as an allocation parameter is that its application would be quite cumbersome. The application of "time in the system" as a parameter therefore needs to be approached with caution and is not recommended.

Aircraft weight

4.80 The weight of an aircraft is readily and objectively measurable. It may not, however, provide an accurate indication, for cost allocation purposes, of the extent of the use of route facilities and services, even though such facilities may have been largely provided to serve larger and heavier aircraft, and its application could therefore lead to inequities and distortions in the allocation of costs to user categories. The application of aircraft weight as a cost allocation parameter should, therefore, be approached with caution and is generally not recommended.

Allocation of approach and aerodrome control costs among categories of users

4.81 Under allocation of en-route costs among categories of users reference was made to the Council Statements in Doc 9082/4 (paragraphs 32 and 36) specifically calling on States to ensure that no users are burdened with air navigation services costs not properly allocable to them according to sound accounting principles. Such an allocation exercise should be less complex for approach and aerodrome control costs than for en-route costs. Certain basic steps apply As to the first of these the air navigation services costs attributable to each airport (i.e. cost of approach and aerodrome control) would normally need to be identified, an approach to which was outlined above.

4.82 The next step involves identifying the categories of users concerned. For practical purposes this could be limited to the major categories that would either be charged or exempted from charges. The former includes international civil traffic and domestic civil traffic (which could be subdivided into commercial and general aviation), the latter, State, including military traffic unless such traffic is minimal and incidental. The costs attributable to the latter needs to be determined so that they can be deducted from the costs forming the basis for charges on other traffic. Similarly where the entity providing the air navigation services does not levy charges on air traffic at the airport(s) concerned but instead charges the airport(s) themselves, the cost share attributable to State traffic, including military traffic, should be deducted and excluded from the costs charged to the airport(s). A related factor is that State traffic, including military traffic, is often exempted from airport landing charges. When this is the case the State and the airport(s) concerned will need to determine how these costs are to be recovered (e.g. by a subsidy to the airport(s) concerned).

4.83 The third step involves deciding on the parameter or combination of parameters to be applied in allocating approach and aerodrome control costs among categories of users. The parameters which appear suitable and require further consideration are also those which were reviewed above with regard to allocation of

en-route costs among categories of users, namely number of flights, distance flown, time in the system and aircraft weight. Aircraft weight and time in the system have the same shortcomings for allocating approach and aerodrome control costs among different categories of users as they have with regard to en-route costs.

4.84 Distance flown is not as relevant to the allocation of approach and aerodrome control costs as it is to the allocation of route costs. This is because the distances flown are much more homogeneous during the approach and aerodrome phase of operations than during the en-route phase. The number of flights, however, meets the basic requirement for cost allocation purposes and is also a readily measurable parameter. Using that parameter the approximate approach would be to determine the cost share of each of the major categories of users on the basis of the total number of movements by each category.

4.85 In the case where there are no differences in the level of services provided to users, the allocation of costs need not go beyond the allocation of the total air navigation services costs to the different services provided (i.e. approach and aerodrome, and en-route air navigation services). An example of such an allocation is provided in Appendix 7.

D. COST BASIS FOR INDIVIDUAL AIR NAVIGATION SERVICES CHARGES

Basic aspects

4.86 Once the total costs attributable to civil traffic have been established (see column "f" in Table 4-1) and, if required, divided into their international and domestic components, the cost basis for individual charges can be established. There are basically two types of charges for air navigation services i.e. route air navigation services charges and approach and aerodrome control charges. The latter though are levied in relatively few States, most States instead including costs of air navigation services provided during the approach and aerodrome control phase of flight in the cost basis for landing charges, which also includes other airport costs. The Council Statements in Doc 9082/4 (paragraph 34 (iii)) recommend that the costs of air navigation services provided during the approach and aerodrome phase of aircraft operations should be identified separately.

4.87 As the number of autonomous airport authorities is expected to increase, there are likely to be more situations where a different entity provides approach and aerodrome control (and route air navigation services). This in turn will mean a growth both in the number of instances where separate approach and aerodrome charges will be levied, and also in the alternative approach where costs of approach and aerodrome will be charged to the airports involved, that presumably would include them in the cost basis for their charges. These issues are further addressed in the following chapter.

Cost basis for route air navigation services charges

4.88 This would include all the costs attributable to the provision of route air navigation services, by all the entities providing such services in the State concerned, including the costs of ATS, COM, MET, SAR and AIS.

Cost basis for approach and aerodrome control charges or basis for contractual payments for approach and aerodrome control — by airport

4.89 This would include all the costs attributable to the provision of approach and aerodrome control services i.e. ATS, COM, MET, SAR and AIS by all the entities providing such services. Where an approach control office serves more than one airport its cost should be allocated among the airports concerned on the basis of the number of flights handled for each airport

E. SPECIAL COSTING CONSIDERATIONS PERTAINING TO CNS/ATM SYSTEMS

4.90 As CNS/ATM systems components are implemented States should add the associated costs to their costs basis for air navigation services charges provided such facilities are provided for and implemented under the ICAO Regional Air Navigation Plan(s) supplemented where necessary by the relevant ICAO Regional Air Navigation Meeting (Council Statements in Doc 9082/4, paragraph 34 (i) refers). This could include for example, costs associated with air traffic management automation and support systems, the provision of or participation in the provision or access to

satellites or satellite transponders, ground earth stations and wide-area augmentation system(s) and local area augmentation facilities.

4.91 One particular issue that needs to be addressed in the implementation of CNS/ATM systems is the treatment of costs and cost-recovery during the three stages of systems implementation i.e. development, transition and CNS/ATM as the only systems. The ICAO Air Navigation Services Economics Panel's *Report on Financial and Related Organizational and Managerial Aspects of Global Navigation Satellite System (GNSS) Provision and Operation* (Doc 9660) addresses that particular issue in the specific context of the GNSS. As that guidance, including a descriptive tabular presentation, is also relevant in the context of other CNS/ATM systems components it is being reproduced below.

> "3.8.1 Special attention will need to be given to the treatment of costs and cost-recovery during the three stages of implementation of the GNSS services, i.e. development, transition, and GNSS as the only system. The costs involved cover both GNSS services and conventional navigation services, and can be divided into three categories: research and development (R+D), depreciation and cost of capital, and operational costs. Table 2 summarizes how it is suggested these costs be dealt with for cost recovery purposes during the three stages of implementation."

4.92 Implementation of the satellites required under the CNS/ATM systems concept to serve communication and navigation needs will make redundant certain facilities and staff required to provide conventional communications and navigation systems. CNS/ATM systems, once implemented, would also make it possible and technically and economically feasible to merge many FIRs and correspondingly reduce the number of ACCs. But even without an ACC, a State would still incur costs associated with providing CNS/ATM systems services as well as other air navigation services for overflying traffic and during the en-route phase of traffic landing on or departing from its territory (e.g. costs arising from participation in GNSS augmentation schemes provision of AFS links with one or more ACCs, MET services, etc.)

4.93 Such costs would continue to be recoverable by the State(s) concerned. Likewise would be costs brought about by the implementation of CNS/ATM systems components (but not incurred for them as such) including severance payments and/or costs of retraining of staff and costs of writing-off structures and equipment prematurely i.e. before their economic life has expired. These costs could be capitalized and thereafter written-off gradually with the portion written-off each year being included in the cost basis for air navigation services charges, be that route or approach and aerodrome control charges, regardless of whether or not the State concerned operates an ACC. Recovery of the costs of CNS/ATM systems components, as well as other costs attributable to en-route utilization by States that do not operate an ACC (or FIC) is discussed in Chapter 5 — *Air navigation services charges and their collection*, Section E.

TABLE 2. GNSS COST RECOVERY DURING DEVELOPMENT AND IMPLEMENTATION

Stage	*GNSS Service*			*Conventional NAV Service*		
	*R + D**	*Capital*	*Operational*	*R + D**	*Capital*	*Operational*
1. Development	Capitalize	Capitalize	NA	Current expense to all users	Applicable depreciation to all users	Current expense to all users
2. Transition 2.a GNSS-Service provided on request of special User Groups	Capitalize if related to major new asset, otherwise expense to GNSS user. Amortize previously capitalized R+D expenses to GNSS users.	Applicable depreciation and financing charges to GNSS user	Current expense to GNSS user	Current expense to all users. Applicable amortization of previously capitalized R+D to all users.	Applicable depreciation and financing charges to all users	Current expense to all users
2.b Conventional NAV and GNSS in Regional Plans (GNSS is acceptable sole means)	Capitalize, if related to major new asset, otherwise current expense to all users. Amortize previously capitalized R+D to all users.	Applicable depreciation and financing charges to all users	Current expense to all users	Current expense to all users. Applicable amortization of previously capitalized R+D to all users.	Applicable depreciation and financing charges to all users	Current expense to all users
3. GNSS the only system in Regional Plans, Conventional NAV on request of special user groups	Capitalize, if related to major new asset, otherwise current expense to all users. Amortize previously capitalized R+D to all users.	Applicable depreciation and financing charges to all users	Current expense to all users	Current expense to conventional systems users only, if still applicable. Remaining applicable amortization of previously capitalized R+D to all users.	Unwritten depreciation and financing charges to all users. New investments to conventional users only	Current expense to conventional system users only

*Capitalized R+D is an intangible asset which is amortized and an appropriate cost of capital may be charged.

Chapter 5

AIR NAVIGATION SERVICES CHARGES AND THEIR COLLECTION

INTRODUCTION

5.1 Once the costs attributable to air navigation services have been determined (see Sections B and C of Chapter 4), charges and charging systems aimed at recovering these costs from the users concerned need to be established. This chapter provides guidance on the various aspects of levying air navigation services charges. The guidance supplements the recommendations on air navigation services charges and charging systems, as well as consultation, contained in the Council Statements in Doc 9082/4. The chapter is divided into five main sections. The first — *Basic factors influencing air navigation services charges or cost recovery* — addresses various factors that need to be considered once costs attributable to air navigation services have been determined, but before the charges are set. The second main section — *Individual charges* — suggests systems to be applied with regard to individual types of charges i.e. route air navigation services charges, approach and aerodrome control charges, and how charges could or should be established in each instance.

5.2 The third main section — *Collection of charges* — focuses on various related factors, for example, when charges are to be paid, collection problems, etc., while the fourth main section — *Consultation with users* — addresses the nature of consultation and the approach to consultation. The fifth main section — *Charges/cost recovery aspects of CNS/ATM systems provision* — reflects on considerations relevant to this subject matter.

A. BASIC FACTORS INFLUENCING AIR NAVIGATION SERVICES CHARGES OR COST RECOVERY

5.3 The aim of levying air navigation services charges on air traffic (and/or to charge airports for air navigation services provided for them) is to recover the costs incurred in providing the air navigation services required for that traffic (and airports). Full cost recovery may, however, not always be feasible because unless traffic volume reaches a sufficiently high level to permit an efficient utilization of the air navigation services concerned, charges could become prohibitively high. Consequently, many States elect to subsidize air navigation services provision where the revenues from charges on air traffic cannot cover the cost(s) attributable to it.

5.4 The Council Statements in Doc 9082/4 (paragraph 37 (iv)) recommend that any under-recovery of costs properly allocable to a particular category of users should not be shouldered on to other users. To meet that objective, the system or systems of accounts should permit comparison between the revenues from charges on any one user category and the costs allocated to it. It is, of course, a policy decision for each State to decide whether air navigation services charges should be levied and, if charges are levied, the extent of cost recovery to be achieved. In practice most States levy route air navigation services charges and essentially all levy some form of airport charges. This requires that consideration be given to the types and levels of charges on the various traffic categories and whether full or only partial cost recovery should be sought from each of them. For practical reasons, such as efficiency of billing, or to support certain user categories such as domestic operations or general aviation, some States may wish to levy lower charges on them than could be justified by the allocated costs, or to exempt them from charges. Whatever the level of cost recovery which is chosen for different users, any under-recovery of costs allocable to one user category should not be charged to other users by recovering from them more than their total allocated costs. The allocation and recovery of all costs should be transparent for all users.

5.5 While the majority of States are not recovering the total costs of providing air navigation services the

number of those that do is growing. As noted in Chapter 1, the policy guidance provided in the Council Statements in Doc 9082/4 (paragraph 34 (iv)) on this subject is that "Air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets (before tax and interest charges) to contribute towards necessary capital improvements."

5.6 States pursuing a policy of full recovery of air navigation services costs through charges should adjust for any over-recovery or under-recovery of costs through charges levied in one year when establishing the cost base and the level of charges for the following year.

5.7 The currency charges could be expressed in has been a subject of considerable concern world-wide. To assist States the Council in its Statements in Doc 9082/4, paragraph 38:

"i) Recommends that under normal circumstances, user charges should be expressed and payable in the local currency of the State concerned.

ii) Recommends that under special circumstances, for example where economic conditions are not stable, when a State proposes, or allows, denomination of user charges in other than local currency, airlines could apply the same currency of denomination, using the same exchange rate, for their local ticket sales.

iii) Recommends that remittance problems be resolved.

iv) Recognizes that when route air navigation services charges are billed on a regional basis (i.e. on behalf of several States or by a jointly operated agency), it may be advantageous to both users and providers to denominate and pay charges in a single convertible currency."

In so far as international operations are concerned, calling for payment in convertible currency would not be in conformity with Article 15 of the Chicago Convention unless it is equally applied to international operations of the national carrier(s).

B. INDIVIDUAL CHARGES

General

5.8 Chapter 4 contains guidance on the approach to determining the cost basis for individual charges. In that context it is noted that apart from costs incurred by the entity carrying out the billing function (usually the entity that provides the ATS) with regard to functions it is directly responsible for, adjustments in the form of transfers of costs to and from that entity may have to be made because of services provided by other government departments, or government or non-government entities, to that entity or provided to them by it.

5.9 As in the case of costs, one or more elements of the revenues an entity carrying out the billing function collects through its charges might be attributable to another department or entity providing air navigation services. This applies, for example, if the landing charges include an element attributable to en-route services provided by another department. That would require the transfer of the revenue element involved, once it has been collected, from the airport to the department concerned. The reverse would apply if, for example, route air navigation services charges levied by a government department or non-government entity other than the airport to recover its costs, also contained an element for approach and aerodrome control, the costs of which were charged to the airport. In that case, the revenue element concerned should be allocated to the airport to offset the corresponding costs charged to it, which would reduce the costs that form the basis for the charges levied by the airport on air traffic.

5.10 A principal objective when establishing charges is usually to determine what charges should be levied on traffic in the immediate future, normally the next financial year. This requires an estimate to be made of the cost basis for individual charges for the next year which would be arrived at on the basis of costs of the most recent financial year.

5.11 Similarly, in order to set charges at a level which permits predetermined cost recovery and revenue objectives to be met, traffic for the next year would need to be forecast. This would involve estimating the total number of aircraft movements, broken down, depending on the type of charge (en-route versus approach and aerodrome control charges) and by applicable charging parameters. Sometimes longer term forecasts may be required to project trends in revenues from air navigation services charges in the future as necessary components to be incorporated into the budgeting process described in Chapter 3. For all these purposes reference is made to the guidance on medium- and long-term air traffic forecasting contained in the ICAO *Manual on Air Traffic Forecasting* (Doc 8991). In developing their traffic fore-

casts, it is desirable that air navigation services providers consult with regular users or their representative organizations. As to arriving at unit costs for individual charges, the approach would normally be for the cost basis for the charge concerned to be divided by the estimated accumulated charging parameter units concerned (the divisor applied depending on what the charge concerned was based, as further discussed below).

ROUTE AIR NAVIGATION SERVICES CHARGES

Introduction

5.12 A number of parameters are available for application to establish flight charges which more accurately reflect use of the services and their value to users, and therefore ensure greater equity. The advantages and disadvantages of several parameters are discussed below. Only the first two, "distance flown" and "aircraft weight", are recommended in the Council Statements in Doc 9082/4. The application of these two parameters is discussed in the following sub-section. A flat charge per flight may be used in circumstances where there is little difference in both the distances flown and the weights of the aircraft flying through the airspace concerned (or in cases where the charge per flight would be relatively low). In most situations, however, a flat charge per flight levied without regard to distance, type of flight or the aircraft used will not recover costs equitably from among users. Nevertheless, in some circumstances, it may be considered appropriate to use a combination of a flat charge per flight and a charge based on other recommended parameters to recognize that there is an element of fixed costs in providing air traffic services.

Parameters recommended by the Council

5.13 The Council Statements in Doc 9082/4 (paragraphs 40 and 41) include the following policy guidance with respect to route air navigation services charges:

> "40. The charge for route air navigation services should, so far as possible, be a single charge per flight; that is to say, it should constitute a single charge for all route air navigation services provided by a State or group of States for the airspace to which the charge applies. The charge should be based essentially on:
>
> i) the distance flown within a defined area;
>
> ii) the aircraft weight.
>
> The element of distance flown, taken as one of the acceptable measures of the service rendered, should be applied by means of a distance scale using great circle distances or other commonly agreed distances. The element of aircraft weight should be applied by means of a weight scale using broad intervals which should be standardized so far as possible. This weight scale should take into account, less than proportionately, the relative productive capacities of the different aircraft types concerned.
>
> 41. Without prejudice to the guidelines provided above, which constitute a charging system for general application, the Council recognizes however that:
>
> i) the characteristics of a given airspace will determine the most appropriate charging method for that airspace, having regard to the type of traffic, the distances flown, and the characteristics of the aircraft in that airspace;
>
> ii) when the distance flown and/or the aircraft types are reasonably homogeneous, the distance and weight elements may be separately or jointly neglected as the case may be."

Distance flown

5.14 The distance flown by a flight within a defined area is usually a good reflection of the extent to which route services are used. Depending on local circumstances, it may be taken into account in the establishment of a flight charge by means of a linear scale, a stepped scale with even intervals or a stepped scale with uneven intervals. A straight, linear application, being simple, is to be preferred when circumstances permit. If a charging system established by a group of States, involving revenue sharing among them, uses distance as a factor, then it would need to be applied on a linear basis. Distance would, however, have little relevance for a charging formula where there are no significant differences in the lengths of flights over the routes in the airspace concerned. Therefore, distance could be excluded from a charging formula in such cases.

Aircraft weight

5.15 It is clearly stated in the Council Statements in Doc 9082/4, that the element of aircraft weight should be taken into account less than proportionally in the determination of route air navigation services charges. Nevertheless aircraft weight is considered to be a valid charging parameter for representing the value of service to users and is recognized as such in the Council Statements. It is, however, recognized that its relationship to the cost of services is not necessarily direct. It may be assumed that the value of the service generally increases as aircraft payload increases, and since aircraft weight generally has an approximate relationship to payload capacity, it provides a reasonably good measure of that value. The use of heavier aircraft, however, may achieve greater productivity and efficiency for the aircraft operator as well as economy in operation of the air traffic control system through reduction in traffic congestion. Most route air navigation services charging systems reflect this view. Application of the square root of weight or by otherwise ensuring that the charge increases less than proportionately to an increase in aircraft weight, are the usual means of ensuring that heavy aircraft are not treated inequitably.

5.16 When weight is to be used in a charging system it is important that it does not discourage the use of larger aircraft which can reduce the effect of a capacity constraint in the air traffic control system without the need for capital investment. It is also important to consider the mix of aircraft for which the services are being provided, which can vary significantly, to ensure equity in the impact of charges. Although a variety of weight scales can be devised to generate the required level of charges revenue for any given number of flights, the essential objective is to ensure that the system produces the appropriate level of revenue with reasonable equity to the aircraft operators. Also, in cases where the aircraft types served are relatively homogeneous, weight may be eliminated from the charging formula.

Other parameters

Fuel intake

5.17 While fuel intake may be a convenient parameter to use, the amount of fuel taken on or consumed during a flight may not necessarily reflect the extent of the use of route facilities and services. This applies particularly to general aviation flights, which are frequently conducted locally under VFR conditions. Moreover, for international flights there is no direct relationship between fuel taken on in one State and the use of route facilities provided by another State. A charge based on fuel intake, however, may be a useful approach to recovering costs from general aviation users in the absence of a more suitable basis of charging, since the potential revenues from separate route facility charges on each flight may not in many instances be commensurate with the costs of identifying flights, billing and collection.

Revenue payload (passengers and freight)

5.18 In the right geographical circumstances, a charge on revenue payload may be a useful approach to the recovery of route costs. Revenue payload may in such circumstances be used as a proxy for weight and distance when applied in the form of a flat rate charge on each passenger carried an&or each unit of freight carried. This parameter should be used with caution, however, since it constitutes an imperfect proxy for a combination of weight and distance factors when the charge is expressed as a percentage of the fares and rates applied, given the complexity and variations in air carrier fares and rates. There is also no relationship between charges levied by one State on the revenue payload of multi-sector international flights and their use of the route facilities of two or more States, for which this approach would be complicated and difficult to apply. Finally, this approach also discriminates in favour of empty flights.

Flight time or aircraft speed

5.19 The time a flight spends in the system is a function of its speed and indicates the amount of time route services are provided to it. Higher speeds mean less time spent in a given airspace and therefore a reduction in the duration of the service provided en route. Faster aircraft can also alleviate traffic congestion by permitting more aircraft to be processed in a given time. However, where there is a significant mix of aircraft operating at different speeds in relatively congested airspace, additional and more sophisticated facilities and procedures may be required for traffic control purposes. These factors dilute the equity and usefulness of charges based solely on flight time or aircraft speed.

Charging systems based on distance flown and aircraft weight

Introduction

5.20 Only distance flown and aircraft weight are recommended in the Council Statement in Doc 9082/4 as parameters suitable for use in a charging system (see also 5.12). Charging systems based on a combination of these two parameters account for a growing majority of all route facility charging systems. In such systems, the charge for a specific flight is usually determined by applying a unit rate to the number of "traffic units" represented by that flight. The number of traffic units is calculated by multiplying for each flight the distance flown by a weight factor for the aircraft used for the flight concerned. The traffic units thus calculated for each flight can then be added together to arrive at the total volume of traffic for each user category and for all categories combined.

The distance flown factor

5.21 Distance flown is usually measured between:

a) the airport of departure or the point of entry into the FIR or airspace for which the charging State or authority is responsible; and

b) the airport of first destination or the point of exit from the FIR or the airspace for which the charging State is responsible.

For charging purposes, distance flown is usually expressed in hundreds of kilometres (occasionally nautical miles). A standard deduction (in most systems the equivalent of 20 kilometres) is usually made for each take-off and landing at an airport within the area concerned, to reflect the use of approach and/or aerodrome control facilities and services. The distance flown should be identified from the relevant records of the ACC/FIC processing the flight, usually the so-called "flight strips", indicating the route travelled through the airspace.

The aircraft weight factor

5.22 Aircraft weight is normally expressed in metric tonnes or an equivalent measure for charging purposes. In order to take weight into account less than proportionately, as recommended in the Council Statements in Doc 9082/4, various weight scales and intervals may be used (see also 5.15 above). A large number of States apply the square root of the aircraft's weight to achieve this objective. Whatever approach is used, care should be exercised in selecting the type of aircraft weight to be applied, so as to ensure that the differences between the proportions of payload capacity to aircraft weight for different aircraft types are equitably reflected.

Unit rate

5.23 The unit rate to be applied for each user category is determined by dividing the total estimated route facility costs to be recovered from each user category for the period concerned (usually one year), by the estimated total of "all traffic units" (see 5.20) produced by that user category. The number of traffic units for the following year may be estimated by applying a rate of anticipated growth (or decline) to the total traffic units of the preceding year. 'Where the number of traffic units for the preceding year is not available, it may be estimated on the basis of flight data available from the ACC(s)/FIC(s). Similarly, the total estimated costs for the next year should be arrived at on the basis of the actual costs of the preceding year.

5.24 The unit rate can either be expressed in the local currency or another currency. As to the approach to be taken in any specific instance, reference should be made to the guidance in 5.7 above.

Simplified charging systems

5.25 While charges are most commonly based on a combination of distance flown and aircraft weight, they may in certain circumstances, as indicated in 5.14 and 5.16 above, be based either on aircraft weight or distance flown exclusively. Where there is little difference in both the weights of the aircraft served and the distances flown, the charge could take the form of a fixed charge per flight. Being simple and less costly to administer, this approach may also be adopted in those circumstances where the charge per flight would be relatively low.

APPROACH AND AERODROME CONTROL CHARGES

General

5.26 Air navigation services costs attributable to approach and aerodrome control have in most instances

been recovered through landing fees levied by the airport operator. With the increased tendency to set up airports and air navigation providers either as autonomous authorities or as corporate entities, however, the relationship between the airport and the air navigation provider has changed, including the competitive provision of airport related air navigation services. In a number of these cases the cost of providing approach and aerodrome control or terminal area navigation services could be recovered through direct charges on users or recovered from users in co-operation with the airport operators through landing or other similar charges. In certain other cases where the services are linked directly to a specific airport they could alternatively be recovered from the airport operator by means of an agreed charge. In the latter two cases this would normally be laid down in an agreement between the airport and the service provider covering the provision of air navigation services following consultation between users and the appropriate authorities subject to commercial confidentiality.

5.27 If an air navigation service provider charges an airport directly the airport operator would then establish the charge to be levied after consultation with users. The practice of some airports to include an air navigation services charge in their landing charges should be approached with caution for the following reasons:

a) it lacks transparency for the users;

b) the charging parameters for air navigation services charges and landing charges can be different; and

c) the Council Statements (Doc 9082/4) recommend that the costs of air navigation services provided during the approach and aerodrome control phase of aircraft operations should be identified separately.

5.28 Whatever method is used for recovering the cost of these services, States should seek to facilitate arrangements to ensure that the Council Statements concerning consultation with users as set out in ICAO Doc 9082/4 are observed.

Parameters recommended by the Council

5.29 The Council Statements in Doc 9082/4 recommend in paragraph 39 that:

> "Where charges for approach and aerodrome control are levied, whether as part of the landing charge or separately, the charge should, so far as possible, be a single element of the landing charge or a single charge per flight and could take aircraft weight into account but less than in direct proportion."

5.30 As is the case for route air navigation services, in some circumstances it may be considered appropriate to use a combination of a flat charge per flight and a charge based on other recommended parameters to recognize that there is an element of fixed costs in providing air traffic services.

Other parameters

5.31 Other parameters i.e. fuel intake, revenue payload (passengers and freight) and flight time or aircraft speed that were discussed above under Route Air Navigation Services Charges can also be considered to be similarly applicable with regard to cost recovery for air navigation services provided during approach and aerodrome control phase of aircraft operations. Some States also offer the operators of small aircraft used for private and for pleasure purposes the option of purchasing annual or quarterly cards or certificates at fixed rates which cover use of the air navigation services and landing at some or all airports in the State concerned.

Common approach or terminal area charge

5.32 There is a growing tendency, especially in complex highly congested areas, for approach control services to be centralized with controllers handling aircraft on behalf of a group of airports. It is recognized that in these situations there are some facilities and services that might fall into either the en-route or approach categories. In these circumstances consideration might be given to designating these tasks to a specific terminal area control unit which would also cover services and facilities related specifically to approach control. The charging parameters can still reflect the parameters described in 5.29 and 5.30 above.

5.33 Some airports levy relatively high minimum charges and/or high fixed charges per aircraft movement during peak hours to reflect more accurately the investment in capacity that is determined by the number of peak users. Similar consideration could apply to aerodrome and approach control services. Peak charges have

also been used by some airports in an attempt to smooth the hourly flow of airport traffic although its effectiveness in redistributing traffic is limited by the fact that very large differentials would be needed before airlines would accept the commercial and operating disadvantages of moving from the peak. This might be particularly so for long-haul services where constraints on the times at which they can offer an attractive service are tightly drawn. On the other hand, peak charges may have an effect "at the margin", which could result in reduced delays when capacity is severely constrained and would help to encourage its efficient use. A minimum charge for aerodrome and approach services could also help to encourage the efficient use of capacity where general aviation movements account for a relatively high share of total movements. The 1991 Conference on Airport and Route Facility Management concluded that the value of peak charges required further study, and it did not recommend their application at that time.

C. COLLECTION OF CHARGES

Charges levied directly on users

General

5.34 Many entities providing air navigation services recover the associated costs by means of air navigation services charges levied directly on the users. In certain circumstances air navigation services may be provided under contract to another service provider, for example, an entity providing air navigation services may provide a service on behalf of an airport. In this case the air navigation services entity may recover its costs by means of a periodic charge to the airport organization.

5.35 Separate air navigation services charges may be levied to cover the different types of services provided. (The allocation of the associated costs, including allocation parameters, are discussed in detail in Chapter 4). The principal types of services/charge are:

a) *approach and aerodrome control.* The associated charge may be levied either as a combined charge or levied separately.

b) *centralized approach control.* This service would usually refer to a situation where approach control is provided to a number of airports from a centralized unit — normally an area control centre. A combined charge or separate charges may apply;

c) *centralized approach/terminal area control.* This refers to the situation where approach control and en-route services are provided by a terminal area control unit as described in 5.32 above. A combined charge or separate charges may apply;

d) *area control.* This refers to all en-route (area control) services provided in the domestic FIR(s) of the State concerned. It is more common to have a single charge covering all those air navigation services properly attributable to en-route services. It might be considered appropriate, however, to have separate charges for individual FIRs; and

e) *oceanic control.* This refers to the situation where a State has accepted the responsibility of providing air navigation services over the high seas under specific delegation by ICAO. Separate route air navigation services charges would normally apply for these services.

Sources of data for billing

5.36 Data for charging can be obtained from a variety of sources. However, regardless of the source the data should represent reasonable evidence that the flight being charged for the services concerned has taken place.

5.37 In the case of approach and aerodrome control charges the source data may be the same or similar to the data used for calculating landing charges, for example air traffic control logs, apron control logs or records kept by handling agents, unless the approach and aerodrome control charges refer to services provided centrally in which instance the source data is more likely to be similar to that used for charging for route air navigation services (see below).

5.38 The prime source data for domestic and oceanic route air navigation services charges will emanate from the operations control rooms and can be in a variety of forms such as:

a) daily flight summaries of flights handled;

b) direct input from the flight data processing system;

c) activated stored flight plans; and

d) ATC flight progress strips.

5.39 The above would normally represent the direct operational data used for charging purposes. However, this may not represent the only data required especially where there are significant numbers of flights outside controlled airspace. In such cases services provided could include flight information services, meteorological services, the provision of navigation aids and area control services from aerodrome towers. Sources that could provide additional data required in these cases could include:

a) aerodrome air traffic control logs;

b) flight plans/AFTN; and

c) ATC flight progress strips.

5.40 Whatever the situation of the ATC entity, the source data used for charging purposes will need to be sorted and validated. Where the service is highly automated, data processing systems can be utilized making use of the operational ATC systems. This would be particularly applicable to high volume operations, however, where volumes are low or these resources are not available then this is likely to be a manual operation. This will necessitate the employment of staff to sort the flight progress strips and other source data in order to identify the chargeable flights.

Legal basis for the charge

5.41 Air navigation services charges are levied for services provided or made available to users (in accordance with the regional air navigation plan). Charges may be levied on the basis of the same unit rate regardless of category of user or, alternatively, some categories of users may be specifically exempted or charged at a lower unit rate, for example flights made under visual flight rules (VFR).

5.42 In summary a flight may be defined as:

An aircraft movement through any airspace and defined by aircraft identity and/or airline flight identity, aircraft type, flight category, respective entry and exits points, departure and destination airports, date and time of departure.

5.43 In general the liability to pay the charge would fall on the user who at the time the flight was made was the operator of the aircraft concerned. In some cases where the operator cannot be traced the owner of the aircraft can be made liable for the charge.

5.44 Identification of the correct operator is fundamental to the smooth operation of any billing system. In the majority of cases the ICAO call-sign and/or the registration of the aircraft will provide the crucial link. This information is usually entered on the flight plan and will appear on the ATC flight progress strip. In addition it may be used by handling agents and apron controller';. Nonetheless there can be problems when aircraft are leased, especially if there is a wet-lease involved (an aircraft leased along with a crew to operate it). In these cases the call-sign may not be sufficient unless the system's billing regulations specifically state to this effect. Follow-up action through to the aircraft owner may be necessary. If the uncertainty remains, other factors may need to be considered. These could include:

a) the carrier under whose certificate or permission the flight was made;

b) the identity and employment of the crew; and

c) the operator identified with the aircraft concerned.

5.45 It is recognized that where major carriers or operators are involved the identification will normally be obtained from the activated stored flight plans or ATC flight strips generated from the operational system; these will usually identify the flight through its specific call sign rather than its aircraft registration.

5.46 A formal agreement between the air navigation services provider and the owner/operator of the aircraft is generally not necessary. The charges for air navigation services are either levied through promulgated regulations or, where charges for aerodrome control services are levied as part of the airport charges, under the airport's published terms and conditions. Additional information required will depend to a certain extent on the charging parameters used. For example, if weight is a parameter then the aircraft type will need to be identified. Various weight options may be adopted. Many systems use maximum certified take-off weight but a system of published standard weights could be used, the main criterion being that this should be applied consistently.

5.47 If distances are also used, and this is very likely to be the case for route air navigation services charges, then airports of departure and arrival and/or respective entry and exit points will need to be identified in order to take account of distances within the airspace for which the State concerned has accepted responsibility for providing air navigation services; this information can be obtained from the operational data. Some systems use standard distances, whilst others use actual distances. Relevant data is necessary to support the choice of distance methodology used for calculating distances, the main criterion again being consistency.

5.48 In the case of many charging systems the conditions regarding their application as well as key elements of the system, for example the method of calculating the charge, exemptions and payment conditions, are published. Such publication is recommended as a general practice.

Verification and validation of data

5.49 As stated above there are a variety of data sources but the most important are generated from the ATC flight data processing systems (FDPS). In addition programmes have been developed for extracting the chargeable data but given the wide range of sources of data needed to ensure availability of all the data required a data validation process needs to be installed in order to minimize future claims and reduce the burden on users.

5.50 In most systems it is advisable to establish an agreed timetable for validating and transmitting the data to whoever is responsible for the billing. In the case of multilateral systems (see below) adherence to this timetable is essential in order to prevent delays in charging.

5.51 Where there are high volumes of traffic one option is to break down the data into specific days and assign the responsibility for validating a particular day's traffic to whom it may be most appropriate. Under this system a day's traffic could be a compendium of data from various sources as described above.

Corrections and claims (disputed bills)

5.52 In spite of having a validation procedure the department or agency receiving the data for billing may identify queries that will require correcting by the group responsible for data transmission. For err ample, the ICAO designator may be incorrect. In order o minimise delay a list of queries should be sent to the validating section for investigation.

5.53 In the case of claims the situa ion can be sensitive since the user concerned will be expecting an answer as quickly as possible. Delays in processing claims are not only costly to the ATC entity but are also costly to the users and unless they are handled promptly can bring the system into disrepute.

5.54 Some large users can receive de tails of the invoices electronically and that greatly eases verification since it can be automatically compared with the users own flight data. Where a user submits the claim on a disputed bill it should be passed back to the data validation department for verification. Where there are high volumes of data and/or where data is from a large variety of sources with significant categories of users exempted, e.g. VFR flights, it may be necessary to employ a person full-time on this task.

Multilateral systems

5.55 This principally applies to route air navigation services. A multi-State multilateral system can provide economies of scale for those States participating in the system and, because of the wider area covered, such a system can facilitate enforcing r ecovery of charges. This particularly applies to States with a relatively small geographical area where a high proportion of the flights handled are overflights. In addition, and most importantly from a user's point of view, users will receive only one bill regardless of the number of participating States overflown.

5.56 In multilateral systems involving a number of participating States it is usual to adopt a comm on convertible currency for billing and payment purpo ses. Where this is the case the Council Statements in Doc 9082/4, paragraph 38 (iv) should be noted. (See also 5.7 above).

5.57 The same criteria regarding fligh t definition, legality and validation described in 5.41 to 5.54 above will also apply to multilateral systems. In addition, rules would need to be established for reporting the charging data to the central authority for issuing the invoices. This would normally involve allocating specifi c reporting responsibilities to participating States usuall y based on

geographical location to ensure a flight was only reported and billed for once. A feature of multilateral systems is that responsibility is placed on each participating State to report on behalf of other members thereby establishing a degree of interdependency. A further description of some of these systems is contained in Chapter 2 of this manual.

Billing issues

5.58 Following the collection of data on chargeable flights, data for air navigation services bills must be prepared and payment collected from the operators concerned. It will be more practical and economical to bill operators periodically where many regular operators or flights are involved rather than sending a separate bill for each flight. As stated above a multilateral system is particularly helpful in this respect.

5.59 Most States and charging agencies usually bill operators once each calendar month, although where source data is easily obtainable without undue delay consideration may be given to more frequent billing. This should reduce working capital exposure as a result of shortening the time between the flight taking place and the dispatching of the invoice, and lead to an improved cash flow.

5.60 In certain circumstances the charging authority (e.g. an entity providing air navigation services, or an airport) may prefer to collect the charge directly after landing or prior to take-off of the flights concerned. The main advantage of this method is the prompt receipt of the amounts involved; this may be particularly relevant in the case of occasional or one-time users from whom collections might otherwise be difficult or users who have a poor payment record. Apart from such users, this approach is not recommended as it can involve more elaborate administrative arrangements to ensure the proper receipt and recording of payments.

5.61 Regardless of the approach, billing should be carried out as soon as feasible after the time the flight(s) involved took place not only to accelerate the flow of revenues to the air navigation services provider but also to facilitate verification by the operator of the flights(s) involved and the facilities or services used or made available and charged for. Very late billing by the charging authority (for example many months or even a year after the flight(s) took place) could delay payment because of difficulties the operator may experience in such verification so long after the event, and as a result it is recommended that charging authorities always issue bills promptly.

5.62 The bill or invoice must provide the aircraft operator with the information necessary for verification and payment purposes, for example the type of charge(s) and amounts(s) due, the flight(s) involved, and the date by which payment is required (which should be reasonably close to the billing date to avoid undue delays in the receipt of revenues, but would still allow for verification of the data in the invoice). Terms of payment should also be indicated and where payment should be sent (for example, the charging authority itself or a bank, in which case the address(es) and account references should be included). The invoice should show a contact address and telephone/fax number to facilitate the handling of queries and disputes. If necessary, the invoice may also indicate that failure to make payment by the due date would lead to an interest penalty being charged at the discretion of the charging authority.

5.63 In some cases the entity providing the air navigation services will employ an outside agency to prepare its invoices. In situations such as these care will need to be taken to ensure that the validation process does not delay transmission of data to the billing authority. Adherence to a strict transmission timetable together with close monitoring of performance are essential attributes to an effective operation.

Charges in the form of levies on passengers, freight and/or fuel

5.64 Charges in the form of fees or taxes on passengers, freight and/or fuel are not normally collected by the charging authority directly from the user. For administrative convenience and economy, the charges would usually be collected by airlines or agents with respect to those relating to passengers and freight, and by fuel companies for fuel-related charges. Passenger- or freight-related charges, whether fixed or expressed as a percentage of the fare or rate, would be collected by the airline or agent when the ticket or air waybill is issued. For passengers with tickets issued abroad, the tax may be collected at the airport of departure in the State levying the charge at the time of check-in (most international passenger tickets are for return travel). Since freight is transported only one way (on each air waybill) such procedures could not be applied to incoming international

air freight shipments. Fuel-related fees would be added to the price of fuel charged by the fuel companies.

Collection of taxes by the charging authority as an agent of the government

5.65 The charging authority may in some instances be responsible for collecting taxes levied by the government for general or specific revenue purposes or other purposes unrelated to the provision of air navigation services. In such instances the charging authority acts solely as an agent of the government. The taxes collected should be recorded and held separate from air navigation services revenues even when they are collected at the same time as the air navigation services charges concerned. As the taxes are collected they should be transferred directly to a specified treasury or other government account, however, if the charging authority needs to transfer the taxes collected only at certain intervals, such as once a month, it could place the taxes collected prior to the date of transfer in an interest-bearing account in its own name.

Collection problems

5.66 Problems may be encountered in the collection of air navigation services charges. In dealing with such problems, the extent and costs of any collection efforts should be commensurate with the amount involved. The extent of the difficulties encountered in collecting outstanding amounts will vary depending on whether the parties concerned are located in the State imposing the charge, or whether they relate to payments for overflights by operators not located in that State. In the former case, collection may be easier because of the greater accessibility of the debtor. In extreme cases, seizure of aircraft or other assets of the debtor may be necessary.

5.67 With respect to overflights, the Council Statements in Doc 9082/4 (paragraph 42) confirm that the providers of air navigation services may require all users to pay their share of the costs regardless of whether or not the utilization takes place over the territory of the provider State. In practice, a State may have difficulty in collecting the charge for one-time or infrequent overflights that do not land on its territory, by an operator not located or without an office in the State concerned. Where repeated collection efforts have proven unsuccessful and the amount involved is significant, the provider State may, as a last resort, for example, consider seeking the assistance of the Directorate of Civil Aviation of the State of Registry of the aircraft concerned, or contracting with a collection agency in the State where the operator is based.

5.68 Where such approaches have failed, consideration might be given to an alternative approach of making the granting of any overflight permit or preflight clearance (if required) subject to the operator concerned naming an agent in the State to be overflown, who would undertake to pay the charges levied. The State should make its acceptance of such an agent contingent upon him having proper authorization from the operator and being capable of making the payments concerned.

5.69 In cases where a regional agency has been established to levy and collect the charges for several States, the problem of non-payment for overflights is significantly reduced because most of the operators of overflights are likely, sooner or later, to land in one of the participating States. Such regional agencies are discussed in Chapter 2.

D. CONSULTATION WITH USERS

Nature of consultation

5.70 The Council Statements in Doc 9082/4 (paragraphs 44 and 45) recommend that air navigation services providers consult with the users when significant changes in air navigation services charging systems or levels of charges are contemplated. It should be understood, however, that the purpose of such consultation is to ensure that the providers give consideration to the views of users and the effects the charges will have on them, that consultation implies no more than discussion between users and providers in an attempt to reach general agreement on any proposed charges and, that failing such agreement, the providers would continue to be free to impose the charges concerned (consistent with policy set by the State or other national economic regulator).

5.71 Consultations with users may provide useful comments and suggestions for improvements in the management of the charging system and lower costs for both providers and users. Consultations might also reveal

aspects of the proposed charges which may inadvertently discriminate unfairly against certain user groups. Closely related to consultation concerning charges is the Council recommendation in Doc 9082/4 (paragraph 46) concerning the desirability of regular users of route facilities and services or their representative organizations being consulted as early as practicable when major new air navigation services are being planned and the responsibility of users for their part to provide advance planning data to air navigation services providers relating to their operations, requirements and other relevant matters.

Approach to consultation including advance notice

5.72 Inherent in the consultation process recommended by the Council is the need to give users reasonable advance notice of new or increased charges, to permit them to make any necessary arrangements to meet the additional costs involved. The Council recommends in Doc 9082/4 (paragraph 45 (i)) that, so far as possible, at least two months' advance notice of any significant review of existing charges or the imposition of new charges be given to the principal users, either directly or through their representative bodies. For the purpose of consultation, the Council Statements (paragraph 45 (ii)) recommend that users should be provided with adequate financial information. Summaries of the main revenue and expense items as well as other financial data shown in Chapter 3, Section B illustrates the type of information referred to. Bodies representing the users referred to above include the International Air Carrier Association (IACA), the International Air Transport Association (IATA) and the International Council of Aircraft Owner and Pilot Associations (IAOPA). The advance notice, usually a circular letter and/or Class II NOTAM, would describe the intended new or revised charges or charging system and stipulate the date of effectiveness, and would invite comments on the proposed charges by a given date.

5.73 Consultation may be undertaken in various ways, the principal means being by consideration of written submissions and by consultative discussions with users or their representative bodies or associations. Sufficient information on the causes of changes to the cost basis and recovery of costs should be provided to users as a basis for meaningful discussion. After consideration of the submissions, and any associated discussions, the notice of the final decision should be given to the users at the earliest possible date, which should fall, so far as possible, within the two months' advance notice period referred to in the preceding paragraph.

E. CHARGES/COST RECOVERY ASPECTS OF CNS/ATM SYSTEMS PROVISION

5.74 Costs attributable to the provision of CNS/ATM systems services are recoverable from the users of these services as are costs of providing other air navigation services. The identification of CNS/ATM systems costs was addressed in Chapter 4, Section E The approach to the recovery of these CNS/ATM systems costs, however, can take more than one form depending on whether the costs are attributable to en route utilization as opposed to approach and aerodrome utilization.

5.75 When a portion of CNS/ATM costs is attributable to en-route utilization, the approach to cost recovery of that portion is affected by whether or not the State concerned operates an ACC (or FIC). As to the approach and aerodrome control portion of the CNS/ATM costs it could either be included in any such approach and aerodrome control charges as might be levied on traffic at the airports concerned or recovered from the users in co-operation with the airports concerned; or alternatively it could be included in such approach and/or aerodrome control costs that would be charged to any of these airports. In the latter two instances each airport could then include those costs together with other air navigation services costs in the cost basis for, and recover them through, such charges as landing charges or, where they are levied by the airport, approach and aerodrome control charges.

5.76 The CNS/ATM systems services costs attributable to en-route utilization could be includes I together with other air navigation services costs allocable to en-route utilization in the cost basis for and recovered through route air navigation services charges levied by the State concerned. As was noted, however, in Chapter 2, 2.79 and 2.80, implementation of the CNS/ATM systems concept offers the cost saving potential of merging many FIRs and correspondingly reducing the number of ACCs. Nevertheless, even without an ACC a State would still need to incur costs associated with providing CNS/ATM systems services as well as other air navigation services to traffic during the en-rout,: phase of flight e.g. costs associated with participation in or provision of GNSS augmentation, provision of AFS links with one or more ACCs, MET services, etc.

Recovery of these costs would call for co-operation or agreement between the State concerned and the entity operating the ACC serving traffic in the expanded FIR wherein the State concerned would be located. The purpose of such an approach would be for route air navigation services costs of that State to be included as an identifiable element in the cost basis for, and recovered through, the charges levied by the ACC serving the expanded FIR. The charges share represented by these costs would then be transferred to the State upon payment by the users charged.

5.77 With regard to cost recovery aspects of the GNSS additional guidance is provided in the ICAO Air Navigation Services Economics Panel's *Report on Financial and Related Organizational and Managerial Aspects of Global Navigation Satellite System (GNSS) Provision and Operation* (Doc 9660).

Chapter 6

FINANCING AIR NAVIGATION SERVICES INFRASTRUCTURE

INTRODUCTION

6.1 This chapter discusses various aspects of financing that need to be considered when embarking on an air navigation services infrastructure investment project. The project may entail construction of a new, or extension of an existing building, and/or purchase and installation of new equipment, etc., required for providing air navigation services.

6.2 The chapter is divided into five main sections. *The* first — *General* — addresses the relevance and content of traffic forecasts in the context of project development and financing and refers to related policy and other guidance available. It also discusses the services of consultants. *The* second main section — *Financial and economic analysis* — focuses on the relevance and purpose of three types of such analysis, i.e. financial evaluation, cost/benefit analysis and economic impact analysis.

6.3 The third main section — *The financing plan* — considers the purposes of such plans, and the basic information they need to provide, addresses currency requirements — domestic as well as foreign, and discusses the repayment of loans. The fourth main section — *Sources of financing* — focuses first on possible domestic sources and then on foreign sources that might be approached for financing an air navigation services investment project. Finally, the fifth section — *Special financing aspects of CNS/ATM systems implementation* — reflects on considerations specifically relevant to the provision of CNS/ATM systems.

A. GENERAL

Differences between air navigation services and airports in the context of financing

6.4 There are certain differences between air navigation services on one hand and airports on the other, which are relevant in the context of financing. First, in the majority of States air navigation services, unlike an airport, may be provided by more than one entity. In those States where several entities may be involved, only a few may be major service providers. The financial strength of each of these entities may differ and so may consequently the ability of each to secure financing as well as to negotiate favourable terms. Secondly, air navigation services may have an international or multinational dimension rarely found in airports. This is manifest by the existence of international operating agencies to which the participating States have assigned the operation of air navigation services, notably route facilities and services; and by the emergence of multinational facilities and services, such as the world area forecast system (WAFS) and many components of the CNS/ATM systems. In such circumstances the prospect of obtaining financing and of negotiating favourable terms would normally be enhanced where the servicing of such financing is backed by a collectivity of the States concerned.

6.5 A third area where the operation of air navigation services differs from that of airports is that frequently a substantial and sometimes major portion of the traffic does not land in the State providing the services but overflies through the airspace within which the State has accepted the responsibility of providing air navigation services. Such traffic represents users that may be required to pay costs allocated to them in a reasonable manner. Of importance in this context is that revenues from overflights may be relevant in any loan negotiations or debt servicing.

Relevance of traffic forecasts

6.6 Sound traffic forecasts are essential to any air navigation services infrastructure development project and its financing. The main purpose of such forecasts is to identify traffic developments and to establish the

associated capacity requirements of the air navigation facility or service involved. The forecasts should cover the planned life of the project concerned, and should include forecast annual volumes of international and domestic scheduled and non-scheduled aircraft movements, in terms of en-route traffic and also, if relevant, airport traffic at the airport(s) the facility would serve. In addition, en-route movements should be broken down into overflying and landing/departing traffic. The forecasts should moreover include, where relevant, general aviation and State (including military) traffic. Depending on the project, distribution of traffic by month, day and hour may also be required in order to recognize traffic trends and peaking patterns, as would be data relating to aircraft types expected to be operated.

6.7 For guidance on the preparation of traffic forecasts reference is made to the ICAO *Manual on Air Traffic Forecasting* (Doc 8991). Reference should also be made to the Council Statements (Doc 9082/4), where it is recommended in paragraph 46 that users of air navigation services, particularly airlines, should "provide advance planning data relating to future types, characteristics, and numbers of aircraft expected to be used; the special facilities which the users desire; and other relevant matters, to the extent possible on a 5- to lo-year forecast basis."

Consultants

6.8 In the planning and throughout the implementation of an air navigation services investment project it may often be desirable and advantageous for the provider of air navigation services without sufficient expertise in the planning field to obtain the services of one or more outside consultants. In so doing, however, it is important that every effort be made to ensure the consultant selected is thoroughly knowledgeable in the area of expertise required. Under normal circumstances it is also desirable that the consultant not be affiliated with a major contractor or a manufacturer of air navigation services equipment, as this could possibly influence any technical specifications drawn up by the consultant or prepared on the basis of the consultant's report. Management of the air navigation services concerned should also work closely with the consultant, regularly monitor the work and carefully review the resultant report, assessing, for example, whether it is realistic and that national and local circumstances have fully been taken into account. (With regard to obtaining expert assistance reference should also be made to the text on the United Nations Development Programme in Section D below.)

B. FINANCIAL AND ECONOMIC ANALYSIS

General

6.9 All organizations are faced with decisions on how best to pursue their objectives. To guide investment decisions, organizations use evaluation techniques which focus on the options and search for that which maximizes net benefits. Every major investment decision taken by a provider of air navigation services should be supported by analyses to demonstrate costs and benefits accruing from investment in infrastructure to providers, users and, as appropriate, the wider community. Consultation with users should assist States in guiding their major investment decisions. With regard to analyses undertaken, commonality in approach within a State or region would be desirable.

6.10 In the following paragraphs, three types of analyses are described in general terms. These are financial evaluation, cost/benefit analysis and economic impact analysis. Each focuses on a different frame of reference. Considerable literature is readily available on each of these analyses which would provide much more detail than can be afforded in the limited space and scope of this document.

Financial evaluation

6.11 Financial evaluation deals with the direct costs, revenues and sources of funds associated with the specific investment. This evaluation is intended to demonstrate the financial viability of the investment to the provider of the capital funds of identifying the total incremental costs and comparing these to the scope for recovering these costs over the life of the asset.

6.12 The total costs include not only the initial capital investment, but also the incremental operation and maintenance costs throughout the useful life of the asset. The capital costs would include any project office costs that may be required to plan and integrate the new project into the current operations as well as the interest costs of borrowing the funds. Capital costs are often restated as depreciation and interest to be recovered over the life of the asset. Incremental operations and maintenance costs may indeed be a negative amount if the capital investment resulted in reduced staff or other maintenance costs over the life of the asset. Technologi-

cal advances are creating many new opportunities to provide increased levels of service while reducing long-term costs.

6.13 On the revenue side, the source of the revenues needed to pay the incremental costs must be identified and the risks associated with that source of revenue must be assessed. Usually, the revenues come from charges which would be set to recover the total costs over the useful life of the asset. User charges may decrease as a result of the investment. However, to help assess the risks, any increase in user charges can be restated to reflect the impact on the users, such as the resulting increase per passenger ticket or as a percentage of the flight operating costs. The increase in these user charges will have a direct impact on the demand for services provided. The extent to which the demand is affected can then be taken into account in determining the risks associated with this revenue stream and ultimately the financial viability of the project itself.

6.14 A properly completed financial evaluation will provide a complete assessment of the cash flows, including the risks of the downstream revenues, associated with each investment option and also assist with choosing between alternative solutions.

Cost/benefit analysis

6.15 Cost/Benefit Analysis (CBA) identifies the investment option that best conforms to the economic goal of maximizing net benefits. This obviously goes well beyond a financial evaluation which focuses on the project's financial accounts and cash flows. In addition, there are differences between a financial evaluation and a CBA on the treatment of capital costs. While a financial evaluation would normally restate the capital costs into annual depreciation and interest expenses, a CBA measures capital costs by the cash expenditures required in future years — not by depreciation and interest. The cash stream of expenditures is compared to the stream of benefits and the annual net amounts are discounted to compute a net present value for the investment option.

6.16 To illustrate the different scope of a financial evaluation and a CBA, consider the installation of a new radar in a previously non-radar airport location. The financial evaluation would look at the financial cash flows and required user charges associated with this investment, while a CBA would consider the benefits and costs of all parties involved. These would include the user benefits to the air carriers from fuel savings anc to passengers from time savings. Additionally if con sidering the wider social effects, the negative effects like increased traffic and noise experienced by individual!, living or working in the vicinity of the airport need to be taken into account.

6.17 There are also potential productivity gains fo the provider of the air navigation services which must be taken into consideration. For example, an investment in modem ATS technology may reduce the number of air traffic controllers required in the future thereby reducing future operating costs. Transportation efficiency benefit:; may also accrue to the operator (e.g. airlines) and would include savings arising from the more efficient operation of aircraft, and greater service reliability and predict ability. Similar considerations to those noted in the last sentence of 6.16 would also apply.

6.18 The measurement of safety benefits require s an analysis of the safety risks which are a composite measure of the probability and the severity of an adverse occurrence. A CBA takes the consequences determined by a risk analysis and attributes a specific monetary value to them. Where accident losses involve tangible goods such as property, accident risks can be valued on the basis of replacement or repair costs. Where losse s have intangible consequences such as personal injury or loss of life, the proper valuation of accident risk become,; more uncertain and judgmental, and should be approached with care. Given the difficulties involved with measuring safety benefits, they are often omitted in these analyses unless the safety benefits would differ among the options considered or prove decisive in establishing a positive net benefit for a single infrastructure investment. Where a project cannot be justified by con - sideration of the non-safety benefits, it may be necessary to consider whether the project will lead to an improve - ment in the level of safety.

6.19 Projects may have negative or positive effect s which are experienced by third parties (for example environmental impacts). The identification and measure,- ment of these effects are less readily identifiable and l may have no obvious market value. It is nevertheless useful to list these and quantify them using analytic; 1 techniques if at all possible.

6.20 The impact on the environment is an important effect of many large transportation projects. Whether considered as a cost or as a negative benef t (environmental effects are often unintended and typically negative), these effects are difficult to measure in a

precise way. Nevertheless, it is important that they be identified and carefully evaluated. Considerable literature is available to assist in the quantification of environmental effects.

6.21 Once all of the benefits and costs have been identified and forecast, in order to determine if a project is cost beneficial, or to assess which option yields the greatest net benefits, the net cash stream of benefits and costs is discounted to today's value to produce a single Net Present Value (NPV). The preferred option, from an economic perspective, would be the one with the highest NPV. The need for discounting stems from the fact that the value that is placed on income and expenditures depends on when they occur. One unit of currency to be received a year from now is worth less than the value of one unit of currency in one's pocket today, because of opportunities foregone during the year.

6.22 Benefits and costs do not necessarily follow the same distribution of cash flows arising from a financial evaluation. In addition, benefits accruing to aviation users may be insufficient to cover the total cost of the project.

Economic impact analysis

6.23 Economic impact studies demonstrate how payments for transportation and construction activity permeate an economy. These economic impacts include induced benefits, often referred to as the "multiplier effects" which are not taken into account in a cost/benefit analysis.

6.24 The contribution by air navigation services to the economy can be assessed on the basis of the following five key indicators of direct, indirect and induced economic activity: employment, personal incomes, business revenues, tax revenues and capital investment. Accordingly, economic impact surveys can be designed to collect information on a wide range of economic activity taking place throughout the State. In this context, large-scale and expensive macroeconomic and input-output models are required in order to develop baseline and project-related macroeconomic scenarios. Hence, level of effort considerations would suggest that the project has to be very large to warrant this type of analysis.

6.25 Economic impact surveys would normally include information on the impact on the number of air navigation services, airport and airline jobs, which could represent a very large payroll and constitute a major segment of the State's economy. In addition, local equipment purchases and maintenance add directly to the economic benefits produced by air navigation services.

6.26 Beyond the direct and indirect economic impact of the air navigation services, there is the induced impact on the economy created by the "multiplier effect" of direct and indirect impacts or activities. For example, the tourism industry would be highly dependent upon the efficient delivery of air navigation services. An economic impact survey can reveal these benefits to the economy from tourism and various related activities.

6.27 An economic impact survey can be structured to gather information on the share of the nation's Gross Domestic Product (GDP) which could be attributed to the provision of air transport services. Decisions regarding investment in additional capacity or infrastructure may depend on the knowledge of the contribution to GDP that is made by air navigation services. However, it must be remembered that air navigation services is but one of the three parts of the air transport system and that the separation of the air transport portion of the GDP into the three components may not be feasible.

6.28 While the preceding paragraphs have focused on the potential benefits of new or expanded I air navigation services, it should be recognised that such projects often involve certain disadvantages. For example, the specialised electronic equipment needed for air navigation services may have to be purchased from outside of the State causing balance of payment concerns. Construction projects may tie up limited supplies of national human, physical and financial resources, thereby delaying or postponing other projects. Also, the project may place demands on other infrastructure (such as airports, access roads and power) in excess of their capacity, leading to reduced services to other users or other costly expansion. Moreover, the project may pose environmental and ecological problems, such as pollution from aircraft noise and other emissions. The determination and, where possible, the quantification of these disadvantages must also be included in an economic impact analysis.

6.29 A well prepared and researched positive economic impact survey can be instrumental in obtaining financing, or better financial terms, for an air navigation services project. Indeed, an absence of such an economic impact survey may make it more difficult to secure financing from foreign government sources, such as

development banks and funds, where the effects on the national economy of the proposed project are taken into account in the evaluation process.

Summary observations

6.30 The expensive nature of air navigation facilities is making the need for financial and economic analyses increasingly important when seeking government or private financing. This is because air navigation, along with airports and the air carriers, makes an important contribution to the economies of the States in which they are located. The financial providers will require assurances of the project's financial and economic viability which can be demonstrated through the detailed analyses described above.

C. THE FINANCING PLAN

Purpose and contents of the financing plan

6.31 Prior to embarking on an air navigation services investment project and securing the financing required, various data need to be compiled. Thus, estimates of the costs of the project involved need to be prepared and, as noted above in Section A, annual traffic estimates need to be made for the period extending over the life of the air navigation services infrastructure created by the project. Possible sources for financing the project would need to be identified, as would potential revenue sources subsequently required to meet debt servicing obligations for which the provider of the air navigation services would be responsible. All this information is also relevant to the financial and economic analysis referred to above.

6.32 Once it is decided to proceed further with the air navigation services project, it becomes necessary to develop a much more detailed plan — the financing plan — which provides such basic information as:

a) estimates of the component costs (labour, materials, equipment, etc.) of each distinct part of the over-all project;

b) the funds required to make disbursements at various stages in the project's progress;

c) the currencies in which payments are to be made; and

d) the sources from which the funds are to be forthcoming whether from:

1) sources generated by the entity providing the air navigation services from its operations (which would primarily include user charges, and possibly retained earnings, but could in some circumstances also include contractual payments);

2) other sources including information on the applicable conditions (i.e. interest rate, repayment period, etc.).

6.33 Also to be emphasized is the importance of the availability of data showing the trend in the financial situation of the air navigation services provider concerned over recent years, as well as anticipated developments over the period of debt repayment. Of particular relevance is the recording of revenues and expenses by major item. Estimates regarding future financial developments would emanate from budgets and longer-term financial plans. In that context, reference is made to the text on the budgeting process in Chapter 3 under Section A — *Basic aspects of accounting and financial control*. In the absence of such financial data it will be much more difficult for those involved to decide whether or not the loan or financing sought should be granted and, if granted, what terms should be offered.

6.34 It should be understood that apart from regular reviews prior to the decision to proceed with the air navigation services project, once that decision has been made, the original cost and revenue estimates will need to be reviewed and updated. This process should continue throughout the project construction and implementation phase.

Currency requirements — general

6.35 An important — and in some instances a determining — factor as to whether or not an air navigation services investment project can proceed is the demand it places on foreign currency, and the extent to which costs can be defrayed in domestic currency. Where, as will often be the case, project costs call for payment in foreign funds and the national currency is not freely convertible, it is essential to establish at an early stage the practicability of obtaining the foreign exchange

required. The provision of such exchange will need to be examined with the appropriate fiscal authorities of the government, and for this purpose a statement should be prepared detailing as fully as possible both the foreign currency payments involved and the extent to which prospective sources of financing for the project can be expected to accommodate foreign exchange requirements. While arrangements securing the loan of foreign funds or even the provision of foreign goods and services on extended credit terms serve initially to reduce exchange problems, all such arrangements remain a legitimate concern of the fiscal authorities of the government, since repayment of the debt involved ultimately constitutes a demand on foreign exchange reserves. However, also to be noted in this context is that air navigation services charges may be made in convertible currency and that an air navigation services investment project may therefore in such circumstances not necessarily impose a (significant) burden on national foreign exchange reserves. (See also "Repayment of loans" below, and the text addressing currency aspects in Chapter *5 — Air navigation services charges and their collection,* 5.7).

6.36 The extent to which payment of project costs can be made in the domestic currency or will involve foreign exchange depends on the many and varied factors present in each situation, and it is therefore only possible to give the following general guide as to the kinds of costs that might typically be expected to fall into each category.

Costs typically payable in domestic currency

6.37 Such costs may include:

a) construction work and other services performed by domestic contractors and firms;

b) land acquisition including associated costs of any easements (e.g. rights of way over another's property), etc.;

c) salaries, wages and other related costs of national employees;

d) domestic materials, supplies and equipment of which the country is not a net importer;

e) interest on domestic credit; and

f) taxes.

Costs typically payable (wholly or partially) in foreign currency

6.38 Such costs may include:

a) construction work and other services performed by foreign contractors and firms;

b) imported equipment, materials and supplies;

c) wages, salaries, allowances and other related costs of expatriate personnel; and

d) interest on foreign credit.

Policy directives and contractual arrangements seeking maximum use of domestic labour and materials can be effective restraints on foreign currency requirements.

Repayment of loans

6.39 Early in the planning stages, an assessment needs to be made of the future ability of the provider of the air navigation services as such to service loan obligations. That ability depends to a large extent on the provider's revenue-generating capacity, which may increase significantly as a result of the availability of the new or improved air navigation services facilities financed by the loan concerned. In this context it may be recalled that many providers still do not recover their total costs and those serving low traffic volumes have little or no immediate prospects of doing so. Where this is the case, the burden of securing funds to service the loan will normally fall on the government concerned. Nevertheless, where circumstances permit, growing emphasis is being placed on providers assuming responsibility for providing the funds required for meeting a part of the interest and instalment payments on a loan taken to finance air navigation services infrastructure developments.

6.40 In a growing number of circumstances where governments have delegated the provision of air navigation services to an autonomous authority or body, they have also delegated to such a body the authority to negotiate and secure its funding and financing requirements, and the obligation of servicing loans taken, including their repayment.

6.41 Where such responsibility is assigned to the provider of air navigation services, a schedule should be drawn up showing for every loan or part of a loan

involved when each instalment and interest payment is to take place and the amounts involved, as well as what revenue or other income the provider intends or is expected to pledge against these commitments. Funds required to service the debt obligations would need to be channelled from the over-all revenue flow, principally revenues from charges.

6.42 Repayment of foreign loans usually requires outlays in convertible currency. To the extent the entity that provides the air navigation services is responsible for any servicing of this type of loan, it may be advisable for it to be given access to such convertible currency as it might have generated from its operations. This could involve the establishment of a convertible currency account (or accounts) being held for that purpose by the entity, subject, if required, to monitoring by the foreign exchange authorities in the State concerned to ensure it is being used as intended.

6.43 More recently growing attention has been given to offering a further guarantee to the lender by stipulating in the contract or agreement covering the loan, that a certain portion of the air navigation services charges collected will be set aside (possibly in a separate account) specifically to service interest and capital repayment obligations. In some cases, it may be necessary for the State to guarantee the loan. Where a foreign loan in convertible currency is involved the contract could stipulate, if this would facilitate obtaining the loan, that such an account would be held in a bank and State mutually acceptable to both parties.

D. SOURCES OF FINANCING

General

6.44 A survey of potential sources of funds for an air navigation services project and the selection of which of them to approach should be done as early as possible in the planning process. It is important to do so in order to have from the outset an indication of the probability of financing being available, to provide adequate time for completion of the usually lengthy preliminaries preceding the conclusion of specific financial arrangements and to become versed in the procedural and other requirements of such arrangements in time to incorporate those requirements directly into the planning process itself wherever compliance therewith would be facilitated by so doing.

6.45 Potential sources of funds will vary considerably from State to State, and which of them are to be approached has to be studied and decided individually for each project. The sources could be grouped as follows: direct contributions from government(s), loans or debt financing, internally generated resources (e.g. depreciation and retained profits), share capital and leasing.

6.46 The predominant share of air navigation services financing is provided by direct contributions from government and debt financing. Most common are government sources. This includes funds provided by the Government directly as well as through government-owned or -sponsored financial institutions, including development or export-promoting agencies. The government may be a national government, or one or more foreign governments. Also, one or more international governmental institutions or agencies may be involved. Financing through commercial loans, usually the most expensive form of financing air navigation services investment projects, is less common.

6.47 Domestic as opposed to foreign currency requirements and the associated relevance of domestic as opposed to foreign sources of financing are often factors of major importance, particularly in developing States. The text below therefore first addresses each of these two groups of sources separately. Reference will then be made to internally generated resources and briefly to financing through bonds, and share capital. Finally, the concept of leasing will be discussed as a means to be considered where purchase by the provider of air navigation services may not be as feasible or advantageous.

6.48 Not addressed below are arrangements where an enterprise undertakes to construct and operate a building and lease it out to one lessee for the expected life of the building. This approach, which is common in private industry, could also be applied with regard to building, for example, an area control centre or a communications centre, and may be a viable alternative where funds may not be readily available for the air navigation services provider to construct and own a facility whereas rental payments could be met from operating revenues.

Domestic sources

6.49 Costs to be met in domestic currency may be financed by various means available within the State itself, including loans (and sometimes grants) from

government sources, commercial loans negotiated through banks and other domestic financial institutions, and the extension of credit by contractors and other firms engaged in the project. Government assistance in the form of interest-free loans or even grants can appropriately be sought in recognition of the national (and possibly local and/or regional) benefits derived from the existence and development of the air navigation services concerned. Where, as is presently the situation with regard to most air navigation services, revenues are insufficient to cover total operating costs, including depreciation and cost of capital, the execution of any new development project will inevitably depend on government assistance in some measure, and the benefits just mentioned could play a role of particular importance in securing such assistance. Their evaluation, even though only practicable in broad terms, should therefore not be neglected and is a primary purpose of the economic analysis referred to in Section B above. Financial assistance in recognition of such benefits may of course be sought from the local and regional, as well as the national, governments, but in so doing it would need to be demonstrated that the particular communities falling within such jurisdictions would in fact derive distinct benefits beyond those realized nationally.

6.50 Further to what is noted in 6.33 above, where an entity providing air navigation services seeks commercial loans directly from banks or other domestic financial institutions it can expect that forecasts of its future operating costs and revenues will be required as a basis for assessing its ability to repay such loans. Where that ability is judged adequate, such commercial financing will probably be obtainable against an appropriate pledge of future revenues as already noted, but to the extent that it is found lacking it is likely that the loan will only be forthcoming if repayment is backed by the government or some other acceptable guarantor.

Foreign sources

General

6.51 Project costs payable in foreign funds constitute a demand on the State's reserves of foreign exchange and as such their financing will usually have to be arranged through, or with the approval of, the appropriate government authorities.

6.52 Depending on the magnitude of the costs involved and the state of exchange reserves, it may prove possible to obtain the required financing through such domestic institutions as those mentioned above, but usually this will not be the case and foreign sources will need to be found. In any event, quite apart from foreign exchange considerations, such sources should always be explored as a matter of course, since financing may be available from them on more favourable terms than those obtainable from domestic institutions (lower interest rate, repayment over a longer period, etc.). Foreign loans, however, are subject to the uncertainties and risks associated with currency fluctuations.

6.53 For most States, particularly developing States, the foreign sources of financing are principally government-operated. The following paragraphs focus first on such foreign governmental financing sources as bilateral institutions, and development banks and funds, and then comment on foreign commercial sources such as commercial banks, contractors and suppliers.

Bilateral institutions

6.54 Foreign financing may be available from foreign governments in the form of loans negotiated directly with the government of the recipient country, or may otherwise be facilitated by particular agencies of government which have been established for he primary purpose of promoting the nation's export trade. The development of transport facilities and the consequential benefits to the national economy as a whole expected to result from any given project may evoke the provision of such assistance for various reasons, among them being the desire to promote trade and cultural relations between the two countries. Additionally, as mentioned, the wish to facilitate the export of technology and equipment required for the project and available in the assisting State, may be a further reason for interest. Such assistance, as well as any subsequent negotiations, will usually need to be pursued through the appropriate governmental authorities of the State in which the project is being undertaken.

6.55 In the case of developing States in particular, such assistance may be available through the specific aid programmes which certain governments have established to promote economic and social development in various areas of the world. These programmes extend assistance in forms such as loans on preferential terms and the direct provision of supplies, equipment and technology. Examples by State of such sources of funds are:

Belgium. Administration générale de la Coopération au Développement — Brussels

Canada. Canadian International Development Agency (CIDA) — Ottawa

Czech Republic. Ministry of Foreign Affairs — Prague

Denmark. Danish International Development Agency (DANIDA) — Copenhagen

France. Caisse centrale de Cooperation économique (CCCE) — Paris

Germany. Ministry of Economic Cooperation — Bonn; Kreditanstalt für Wiederaufbau (KFW) — Frankfurt. Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) — Frankfurt

Italy. Department of Cooperation — Rome

Japan. Overseas Economic Cooperation Fund — Tokyo

Netherlands, Kingdom of the. Foreign Ministry — The Hague

Norway. Norwegian Agency for International Development (NORAD) — Oslo

Spain. Cooperación Internacional — Madrid

Sweden. Swedish International Development Agency (SIDA) — Stockholm

United Kingdom. Overseas Development Administration (ODA) — London

United States. U.S. Agency for International Development (USAID) — Washington, D.C.

6.56 For projects not qualifying for aid from such sources, assistance in meeting the requirements for foreign financing may be available through the special export-promoting agencies of certain governments. Assistance from these sources takes various forms, including direct loans by the agency itself, guarantees covering private loans, and insurance of the risk assumed by national enterprises in providing goods and services on credit terms. Examples of agencies of this nature are the Export Development Corporation of Canada, the Export-Import Banks of Japan and the United States, COFACE of France, HERMES of Germany, the Export Credit Guarantee Agency of Sweden, and the Export Credits Guarantee Department of the United Kingdom.

Development banks and funds

6.57 Probably of most importance among the possible sources of foreign financing available to developing States, are the international banks and funds that have been established to assist in the financing and execution of projects seeking to promote national economic development. Such projects cover a wide range of economic activities, of which the provision of ail: navigation services is but one. Prominent among these banks and funds are the International Bank for Reconstruction and Development and its affiliates, the International Development Association and the International Finance Corporation (although the purpose of the latter is to promote development through loans to the private sector), and various regional development banks and funds. A list of such institutions includes the following :

International Bank for Reconstruction and Development; International Development Association; International Finance Corporation (The World Bank Group) — Washington, D.C., United States

European Development Fund — Brussels, Belgium

Organization of Petroleum Exporting Countries (OPEC) Fund for International Development — Vienna, Austria

African Development Bank — Abidjan, Côte d'Ivoire

Asian Development Bank — Manila, Philippines

Caribbean Development Bank — Bridgetown, Barbados

Inter-American Development Bank — Washington, D.C., U.S.A.

In addition there are the following institutions established and financed essentially by Arab States:

Arab Bank for Economic Development in Africa (ABEDA) — Khartoum, Sudan

Islamic Development Bank (IDB) — Jeddah, Saudi Arabia

Saudi Fund for Development — Riyadh, Saudi Arabia

Abu Dhabi Fund for Arab Economic Development — Abu Dhabi, United Arab Emirates

Kuwait Fund for Arab Economic Development — Kuwait

Arab Fund for Economic and Social Development — Kuwait

6.58 As in the case of financing by foreign governments, the possibilities of obtaining financial assistance from the above institutions for any particular air navigation services development project, and the procedures to be followed in applying for such assistance, will inevitably involve the government of the State in which the project is being undertaken. There are two reasons for this: first, any loan or grant that may be extended will be made either to a government or government agency, or to a private entity with the support and guarantee of the government; second, the first test of suitability of a project is usually whether the sector of the economy in which it falls, and the project itself, are of high priority for development and are so recognized in the government's development plans.

United Nations
Development Programme

6.59 The United Nations Development Programme (UNDP) should be borne in mind by developing States as a source of assistance when seeking to finance air navigation services project(s). The various kinds of expertise required for the consideration, planning and execution of air navigation services development projects, such as will be needed for the necessary feasibility and cost-benefit studies, in the preparation of master plans and in the actual construction phase itself, may be requested from the State's programme of UNDP-funded technical support. As well as expertise, funding for minor necessary air navigation services equipment may also be obtained through the UNDP. Where such technical support is to be sought for any air navigation services development project, the specific requirements will need to be formulated and submitted to the national government for approval within the country's over-all programme of development projects for which technical support is being requested. It should always be remembered, however, that the principal role of the UNDP is to provide expertise but not the funds required to finance air navigation services construction or expansion projects.

Commercial sources

6.60 One of the simplest ways of dealing with costs payable in foreign funds is to place the responsibility for financing arrangements on foreign contractors and suppliers who stand to benefit directly from the project. In foreign commercial dealings it is often the practice for suppliers to be required to state, as part of their bid, the financing arrangements that they are prepared to offer, and for contractors to be given the responsibility for securing financing on the most favourable terms. When applied, such practices will not only help to reduce the financing problems encountered in air navigation services projects, but will also enable the acceptability of bids to be evaluated from all perspectives, including financial. For the latter purpose the bids should of course be required to quote supply prices separate from the financing charges involved, so that such charges may be compared with the cost of financing through alternative sources. In the financing of costs in such a manner, however, there is a risk that particularly needs to be guarded against, which is that in the process of selecting bids a firm's financing capability may be allowed to assume an importance disproportionate to that of other considerations more basic to the project's successful execution.

6.61 Banks, investment houses and other traditional commercial credit institutions operating in the private sector of the country of a contractor providing equipment, supplies or services for the air navigation services project may, of course, be approached directly for financing assistance. The cost and other terms of credit obtained in this manner are in general likely to be more onerous than those obtainable from the various public sources described in the preceding paragraphs. Commercial institutions of the kind referred to here exist in a variety of forms in different States, and for any particular State those likely to assist with an air navigation services project are probably best ascertained directly from the government concerned.

Internally generated resources

6.62 Depreciation and retained profit: from the operation of air navigation services may become a supplementary source for their financing in a growing number of instances. However, with regard to profits an important qualification that needs to be recalled in such circumstances is the principle outlined in the Council Statements in Doc 9082/4, paragraph 34 (iv):

> "Air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets (before tax and interest charges) to contribute towards necessary capital improvements.'

Bonds

6.63 Bond issues have essentially not been used to finance aviation infrastructure projects except in the United States, where they have provided about two-thirds or more of airport financing needs (federal grants providing the balance). With the prospects of a growing number of entities providing air navigation services moving towards partial or complete financial self-sufficiency, together with the increase in autonomy of most of these entities, this form of financing might attract more widespread interest in the future, because the financial capacity of air navigation services to directly or indirectly service bond issues may increase as a consequence. Of course, the terms under which a bond issue must be offered in order to be marketable, as well as the cost of the issue, will determine in each instance whether a bond issue is more advantageous than some other form of financing.

6.64 Various aspects need to be examined when a bond issue is considered as a source of financing. These include the type of bonds to be issued (e.g. general obligation bonds and/or revenue bonds) and how to gauge the competitiveness of a bond issue in the bond market. It is important that bond issues not be planned and undertaken without the active involvement of experts, because of the various and specific qualitative and quantitative judgments that need to be made, the thorough knowledge of the market required, the relative large amounts often involved in a bond issue and the costs of the issue.

Share capital

6.65 There is no known example of a wholly privately-owned organization being the principal provider of air navigation services. However, as the number of financially viable entities providing air navigation services has been increasing it is possible that consideration might in some cases be given to organizing such an entity as a corporation in which all the shares at least initially would be government held. Financing could then be obtained later by the entity by selling additional shares to private interests, the volume to be sold depending on i.e. whether or not over-all control should remain in government hands.

Leasing

6.66 Leasing rather than outright purchase may in some cases provide an attractive alternative where buildings and technical equipment are involved. The benefit to the entity providing air navigation services would be that it can have the use of the item(s) leased without having to incur a substantial financial outlay, Also, such use would normally take place sooner than if financing had to be sought in order to purchase the items. Leasing, moreover, does not significantly influence the over-all debt the provider needs to serve, and leasing arrangements may not be subject to the same extensive and time-consuming approval processes that purchases frequently are.

6.67 On the negative side, with leasing the entity providing air navigation services does not enjoy the benefit of ownership, including the addition to total assets. This may be relevant when financing for other air navigation services investment projects is being sought and assets that can be considered security are to be identified. Of greater significance is that leasing tends in the long run to be more expensive to the lessee because the overhead and profit of the lessor must be covered by the lease payments. In some circumstances, however, there may be offsetting factors; for example, where the items leased are renewed frequently, the maintenance expenses incurred by the provider may be reduced. Tax laws in some States may also encourage leasing arrangements.

E. SPECIAL FINANCING ASPECTS OF CNS/ATM SYSTEMS IMPLEMENTATION

6.68 Extensive analyses have shown that implementation of the CNS/ATM systems concept would be highly cost-effective both on a regional as well as on a global scale. Financing of CNS/ATM systems components, in particular at the national level, would normally be approached in a manner similar to that applied to conventional air navigation systems. A characteristic, however, of most CNS/ATM systems components which set them aside from the majority of conventional air navigation systems is their multinational dimension. Consequently, and because of the magnitude of the investments involved, financing of basic systems components e.g. satellite transponders, overlays, integrity monitoring and wide area augmentation systems, etc., may in most instances need to be a joint venture by the States involved at the regional or global level. Direct financing of many basic components may, however, not involve aviation at all, particularly where aviation is only

a relatively minor (although important) user of the CNS/ATM services. In such instances financing may be arranged by the system operator with aviation instead paying for access through leases or charges, which would include an element to recover costs of financing and repayment of capital.

6.69 Where an international agency or corporate-type entity would be providing basic CNS/ATM services its costs of financing could possibly be reduced if the States for whom the basic services are being provided were to guarantee the servicing and repayment of the loans concerned. This in turn should correspondingly reduce the costs to be recovered from these user States.

6.70 Leasing rather than outright ownership could become an important alternative in GNSS component provision. This could apply, for example, with regard to integrity monitoring and wide-area augmentation where access to a transponder or overlay may be effected in a less time- and capital-consuming manner than if the State(s) concerned were to operate these facilities itself (themselves). The possibility could also be explored of applying leasing to local area augmentation units, possibly through the establishment of leasing companies that would operate in a manner similar to those purchasing and leasing out, for example, computer systems, communication systems and/or aircraft under long-term leases.

Appendix 1
GLOSSARY OF TERMS

Accrual accounting. Income is credited to the period in which it is earned and expenses charged to the period when incurred.

Aerodrome control service. Air traffic control service for aerodrome traffic.

Aeronautical fixed service (AFS). A telecommunication service between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air services.

Aeronautical information service (AIS). Refer to Chapter 4, Section A, 4.21.

Aeronautical mobile service (AMS). A telecommunication service between aeronautical stations and aircraft stations, or between aircraft stations.

Aeronautical telecommunication service (COM). A telecommunication service provided for any aeronautical purpose. Refer also to Chapter 4, Section A, 4.13 to 4.17.

Air navigation services. This term includes air traffic services (ATS), aeronautical telecommunications service (COM), meteorological services for air navigation (MET), search and rescue (SAR) and aeronautical information services (AIS). These services are provided to air traffic during all phases of operations (approach, aerodrome control and en route). With the implementation of CNS/ATM systems, ATS and COM will be replaced by ATM and CNS which are broader in scope.

Airport phase of operations. Any or all phases of aircraft operation involving approach, landing, take-off and/or departure.

Airspace management (ASM)*. A planning function with the primary objective of maximizing the utilization of available airspace by dynamic time-sharing and, at times, the segregation of airspace among various categories of users based on short-term needs. In future systems, airspace management will also have a strategic function associated with infrastructure planning.

Air traffic control service (ATC). A service provided for the purpose of:

1) preventing collisions:

   a) between aircraft; and
   b) on the manoeuvring area between aircraft and obstructions; and

2) expediting and maintaining an orderly flow of air traffic.

Air traffic flow management (ATFM)*. A service consisting of tactical and strategic planning activities with the objective of ensuring an optimum flow of air traffic to or through areas during times when demand exceeds or is expected to exceed the available capacity of the air traffic control system.

Air traffic management (ATM)*. A system!; approach with the objective of enabling aircraft operators to meet their planned times of departure and arrival and adhere to their preferred flight profiles with minimum constraints, without compromising agreed levels of safety. It comprises ground elements and airborne

* These terms have been developed for the purposes of this manual from information obtained from several ICAO documents. Some of the information used for the definitions is mature, however, much of it is still being developed in light of changing technology and ongoing ICAO work. Formal, technical definitions will be developed as the need arises in line with the work programme of ICAO. The formal definitions, when developed, may be different from those used for the purposes of this manual.

elements which, when functionally integrated, form a total ATM system. The airborne part consists of the elements necessary to allow functional integration with the ground part. The ground part comprises air traffic services (ATS), air traffic flow management (ATFM) and airspace management (ASM), where ATS is the primary component.

Air traffic services (ATS). Refer to Chapter 4, Section A, 4.7.

Alerting service. A service provided to notify appropriate organizations regarding aircraft in need of search and rescue aid, and assist such organizations as required.

Amortize. To write down gradually to extinguishment the cost of an asset by periodic (annual) charges to expenses, usually applicable to intangible assets (e.g. development costs).

Annuity method of depreciation. See *Depreciation of assets.*

Approach control service. Air traffic control service for arriving or departing controlled flights.

Area control centre (ACC). A unit established to provide air traffic control service to controlled flights in control areas under its jurisdiction.

Area control service. Air traffic control service for controlled flights in control areas.

Asset. A resource from which future economic benefits over several years are expected to flow to the air navigation services organization that owns or controls it.

Augmentation (of GNSS). GNSS augmentation is the technique of providing the system with input information, extra to that derived from the main constellation(s) in use, which provides additional range/pseudo-range inputs or corrections to, or enhancements of, existing pseudo-range inputs. This enables the system to provide a performance which is enhanced relative to that possible with the basic satellite information only.

Balance sheet. See *Financial statements.*

Bond. Documentary promise to repay long term borrowed money with interest at a definite or determinable future date.

Book life of an asset. Period of time over which a fixed asset is depreciated.

Book value (or net book value) of an asset. The net amount at which an asset or asset group appears in the books of account, as distinguished from its market value or some intrinsic value.

Building (freehold). Building built on land owned by the building's owner(s).

Building (leasehold). Building built on leased land.

Business plan. Refer to Chapter 3, Section A, 3.15-3.22

Capital assets. Assets acquired with the expectation that they will remain in service for a number of accounting periods.

Capitalization of cost. The recording and carrying forward into one or more future financial periods as a depreciable asset any costs the benefits of which will be realized over the period(s) concerned.

Cash accounting. Income is credited when received and expenses are recorded when paid.

Cash flow. Refer to Chapter 3, Section B, 3.89 to 3.93.

CNS/ATM systems. The ICAO communications, navigation and surveillance/air traffic management (CNS/ATM) systems.

Computer. A system incorporating a central processing unit (CPU), memory, input/output systems, and certain associated equipment.

Computer hardware. The physical computer.

Computer software. Any programme that runs on a computer and instructs it. (Programme. A set of instructions written in a specific language to direct the computer in solving a problem or performing a task.)

Cost of capital. Refer to Chapter 4, Section B, 4.38.

Current assets. Assets that can be realized within one year. Refer also to Chapter 3, Section B, 3.77 and 3.78.

Depreciation of assets. The decrease in the value of an asset due to wear and tear through use, action of the

elements, inadequacy or obsolescence, normally over a predetermined period of time (depreciation period/ book life of the asset). For different methods of calculating depreciation see Chapter 4, Section B, 4.32.

Dividends. Distribution of earnings in cash or in stock.

Economic life (of an asset). The period during which an asset is expected to yield a rate of return.

En-route phase. Portion of a flight excluding the airport phases (see "airport phase of operations" above).

Equity. An interest of an ownership nature, as distinguished from an interest of a creditor nature.

Equity capital. Money furnished by owner(s) of an entity.

Financial statements. This includes the revenue and expense statement and the balance sheet. The revenue and expense statement summarizes all revenues and expenses with the difference between the two totals being either a profit or a loss. The balance sheet summarizes assets and liabilities with the difference between the two representing an increase or decrease in net worth.

Fixed assets. Assets that are permanent in nature and generally held for a period of more than one year (normally buildings and equipment).

Flight information region (FIR). An airspace of defined dimensions within which flight information service and alerting service are provided.

General aviation. All civil aviation operations other than scheduled air services and non-scheduled air transport operations for remuneration or hire.

Global navigation satellite system (GNSS). A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers, and system integrity monitoring, augmented as necessary to support the required navigation performance for the actual phase of operation.

Historical cost of an asset. The original valuation of an asset.

Liquidity. A state or situation determined by the extent or degree of possession of assets which are immediately available for discharge of financial obligations.

Meteorological services for air navigation (MET). Refer to Chapter 4, Section A, 4.18 and 4.19.

Multinational facility or service. A facility/service established for the purpose of servicing international air navigation in airspace extending beyond the airspace serviced by a single State. It could be operated by one State, a group of States or an international operating agency.

Multiplier effect. Normally expressed as a factor showing how much the direct economic impact of the airport is increased by the indirect and induced economic effects of airport activities.

Net book value of an asset. The net amount at which an asset or asset group appears in the books of account, as distinguished from its market value or some intrinsic value.

Obsolescence. The condition of being out of date. Obsolescence is caused by new technology and improved processes or a change in demand. It is not the result of mere age or wear.

Operating life of an asset. Period of time that a fixed asset can be used.

Reducing balance depreciation method. See *Depreciation of assets.*

Regional air navigation plans. Air navigation plans set forth in detail the facilities, services and procedures required for international air navigation within a specified area.

Replacement costs. The value as determined by the cost of replacing equipment with new models and designs capable of performing operations equivalent to those performed by the old equipment.

Residual value of an asset. Cost (of an asset) less any part of the cost that has been depreciated or amortized, or treated as an expense or loss.

Revenue and expense statement. See *Financial statements.*

Search and rescue (SAR). Refer to Chapter 4, Section A, 4.20.

Standard positioning service (SPS). Refer to Chapter 2, Section H, 2.76.

Straight-line depreciation method. *See Depreciation of assets.*

Traffic unit. Defined as 1 000 passengers or 100 tonnes of cargo or mail.

Unit rate. Refer to Chapter 5, Section B, 5.23 and 5.24.

Working capital. The amount of current assets less the amount of current liabilities.

Appendix 2

GLOSSARY OF ABBREVIATIONS

ACC	Area control centre
ADS	Automatic dependent surveillance
AFS	Aeronautical fixed service
AFTN	Aeronautical fixed telecommunication network
AIP	Aeronautical information publication
AIRMET	Information concerning en-route weather phenomena which may affect the safety of low-level aircraft operations
AIS	Aeronautical information service
AMS	Aeronautical mobile service
AMSS	Aeronautical mobile satellite service
ANPP	Air navigation plan publication
ANS	Air navigation services
ASM	Airspace management
ATC	Air traffic control
ATCO	Air traffic controller
ATFM	Air traffic flow management
ATIR	Air traffic incident report
ATIS	Automatic terminal information service
ATM	Air traffic management
ATN	Aeronautical telecommunications network
ATS	Air traffic services
CBA	Cost/benefit analysis
CFMU	Centralized flow management unit
CNS	Communications, navigation and surveillance
COM	Aeronautical telecommunication service
DME	Distance measuring equipment
FDPS	Flight data processing system
FIC	Flight information centre
FIR	Flight information region
GDP	Gross domestic product
GES	Ground earth station
GLONASS	Global orbiting navigation satellite system
GNSS	Global navigation satellite system
GPS	Global positioning system
HF	High frequency
IFR	Instrument flight rules
ILS	Instrument landing system
MET	Meteorological services for air navigation
MWO	Meteorological watch office
NAV	Navigation
NDB	Non-directional radio beacon
NOTAM	Notice to Airmen
NPV	Net present value
OAC	Oceanic area control centre
PANS	Procedures for air navigation services
PPI	Performance and productivity indicator
RCC	Rescue coordination centre
PSR	Primary surveillance radar
RAFC	Regional area forecast centre
R+D	Research and development
ROA	Return on assets
ROCE	Return on capital employed
RSC	Rescue sub-centre
SAR	Search and rescue
SIGMET	Information concerning en-route weather phenomena which may affect the safety of aircraft operations
SMR	Surface movement radar
SPS	Standard positioning service
SSR	Secondary surveillance radar
TAF	Aerodrome forecast
TCAC	Tropical cyclone advisory centre
VAAC	Volcanic ash advisory centre
VFR	Visual flight rules
VHF	Very high frequency
VOLMET	Meteorological information for aircraft in flight
VOR	VHF omnidirectional radio range
WAFC	World area forecast centre
WAFS	World area forecast system

International Organizations/Bodies

APIRG	AFI Planning and Implementation Regional Group
ASECNA	Agence pour la Sécurité de la Navigation Aérienne en Afrique et à Madagascar
COCESNA	Corporación Centroamericana de Servicios de Navegación AC ea
EANPG	European Air Navigation Planning Group
EUROCONTROL	European Organization for the Safety of Air Navigation
IACA	International Air Carrier Association
IAOPA	International Council of Aircraft Owner and Pilot Associations
IATA	International Air Transport Association
UNDP	United Nations Development Programme

Appendix 3

EXTRACT FROM THE *STATEMENTS BY THE COUNCIL TO CONTRACTING STATES ON CHARGES FOR AIRPORTS AND AIR NAVIGATION SERVICES* (DOC 9082/4)

II. STATEMENT BY THE COUNCIL ON CHARGES FOR AIR NAVIGATION SERVICES

Introduction

26. The global costs of providing air navigation services continue to increase relatively rapidly to handle growing volumes of traffic more efficiently. However, the level of cost recovery is now greater than it was in 1981, not only because of increases in existing charges but also because charges for route air navigation services are presently almost universally applied, such charges currently accounting for around 1.5 per cent of total scheduled airline operating expenses. In addition a small but growing number of States are also introducing separate charges for approach and aerodrome control.

27. The comments made in paragraph 6 concerning the potential benefits offered by assigning the operation of airports to autonomous authorities also apply to-air navigation services. Where this is in the best interest of providers and users, governments may wish to explore the possibility of establishing autonomous authorities to operate their air navigation services, recognizing that in some circumstances a single authority may operate both airports and air navigation services, and that the authority may be in the form of an autonomous civil aviation authority. The Council also encourages international co-operation in the provision and operation of air navigation services where this is beneficial for the providers and users concerned.

28. A number of additional factors are likely to exert an important influence on the organization and economic development of air navigation services. For example, the number of autonomous airport authorities is expected to increase. This could result in more situations where a different entity provides both approach and aerodrome control and route air navigation services. Also, additional resources will be required to deal with the problem of airspace congestion, and to implement satellite-based communications, navigation and surveillance (CNS) and air traffic management (ATM) systems, as well as other multinational facilities and services and other improvements in infrastructure.

29. States are likely to increase their efforts to recover their air navigation services costs from users in order to meet the increasing financial obligations of providing air navigation services. However, the Council recommends that States exercise caution in their general policy on charges for air navigation services and take into consideration the effect on users, in particular the air carriers which may need to adjust their tariffs to deal with increased costs arising from new or higher charges. The Council also considers that a balance should be maintained between the respective interests of providers of air navigation services and airlines and therefore recoinmends that States should encourage a greater level of co-operation between them.

30. The Council also expresses concern over the proliferation of charges on air traffic, and the retaliatory effects this could lead to, and recommends that States should:

i) Impose charges only for services and functions which are required for international civil aviation.

ii) Refrain from imposing charges which discriminate against international civil aviation in relation to other modes of international transport.

31. The problems involved in providing and maintaining the facilities required by the Regional Air Navigation Plans are particularly serious for the less advanced economies, principal among these being the limited financial resources available for economic development

generally, the higher priority assigned to other sectors of the economy whose needs are considered more urgent, under-utilization of air navigation services, the high cost of obtaining equipment from other States and the difficulties in recruiting sufficient numbers of qualified personnel. The Council will continue to take appropriate action towards obtaining more assistance for the States concerned in planning and financing air navigation services as well as with regard to the provision of adequate human resources.

The cost basis for air navigation services charges

32. As a general principle, where air navigation services are provided for international use, the providers may require the users to pay their share of the related costs, but international civil aviation should not be asked to meet costs which are not properly allocable to it. The Council therefore encourages States to maintain accounts for the air navigation services they provide in a manner which ensures that air navigation services charges levied on international civil aviation are properly cost-based.

33. The Council considers that an equitable cost recovery system could proceed from an accounting of total air navigation services costs incurred on behalf of aeronautical users, to an allocation of these costs among categories of users and finally to the development of a charging or pricing policy system. In determining the total costs to be paid for by charges on international air services, the list in Appendix 2 may serve as a general guide to the facilities and services to be taken into account. The guidance on accounting provided in the ICAO *Manual on Route Air Navigation Facility Economics* (Doc 9161), Chapter 1, and the *Airport Economics Manual,* Chapters 3 and 4, may also be found useful in this context.

34. When establishing the cost basis for air navigation services charges, the following principles should be applied:

i) The cost to be shared is the full cost of providing the air navigation services, including appropriate amounts for interest on capital investment and depreciation of assets, as well as the costs of maintenance, operation, management and administration.

ii) The costs to be taken into account should be those assessed in relation to the facilities and services, including satellite services, provided for and implemented under the ICAO Regional Air Navigation Plan(s), supplemented where necessary pursuant to recommendations made by the relevant ICAO Regional Air Navigation Meeting, as approved by the Council. Any other facilities and services, unless provided at the request of operators, should be excluded, as should the cost of facilities or services provided on contract or by the carriers themselves, as well as any excessive construction, operation or maintenance expenditures.

iii) The costs of air navigation services provided during the approach and aerodrome phase of aircraft operations should be identified separately.

iv) Air navigation services may produce sufficient revenues to exceed all direct and indirect operating costs and so provide for a reasonable return on assets (before tax and interest charges) to contribute towards necessary capital improvements.

35. In determining the costs to be recovered from users, it should be noted that:

i) Governments may choose to recover less than full costs in recognition of local, regional or national benefits.

ii) It is for each State to decide for itself whether, when and at what level any air navigation services charges should be imposed, and it is recognized that States in developing regions of the world, where financing the installation and maintenance of air navigation service: is difficult, are particularly justified in asking the international airlines to contribute through user charges towards bearing a fair share of the cost of the services.

iii) The approach towards the recovery of full costs should be a gradual progression.

Allocation of air navigation services costs among aeronautical users

36. The allocation of air navigation services costs among aeronautical users should be carried out in a manner equitable to all users. The proportions of cost attributable to international civil aviation and other utilization of the facilities and services (including domestic

civil aviation, State or other exempted aircraft, non-aeronautical users) should be determined in such a way as to ensure that no users are burdened with costs not properly allocable to them according to sound accounting principles. The Council recommends that States should:

i) Acquire basic utilization data in respect of air navigation services, including the number of flights by category of user (i.e. air transport, general aviation and other) in both domestic and international operations, and other data such as the distance flown and aircraft type or weight, where such information is relevant to the allocation of costs and the cost recovery system.

ii) Take into account the guidance on cost allocation contained in the ICAO *Manual on Route Air Navigation Facility Economics,* Chapter 1, and *Airport Economics Manual,* Chapters 3 and 4, although they may use any accounting approach they consider meets their particular requirements.

Air navigation services charging systems

37. States should ensure that systems used for charging for air navigation services are established in accordance with the following principles:

i) Any charging system should, so far as possible, be simple, equitable and, with regard to route air navigation services charges, suitable for general application at least on a regional basis. The administrative cost of collecting charges should not exceed a reasonable proportion of the charges collected.

ii) The charges should not be imposed in such a way as to discourage the use of facilities and services necessary for safety or the introduction of new aids and techniques. The facilities or services provided for in the ICAO Regional Air Navigation Plan(s) or in any recommendations of the relevant ICAO Regional Air Navigation Meeting as are approved by the Council are, however, considered to be necessary for general safety and efficiency.

iii) The system of charges must be non-discriminatory both between foreign users and those having the nationality of the State or States providing the air navigation services and engaged in similar international operations, and between two or more foreign users.

iv) Where any preferential charges, special rebates or other kinds of reduction in charges normally payable in respect of air navigation services are extended to particular categories of users, governments should ensure, so far as practicable, that any resultant under-recovery of costs properly allocable to the users concerned is not shouldered onto other users.

v) Any charging system should take into account the cost of providing air navigation services and the effectiveness of the services rendered. The charging system should be introduced in such fashion as to take account of the economic and financial situation of the users directly affected, on the one hand, and that of the provider State or States, on the other.

vi) Charges should be levied in such a way that no facility or service is charged for twice with respect to the same utilization. In cases where certain facilities or services have a dual utilization (e.g. approach and aerodrome control as well as en route control), their cost should be equitably distributed in the charges concerned.

vii) The charges levied on international general aviation should be assessed in a reasonable manner, having regard to the cost of the facilities needed and used and the goal of promoting the sound development of international civil aviation as a whole.

38. The Council:

i) Recommends that under normal circumstances, user charges should be expressed and payable in the local currency of the State concerned.

ii) Recommends that under special circumstances, for example where economic conditions are not stable, when a State proposes, or allows, denomination of user charges in other than local currency, airlines could apply the same currency of denomination, using the same exchange rate, for their local ticket sales.

iii) Recommends that remittance problems be resolved.

iv) Recognizes that when route air navigation services charges are billed on a regional basis (i.e. on behalf of several States or by a jointly

operated agency), it may be advantageous to both users and providers to denominate and pay charges in a single convertible currency.

Approach and aerodrome control charges

39. Where charges for approach and aerodrome control are levied, whether as part of the landing charge or separately, the charge should, so far as possible, be a single element of the landing charge or a single charge per flight and could take aircraft weight into account but less than in direct proportion.

Route air navigation services charges

40. The charge for route air navigation services should, so far as possible, be a single charge per flight; that is to say, it should constitute a single charge for all route air navigation services provided by a State or group of States for the airspace to which the charge applies. The charge should be based essentially on:

i) the distance flown within a defined area;

ii) the aircraft weight.

The element of distance flown, taken as one of the acceptable measures of the service rendered, should be applied by means of a distance scale using great circle distances or other commonly agreed distances. The element of aircraft weight should be applied by means of a weight scale using broad intervals which should be standardized so far as possible. This weight scale should take into account, less than proportionately, the relative productive capacities of the different aircraft types concerned.

41. Without prejudice to the guidelines provided above, which constitute a charging system for general application, the Council recognizes however that:

i) the characteristics of a given airspace will determine the most appropriate charging method for that airspace, having regard to the type of traffic, the distances flown and the characteristics of the aircraft in that airspace;

ii) when the distance flown and/or the aircraft types are reasonably homogeneous, the distance and weight elements may be separately or jointly neglected as the case may be.

Charges for air navigation services used by aircraft when not over the provider State

42. The providers of air navigation services for international use may require all users to pay their share of the cost of providing them regardless of whether or not the utilization takes place over the territory of the provider State. Accordingly, wherever a State has accepted the responsibility for providing route air navigation services over another State, over the high seas or in an airspace of undetermined sovereignty in accordance with the provisions of Annex 11 and Regional Air Navigation Agreements approved by the Council), the State concerned may levy charges on all users for the services provided. A State may delegate to another State or to an organization the authority to levy such charges on its behalf.

43. The collection of air navigation services charges in cases where the aircraft does not fly over the provider State poses difficult and complex problems. It is for the States to find the appropriate kind of machinery on a bilateral or regional basis for meetings between provider States and those of the users, aiming to reach as much agreement as possible concerning the facilities and services provided, the charges to be levied and the methods of collecting these charges.

Consultation with users regarding charges and air navigation services planning

44. The principles enunciated with respect to consultation concerning changes in airport charges in paragraph 22 are applicable also to changes in air navigation services charges, but in the latter case a need may also exist for more specific consultation between providers and airlines since air navigation services are generally provided by governments and it will therefore be easier to obtain a consultative opinion concerning their charges than in the case of airport charges where a number of conflicting interests may arise.

45. On the understanding that consultation implies no more than discussions between users and providers in an attempt to reach general agreement on any proposed charges, and that failing such agreement governments would continue to be free to impose the charges concerned, the Council therefore recommend,+ that:

i) When any significant review of existing charges or the imposition of new charges is contemplated by a provider of air navigation services, appro-

priate prior notice should, so far as possible, be given at least two months in advance to the principal users, either directly or through their representative bodies, in accordance with the regulations applicable in each State.

ii) In any such review, these users should, so far as possible, be given the opportunity to submit their *views* to and consult with the competent authority. For this purpose the users should be provided with adequate financial information.

iii) Reasonable advance notice of the final decision on any revision of charges or imposition of new charges should be given to these users. This period of notice should take into account the implications for both the users and the provider of the air navigation services.

46. When major new air navigation services are being planned, it is desirable that the regular users of air navigation services or their representative organizations be consulted as early as practicable. Equally, in order that providers of air navigation services may better plan their future financial requirements, the Council considers that users, particularly airlines, should, either directly or through their representative bodies, provide advance planning data relating to future types, characteristics and numbers of aircraft expected to be used; the special facilities which the users desire; and other relevant matters, to the extent possible on a 5- to 10-year forecast basis.

Appendix 4

BRIEF DESCRIPTION OF THREE INTERNATIONAL OPERATING AGENCIES

AGENCE POUR LA SÉCURITÉ DE LA NAVIGATION AÉRIENNE EN AFRIQUE ET À MADAGASCAR (ASECNA)

1. ASECNA, constituted as a public body with legal status and financial autonomy, and founded in 1959, is operated by 15 States in Africa* and France, which is also a member. Its functions on their behalf include the provision and operation of air traffic control services, communication facilities and meteorological services, for both route and approach and landing purposes in the 15 African States. In addition, the Agency may be entrusted by each of the States with the management or maintenance of any operation serving an aeronautical purpose, under individual contracts. The Agency may also be authorized to establish special equipment programmes for a particular State, especially with regard to the operation of its terminal aids or any special tasks entrusted to the Agency.

2. The Agency is governed by a Ministerial Committee, composed of the ministers responsible for civil aviation in the signatory States, which defines general policy. It is administered by an Administrative Council, composed of one representative from each signatory State, assisted by a Director General. The Agency employs its own staff but it can also have staff from signatory States seconded to it. ASECNA headquarters are located in Dakar (Senegal).

3. In accordance with the provisions of Article 15 of the Chicago Convention, the Agency may not extend to any user, directly or indirectly, or in any form whatsoever, benefits not offered to other users availing themselves, under the same conditions, of the facilities under its management.

Methods of financing

4. At present, the Agency is totally financed from its own operating income. It is authorized to levy charges to offset the financial obligations it assumes in the performance of the tasks entrusted to it and in return for services rendered to users. The Agency is also author-iced to collect all income that the property under its management generates in the course of serving aeronautical purposes.

CORPORACIÓN CENTROAMERICANA DE SERVICIOS DE NAVEGACIÓN AÉREA (COCESNA)

5. The Central American Air Navigation Services and Facilities Corporation (COCESNA), founded in February 1960, has six member States, namely Belize, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua. The Corporation is an integrated, international, Central American autonomous organization.

6. According to its Charter, the Corporation has exclusive rights to provide air traffic services, aeronautical telecommunications and radio navigation aids for international civil aviation in the territories of the contracting parties. In practice, however, it provides services in the upper airspace (above flight level 200) and co-operates only partially with contracting governments in the provision of air traffic services in the lower airspace. It may also provide to other States, through agreements, the above-mentioned services and aids specified in the ICAO Regional Air Navigation Plan. Furthermore, it may also provide services and radio aids of the type mentioned above that are not specified in the ICAO Regional Plan within the territories of the contracting parties, by means of contracts with public or private entities.

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* Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Equatorial Guinea, Gabon, Madagascar, Mali, Mauritania, Niger, Senegal, Togo.

Methods of financing

7. In addition to working capital, the contracting parties also agreed to acquire, when necessary, and concede the use and possession of, at no cost to the Corporation, certain equipment listed in the Charter, as well as to provide the land on which the equipment was situated, as well as all other property or furnishings directly related to the discharge of its functions. In order to maintain financial equilibrium and provide for the development and expansion of its aeronautical services, the Corporation is authorized to levy charges on facility users. By this means COCESNA is at present wholly financed from its own operating income.

EUROCONTROL

8. EUROCONTROL founded in 1960, has 22 member States*. It provides the necessary expertise and operational, experimental and training facilities to assist in the expansion of air traffic control capacity in Europe.

EUROCONTROL functions include:

- the establishment of a single European Air Traffic Flow Management Unit to make optimum use of European airspace;
- the management of the European Air Traffic Control Harmonisation and Integration Programme;
- the conduct of research and development work aimed at increasing air traffic control capacity in Europe;
- the provision of air traffic control services in the upper space of Belgium, Luxembourg, the Kingdom of the Netherlands and northern Germany;
- the provision of support on advanced and specialist ATS training.

9. EUROCONTROL also operates a route facility charges collection scheme for its member and non-member States. The level of charges is determined by the States participating in the scheme and monies collected are disbursed to them.

10. The governing body of the Organization is the Permanent Commission assisted by an Agency comprising the Committee of Management and the Director General. The Commission and the Committee are composed of member States' representatives, with voting strength weighted according to each State's annual contribution to the Organization. Both bodies are enlarged to include non-member States' representatives when matters relating to the route charges collection scheme are addressed.

11. EUROCONTROL recruits its own staff and owns the buildings and equipment that it requires to carry its functions. To avoid duplication, use is also made of member States' national technical services and installations where possible.

Methods of financing

12. The Organization is financed by contributions from its member States, except for the costs of its route charges collection scheme which are recovered from airspace users through a supplement included in the charges.

* Austria, Belgium, Cyprus, Czech Republic, Denmark, France, Germany, Greece, Hungary, Luxembourg, Ireland, Italy, Malta, Kingdom of the Netherlands, Norway, Portugal, Romania, Slovenia, Sweden, Switzerland, Turkey, United Kingdom.

Appendix 5

EXTRACT FROM THE INTRODUCTION TO THE *AIR NAVIGATION PLAN EUROPEAN REGION* (DOC 7754)

GENERAL GUIDELINES ON THE ESTABLISHMENT AND PROVISION OF A MULTINATIONAL ICAO EUR AIR NAVIGATION FACILITY/SERVICE

1. INTRODUCTION

1.1 These guidelines were developed and endorsed by the European Air Navigation Planning Group (EANPG) at its 27th Meeting on 1 December 1986 and noted by the Council at the 10th Meeting of its 120th Session, on 13 March 1987, for application in the European Region.

1.2 They reflect relevant ICAO provisions and established policies on the Organization's regional planning for and implementation of facilities/services required for air navigation applicable in the European Region (Article 28 of the ICAO Convention and Assembly Resolution A26-8, Appendices K, L and M, refer). They also recognize the principle that costs may be recovered for facilities and services provided for and implemented under the EUR Regional Plan as approved by the Council (Doc 9082, paragraph 28 (ii) refers) and the principles and policies set forth in that document and in the ICAO *Manual on Route Air Navigation Facility Economics* (Doc 9161).

2. DEFINITION

2.1 The EANPG considered that multinational services/facilities would for some time continue to be the exception rather than the rule when providing for such requirements for air navigation within the EUR Region. Because of their uniqueness, their impact on the system as a whole as well as their implications for users and providers of the multinational facilities/services they would need early identification. The following definition of a multinational ICAO EUR air navigation facility/service would permit this in a rational manner: a facility/service included in the EUR Regional Plan for the purpose of serving international air navigation in airspace extending beyond the airspace serviced by a single State in accordance with the EUR Regional Plan.

Applicability of ICAO provisions

2.2 Pursuant to Article 28 of the Convention and in line with the ICAO policies concerning the formulation of regional plans and their implementation, any multinational facility/service would be set forth in the Regional Plan as established by the Council. In turn, when establishing the cost basis for route facility charges the Council approved, principles are to be applied, i.e. the costs to be taken into account should be those assessed in relation to facilities and services provided for and implemented under the EUR Regional Plan.

Multinational character

2.3 In ICAO rules and procedures the term "facility/service" for air navigation is well understood. Contrary to the term "project" or any other term which may relate only to certain segments or phases of an undertaking it does not exclude research, development, operation and eventually the phasing out of a joint venture. In this context, there is therefore no need to depart from the well known term "facility/service" for air navigation. There is, however, room for amplifying the definition by additional elements in order to dissociate the common undertaking from those facilities/services which are provided by one State only.

2.4 The purpose of a multinational facility/service to serve international air navigation in airspace extending beyond the airspace serviced by a single State is a useful and qualifying element. It is a crucial criterion in that it unambiguously discards other possibilities which the machinery for regional planning and implementation of requirements for facilities/services provides for under Article 28 of the Convention, in accordance with Standards and Recommended Practices and relevant Assembly Resolutions, e.g. delegation of airspace, operating agencies, bilateral and multilateral agreements or, as a last resort, joint financing under Chapter XV of the Convention. While in any such case States would individually remain responsible under Article 28 for the provision of facilities/services within the area of their jurisdiction a "multinational" facility/service by its very nature would extend beyond the individual airspace of a State.

EUR Regional Plan

2.5 Regional plans for facilities, services and procedures are established by the Council, normally on the advice of Regional Air Navigation Meetings. Between such meetings plans are updated, on an *ad hoc* basis, through the Procedures for the Amendment of approved Regional

Plans. In both cases an experimental procedure based on Recommendation No. 2 of the Conference on the Economics of Route Air Navigation Facilities and Airports applies as follows: in case of an objection to the inclusion of facilities/services in the Plan raised by a State on the grounds that such facilities/services are not required for international civil aviation, to the extent feasible, costs of the facilities/services questioned are evaluated. Furthermore Recommendation 1/7 of the EUR/7 RAN Meeting (1985) as approved by Council requests:

> That the EANPG, as well as all parties to the regional processes for the continuous management of the EUR Regional Plan, continue to pay due regard to the operational requirements, the expected technical progress, the likely financial implications for users and providers, and possible alternative solutions and operational cost/benefit considerations.

2.6 For the EUR Region the traditional method of ICAO regional planning has been expanded so as to meet the specific needs for the region. To this end, machinery and processes have been established to keep the EUR Regional Plan continuously updated and under coherent development. To achieve this:

- each part of the EUR Regional Plan is reviewed at intervals determined by the rate at which changes are likely to occur in the corresponding subsystem of the air navigation system (schedule of management). In order to ensure the coherent development of the Regional Plan as a whole, the review of its parts is conducted as a fully integrated operation, on a system planning basis, covering the entire EUR Region;

- in the course of such reviews, States and international organizations are requested to submit their proposals for amendment of the part of the Plan concerned, both with respect to the basic operational requirements, planning criteria and methods of application (RCM) and the requirements for facilities and services. Apart from individual amendments, which should be reserved for cases of urgency, States would thus organize their planning activities so that amendments requiring extensive international co-ordination are submitted at the time when the part of the Plan affected by these amendments is due for a systematic review, in accordance with the schedule of management;

- the management of the Regional Plan under these conditions is the responsibility of the EANPG.

2.7 The processes leading to the inclusion of facilities/services in the EUR Regional Plan also provide an adequate mechanism when multinational facilities/services are considered for development and implementation.

3. DEVELOPMENT AND PROCESSING OF A PROPOSAL FOR A MULTINATIONAL ICAO EUR AIR NAVIGATION FACILITY/SERVICE

3.1 The following constitutes the step by step development and processing of a proposal for a multinational ICAO EUR air navigation facility/service, Comments on individual steps are set forth in subsequent paragraphs.

A. Proposals for a multinational ICAO EUR air navigation facility/service might originate from:

a) the EANPG; or

b) a State or a group of States.

B. Proposals for such a facility/service should be supported by material relating to the following aspects:

a) purpose of the proposal and operational and technical justifications;

b) financial implications and cost-effectiveness;

c) managerial implications; and

d) alternative solutions.

C. The proposal will be evaluated by the EANPG, particularly in respect of requirement, acceptability and cost-effectiveness.

D. The EANPG will then, if in preliminary agreement, through the European Office of ICAO:

a) consult with States which would directly be concerned with the provision of the potential multinational facility/service, as well as those States who would be utilizing it; and

b) re-evaluate the proposal in the light of comments made by these States and to decide either to proceed or to discontinue the proposal.

E. EANPG develops, in consultation with all concerned, a complete proposal for amendment of the EUR Regional Plan for processing in accordance with the procedure approved by the Council.

Comments on the process

3.2 In the light of the basic elements as contained in the definition and their obvious consequence of fully integrating the proposal for a multinational EUR facility/service into the ICAO planning and implementation processes for the EUR Region, it follows that:

A. Proposals for a multinational ICAO EUR air navigation facility/service might originate from:

a) the EANPG; or

b) a State or a group of States.

3.3 In this context it is recalled that the EANPG at all times takes an active posture. For the permanent and co-ordinating machinery this is a prerequisite to remain responsive to the specific requirements of the EUR Region and is reflected in the objectives of the Group, namely to:

a) ensure the continuous and coherent development of the EUR Regional Plan as a whole and in relation to that of adjacent Regions; and

b) identify specific problems in the air navigation field and propose, in appropriate form, resolving action addressed to parties concerned.

3.4 The EUR planning processes and the working methods of the EANPG as reflected in its Procedural Handbook ensure continued intensive information of and co-ordination with States members of the European Region. Although maximum transparency is inherent in these procedures, specific attention is required from the outset when dealing with multinational projects which may have far-reaching implications for all concerned. The EANPG therefore accepted the principle:

— that it proceed in the development of a proposal for a multinational facility/service in close consultation with States and international organizations concerned at all stages of its considerations.

3.5 The procedures for the amendment of approved Regional Plans and the management of the EUR Regional Plan on a continuous basis are described in the Introduction to this Plan.

3.6 At the time a proposal is originated within the EANPG or submitted for its consideration by a State/group of States, basic information must be available to permit preliminary evaluation. Therefore, as a principle:

B. Proposals for such a facility/service should be supported by material relating to the following aspects:

a) purpose of the proposal and operational and technical justifications;

This material should include the over-all plan and targets for the development and the establishment of the facility/service. The likely implications, if any, on regulations, working-routines, equipment, premises and maintenance should be included in the supporting documentation. Information on the expected consequences on the over-all EUR air navigation system or any part thereof should also be included.

b) financial implications and cost-effective less;

Related information should include estimates of the total costs of the multinational facility/service covering, as required, research and development, implementation, operation and maintenance, administration, and capital costs; how all costs incurred prior to the operational phase will be financed; assessing savings which may accrue from the implementation of the facility/service (these can be measured in monetary and/or physical terms, for example air traffic controller positions, communications facilities, etc.) and comparing these savings to the total cost estimates; proposals as to how cost shares of States' participating in the provision of the project are to be determined. Also, assessment needs to be provided or impact on users from charges for the facility/service concerned.

c) managerial implications; and

As a minimum, information on the organizational infrastructure (operational and administrative) and on staff should be included.

d) alternative solutions.

Although it may not normally be expected that all proposals from the outside submitted to the EANPG for consideration will contain relevant information to the extent necessary for preliminary assessment, the EANPG itself should at all times have due regard to any possible alternative which may satisfy the operational requirement in a more cost-effective manner. Such information should be part of the information provided to those who are to be consulted.

3.7 Once necessary information is available, the consequential next phase to be initiated with minimum possible delay is that:

C. The proposal will be evaluated by the EANPG particularly in respect of requirement, acceptability and cost-effectiveness.

D. The EANPG will then, if in preliminary agreement, through the European Office of ICAO:

a) consult with States which would directly be concerned with the provision of the potential multinational facility/service, as well as those States who would be utilizing it; and

b) re-evaluate the proposal in the light of comments made by these States and decide either to proceed or to discontinue the proposal.

3.8 The EANPG's terms of reference, as well as the procedures adopted for the conduct of its activities, enable it to receive advice in the field of economics as necessary

and appropriate. The EANPG would be in the very best position to establish the need for and the form such assistance should take when considering a proposal for a specific multinational facility/service.

3.9 After completion of the above-mentioned preparatory work the process of including a multinational facility/service in the EUR Regional Plan requires that:

E. EANPG develops, in consultation with all concerned, a complete proposal for amendment of the ICAO Regional Plan for processing in accordance with the procedure approved by the Council.

4. FINANCIAL, MANAGERIAL AND OTHER CONTRACTUAL ASPECTS

Introduction

4.1 The participation of States in the provision of a multinational facility/service is based on the assumption that any State having supported and agreed to the implementation of such a facility/service and making use of it, should also shoulder its respective share of the costs involved (4.27 refers). The participating States would need to formalize the terms under which the multinational facility/service is to be provided in an agreement. A primary aim of the agreement should be to ensure that the costs involved are shared amongst the participating States in a fair and equitable manner.

4.2 This part of the guidelines is concerned with the main contractual aspects, financial, managerial and other, that should normally be considered when initiating work on a potential multinational facility/service. The basic provisions that would need to be considered for incorporation in such an agreement are outlined, including provisions concerning cost sharing and cost determination. However, the guidance does not extend to the presentation of a draft model agreement or clauses, since circumstances related to the planning, implementation and operation of individual multinational facilities/services may vary considerably.

Note.- The guidelines generally refer to "agreement" as a generic term covering one or more agreements as the case may be.

Types of agreement

4.3 An agreement covering the development, implementation, operation and maintenance of a multinational facility/service could either take the form of a formal international treaty or an "administrative agreement". Both forms establish an international obligation but a treaty requires the signature of the head of state or government and will also require the ratification or approval of the national legislative assembly, which, as a rule, is a time-consuming process. An "administrative agreement", on the other hand, is at a lower level of requirement in respect of formalities and procedures than a treaty, can be signed by a minister or director of civil aviation or some other authorized person, and could be concluded by an exchange of letters or notes.

4.4 It is recommended that, whenever possible, the agreement be established in the form of an "administrative agreement" rather than a formal international treaty because this would allow the agreement to come into force with minimum delay and also permit greater flexibility in incorporating any subsequent modifications required. It is recognized, however, that in some States constitutional or legal circumstances may require the approval of the legislative assembly for financial obligations to be accepted by the State, particularly if these are of a substantial magnitude and/or extend over a period of time. Whatever form is used, the agreement(s) should be structured to provide for easy subsequent amendments as development:; may require. To this end, material of detail which is more likely to require modifications, and which will not affect the basic provisions of the agreement, should be contained in annexes or appendices.

4.5 It is further recommended that whenever possible only one general agreement (treaty/"administrative agreement") be adopted covering all aspects of the facility/service concerned through all its phases. However., this may not always be possible. In certain circumstance,; it might be necessary or preferable to have more than on.! agreement (treaty/'administrative agreement') differing in scope and content. In those circumstances the aim should be to cover as many aspects as possible in the "administrative agreement" and limit the use of the treaty to those aspects for which this form of agreement is essential for the States concerned. Recognizing this, one agreement for example, might cover the activities, including pre-financing, to be undertaken by those States that accept the responsibility for bringing the facility/service up to operational status, with another agreement to be concluded between all the States (including the first group of States aforementioned), which would use or be served by the facility/service once it became operational. In such circumstances the former agreement would be important because the first group of States would have to ensure the provision of funds from their own resources to ensure the implementation of the facility/service, since no inflow of revenues from charges on users (aircraft operators) would take place until the multinational facility/service becomes operational.

4.6 Another possible approach, if required by circumstances, would be for all the participating States to conclude an agreement covering, in general terms, their commitment to participate in the provision of the multinational facility/service, and then developing a separate

agreement covering all aspects relating to the financing and operation of the multinational facility/service.

4.7 The various basic provisions that would normally have to be covered in an agreement of this nature are addressed below in the sequence they would usually appear, as follows:

A. Objective of the agreement

B. Obligations of States party to the agreement

C. Definition and description of the facility/service

D. Establishment and operation of the facility/service

E. Legal responsibility

F. Liability aspects

G. Managerial aspects:

a) Governing bodies and decision-making arrangements
b) Organization and staffing
c) Consultation

H. Financial aspects:

a) Cost determination
b) Cost sharing
c) Budgeting
d) Authority to approve the budget
e) Financial auditing

I. Taxation and other government levies

J. Procedures for settlement of disputes

K. Accessions, withdrawals, amendments to and termination of agreement.

Basic contractual provisions

A. Objective of the agreement

4.8 In its introductory text the agreement should set out the objective underlying the participating States' decision to jointly arrange for the provision of the multinational facility/service concerned.

B. Obligations of States party to the agreement

4.9 The agreement should at the outset briefly set forth the basic obligations of the participating States. These include the obligation (by a participating State or group of States individually or collectively or as assigned to an organization or agency) to establish and operate the facility/service concerned; the obligation of each participating State to pay its share of the costs involved; the obligation to observe ICAO policies and practices, including those addressing cost recovery by States from aircraft operators, etc.

C. Definition and description of the facility/service

4.10 The agreement should contain a clear and accurate definition and description of the multinational facility/service to be provided and the functions it is to perform, including to the extent possible and desirable, the supporting services required. It may be advisable in certain cases to make specific reference to functions which the multinational facility/service will not be performing.

D. Establishment and operation of the facility/service

4.11 The agreement should specify who will establish and operate the facility/service concerned, namely whether this is to be done by one State, two or more States, an existing international organization, an existing nation; l or international agency, or a new agency to be established specifically for this purpose.

Note.— The decision as to who should provide the facility/service could be influenced, in particular, by the anticipated capital investment and annual cost involved, as well as the extent to which the alternative providers (i.e. a participating State or States, international organization or agency) have been engaged in the function(s) concerned.

E. Legal responsibility

4.12 If an international organization or agency (as referred to in Assembly Resolution A22-19) is to establish and/or operate the facility/service concerned, il. will have to be endowed with proper legal responsibility to have the capacity to contract, to acquire and dispose of property and to institute and answer legal proceedings.

F. Liability aspects

4.13 Closely related to legal responsibility are the liability aspects which may have to be addressed in the agreement. This involves such aspects as the determination of the extent to which liability is to be assumed in connexion with the provision of the multinational facility/service. Other aspects also include whether the entity providing the facility/service concerned, whether an international organization agency or State(s), should alone assume such responsibility or whether this should be shared amongst all the participating States.

G. Managerial aspects

a) Governing bodies and decision making arrangements

4.14 The nature of the governing body or bodies required to administer the agreement needs to be established and a

description of their functions provided. Should a new agency be established to operate the multinational facility/service, this would need to be stipulated in the agreement, where reference should also be made to the functions and responsibilities of the executive head of the agency and to whom he or she would be responsible.

4.15 Voting arrangements should be specified. It would need to be decided whether each participating State should have equal voting power (as is for example the practice of ICAO). Alternatively, each State's vote may be weighed in accordance with a predetermined formula, which would need to be specified, for example, by determining the voting power according to that participant's share of total contributions to the facility/service or agency concerned. A maximum and/or a minimum limit may be set for the number of votes that can be assigned to any individual participant regardless of that participant's share of total contributions.

4.16 Another voting aspect which has to be decided on, and specified in the agreement, is whether a simple majority would apply in all cases or whether for particular issues a large majority vote (to be specified) or even unanimity would be required. Where different degrees of majority voting would apply depending on the matter or subject being voted on, these would also need to be clearly identified in the agreement.

b) Organization and staffing

4.17 The agreement should refer to the manner in which the entity actually operating the facility/service would structure or organize its functions. This would apply in particular if the operation is to be assigned to a new agency.

4.18 Various aspects of staffing (nationality, numbers and type etc.) will also need to be addressed and, as appropriate, incorporated in the agreement (or an annex to it). If the participating States agree that the multinational facility/service is to be provided by one State or by two or more States (each providing separate components or parts of the project involved), the nationality of staff should not give rise to any problems, and need not be covered in the agreement. However, operation by an international organization or agency may require that certain stipulations be included in the agreement concerning the selection of qualified staff from participating States. Other aspects to be considered, aside from the number and types of staff, are the various elements of conditions of service including status to be accorded to any expatriate staff, tax exemptions, etc., which will reflect on the over-all costs of the venture.

c) Consultation

4.19 Provision should be made in the agreement to ensure adequate consultation with States being party to the agreement but not represented on the governing body, and appropriate aircraft operators organizations. Such consultations should at least be undertaken in advance of any developments that could materially affect cost share to be allocated to these States, user charges, and the quality of the services provided.

H. Financial aspects

a) Cost determination

Pre-implementation considerations

4.20 The determination and presentation of the costs attributable to the provision of the multinational facility/service concerned should proceed in a manner acceptable to all the participating States. In this context it should be noted that bringing the facility/service up to implementation status can involve the costs of implementation being, financed by one or more of the participating States. However, once the facility/service has been implemented these costs would be capitalized and then included as depreciation (together with accumulated interest) in the over-all cost base to be shared among the States participating in the provision of the facility/service concerned.

Determination of costs

4.21 In order to formalize the manner in which the costs to be shared should be arrived at, the agreement between the States participating in the provision of a multinational facility/service should contain clauses referring to the determination of the related costs. The agreement should also stipulate that the approach towards cost determination be based on that recommended in Chapter 1 of the ICAO *Manual on Route Air Navigation Facility Economics* (Doc 9161). Should more comprehensive instructions, based on Doc 9161, be required, it is preferable that these be presented in an annex in view of their relative volume and detail, and also because it may be expected that they would need to be updated and modified more frequently than the main text of the agreement. (Amendments to the annexes to the agreement would normally be subject to the approval of the governing body of the multinational facility/service).

4.22 In line with the approach adopted in Doc 9161, the annex would normally contain an inventory of the various components of the multinational facility/service (e.g. buildings, equipment, number of staff by function, etc.). It would also cover the determination of annual costs, i.e. costs of operation and maintenance, administrative and common costs, and capital costs (depreciation and interest) as well as special capital outlays. Finally, where a multinational facility/service or any of its components serve other than the multinational functions specified in the agreement (i.e. functions serving one State only, or non-aeronautical functions), instructions should be provided to ensure the accurate determination of the "multinational" costs to be shared among the participating States.

Presentation of costs

4.23 The agreement would also need to specify, normally in an annex, the basic format to be used for the presentation of the annual costs for approval. The scope and detail of the format will depend on the particular circumstances involved.

b) Cost sharing

Responsibility for the sharing of costs

4.24 As stated in 4.1 above, once a State has supported and agreed to the implementation of a multinational facility/service and making use of it, it would be expected to assume responsibility for its share of the costs involved. This basic obligation should be reflected in the agreement between the participating States.

Determination of cost share of each participating State

4.25 The agreement should outline the procedure to be applied for determining the cost share to be borne by each participating State. Any cost sharing method should, to the extent possible, be equitable, simple and easy to apply. The question of equity should not only be considered in the context of the participating States, but also with respect to the final users (aircraft operators) since it may be assumed that in most instances the participating States would include the costs they incur in the cost base for their air navigation facility charges, where levied.

4.26 In general, it does not appear feasible to recommend one specific method or approach to cost sharing because the situation will vary, depending particularly on the technical and operational characteristics of the multinational facility/service involved, the views or policies of the participating States on how costs should be shared, and the volume of these costs.

4.27 In the interest of equity, however, any method of cost sharing should, in principle, be based on the extent of the use of the multinational facility/service concerned by each participating State. Thus, the parameters or keys used to determine each State's cost share should reflect the extent of such use. However, if the use made of a multinational facility/service can only be measured by applying complex procedures and at a cost which is not commensurate with the costs to be shared, other methods of cost sharing based on readily available and relevant statistical data could be applied. Whatever method is selected it must provide for the just and equitable sharing of the costs' involved.

Tangible national benefits to the State(s) actually operating the multinational facility/service

4.28 A multinational facility/service might be operated by one or more States with other States contributing their share of the costs involved. In such circumstances, all the States concerned must decide whether or not the total costs should be subject to sharing or if any allowances should be made to reflect any tangible benefits accruing to the State(s) engaged in the actual operation of the facility/service concerned. Such benefits would usually be in the form of employment of nationals, contracts awarded to national companies, etc. with their associated multiplier effect on the economies of the State(s) concerned. It should be noted that the States actually operating the facility/service would, like other State(s) using it, be obliged to pay its (their) share of the total costs to be shared.

Recovery of costs from users

4.29 As a rule, a multinational facility/service would have to be "multinationally" financed or prefinanced by a State, group of States or, by an agency as established under the authority of an agreement by State;;. However, any of these could recover the costs so incurred from users once the facility/service has been implemented. Nevertheless, States may also choose to recover less than full costs in recognition of local, regional or national benefits (Doc 9082, paragraph 29 refers). Where an agency has been authorized to recover its costs through charges, the authorizing States would nevertheless need to make up for revenue shortfalls where, for example, the States had decided certain flights should either be exempted from or pay reduced charges.

4.30 It would be up to each participating State to decide whether or not it wishes to recover its cost share from the users (aircraft operators). A State could either include these costs in its cost base for route facility charges (if it levies such charges), or, alternatively, recover the costs by levying a separate charge (normally a more complex and costly procedure to administer). While the recovery of such cost shares from users might normally not be referred to in an agreement on a multinational facility/service, the agreement could include a provision to the effect that such recovery must be based on Article 15 of the Chicago Convention as well as the principles and recommendations in Doc 9082.

4.31 If the participating States were to assign the operation of a multinational facility/service to an international organization or an international agency and decide that it should levy charges on aircraft operators for the purpose of full or partial cost recovery, this would need to be covered in the agreement. In such instances the agreement would usually also stipulate (probably in a separate annex) the charging formula to be used, reductions and exemptions granted, billing and payment arrangements, etc. Such procedures would, of course, need to conform with the provisions of Article 15 of the Chicago Convention and Doc 9082.

c) Budgeting

4.32 Proper financial control will require costs and revenues to be estimated in advance. The itemization of the costs should basically correspond with that used for the presentation of costs (see 4.23 above). This will enable actual costs to be compared with estimated costs, and actual revenues with those estimated.

d) Authority to approve the budget

4.33 The agreement should also stipulate who has the authority to approve the budget and thus authorize the use of funds to meet operating expenses and capital expenditures. This authority would normally be vested in the governing body of the multinational facility/service concerned.

e) Financial auditing

4.34 The financial audit function forms an integral part of the determination of the costs to be shared and the cost share to be borne by each participating State as well as of proper financial control. The agreement between States participating in the provision of a multinational facility/service should therefore specify that an annual financial audit be performed by a certified independent external auditor.

I. Taxation and other government levies

4.35 The subject of tax exemptions and other aspects related to taxation will need to be addressed in the context of the over-all operations of the multinational facility/service. Similarly, with regard to other government levies such as custom fees and duties, value added tax, etc., it may 'also need to be considered whether the import or export, purchase or sale of any equipment, supplies, etc. required for the operation of the multinational facility/service concerned should be exempted from all such levies in the participating States. The inclusion of clauses to that effect would be likely to require an agreement subject to ratification, such as a treaty.

J. Procedures for settlement of disputes

4.36 The agreement should contain stipulations setting out the procedures to be followed for settlement or disputes between the participating States arising from the provision of the facility/service concerned. Regarding the settlement of disputes arising from different interpretations being given to the agreement, the States concerned would have to agree on the procedures for negotiation or arbitration and on the body to which an appeal for a final ruling could be made.

K. Accessions, withdrawals, amendments to and termination of agreement

4.37 The agreement should contain provisions, including those describing the financial implications involved, to:

a) cover the subsequent accession by any additional qualifying State(s) after the agreement is in force; and

b) specify the procedure to be applied when a signatory State wishes to withdraw from the agreement as well as procedures to follow in the event of termination of the agreement.

Similarly, the agreement should specify the procedures to be followed if amendments are to be made to the main text or to any annexes (for which different procedures would normally apply).

Appendix 6

GUIDANCE FOR DETERMINING THE COSTS OF AERONAUTICAL METEOROLOGICAL SERVICE

Introduction

1. Meteorological services are services that are shared by many users including aeronautical users. This generates cost savings and creates specific relationships. Aeronautical meteorology is dependent on the basic meteorological system and the meteorological provider is bound by the general policy concerning air navigation services charges. So it is necessary that the national authorities concerned work in consultation to implement this policy and determine the corresponding costs (see Chapter 1).

2. As indicated in Chapter 4, Section A, the first step in determining the costs of aeronautical meteorological service is to prepare an inventory of all those meteorological facilities and services which serve to meet aeronautical requirements stated in ICAO Annexes (e.g. Annex 3 — *Meteorological Service for International Air Navigation),* Procedures for Air Navigation Services (PANS) (e.g. *Procedures for Air Navigation Services — Rules of the Air and Air Traffic Services* (PANS-RAC, Doc 4444) and air navigation plan publications (ANPPs). This inventory should be drawn up jointly by the national aviation authorities (such as a civil aviation administration) and the meteorological authority (designated in accordance with Annex 3, 2.1.4) in the State concerned. Meteorological services meeting aeronautical requirements are summarized in paragraphs 4.18 and 4.19 as follows:

> "4.18 Meteorological services for air navigation comprise the services provided in accordance with ICAO provisions in Annexes, Procedures for Air Navigation Services (PANS) and Air Navigation Plan Publications (ANPPs). These include meteorological observations, reports and forecasts, briefing and flight documentation, SIGMET and AIRMET information, world area forecast system (WAFS) digital grid point data for computerized flight planning, meteorological information for inclusion in broadcasts (such as VOLMET and OFIS), aeronautical meteorological telecommunications (if not included in COM) and any other meteorological data required from States for aeronautical use. The facilities required to provide such services include world area forecast centres (WAFCs), regional area forecast centres (RAFCs), volcanic ash advisory centres (VAACs), tropical cyclone advisory centres (TCACs), meteorological watch offices (MWOs), aerodrome meteorological equipment for aeronautical purposes (including observational instruments) and telecommunications equipment for aeronautical meteorologicill purposes. Additionally, it may be appropriate to include in the inventory various supporting facilities and services which also serve meteorological requirements in general, among these being surface and upper-air observation networks, meteorological telecommunication systems, data processing centres and supporting core research, training and administration In the case of such general-purpose facilities and (services an appropriate allocation of the costs involved between the aeronautical and non-aeronautical needs served will have to be determined.
>
> 4.19 Furthermore there are additional services specified and agreed by the national aviation authorities, in consultation with the meteorological authority and users. Any additional special facilities or services provided at the request of a single or limited number of users are deemed to be outside these arrangements and should be charged to the user(s) concerned. 'Further guidance on the identification of facilities and services serving aeronautical MET is contained in Appendix 6 — *Guidance for determining the costs of aeronautical meteorological service."*

3. As indicated in 4.5 1 of Chapter 4, it is important to note that national meteorological organizations, while they serve aeronautical requirements, operate to serve the non-aeronautical community as a whole by providing meteorological and climatological information for maritime and other surface transport, civil protection, agriculture, fishing, hydrology, air pollution control,

retailing, sports and recreation, tourism, building and construction, the press and other media, and the general public. Usually, meteorological organizations engage in general meteorological, i.e. core activities in fulfilment of a primary system requirement for meteorological information which is jointly used by all service recipients. Examples of core activities include general analysis and forecasting, automated data processing, weather radar and satellite observations, surface and upper air observations, telecommunications to collect and exchange basic data, training, research and development. Since no single user requirement determines the level and cost of the core activities, the further allocation of core activity costs among aeronautical and non-aeronautical users should be approached with considerable caution. The proportion of core activities used for the benefit of air navigation that it is appropriate to attribute to the requirements of aviation will vary from State to State. Furthermore, there are States which do not allocate core costs to any specific user. It should also be recognized that aviation contributes data to the core system by providing upper air observations of winds and temperatures and that there are core activities which in terms of the level of sophistication exceed the aeronautical requirements. It is therefore not possible to indicate any specific percentage allocations that would have general validity for this purpose. However, the broad description of the meteorological facilities and services required for aeronautical purposes in 2 above gives general guidance in this field, with more specific advice being provided below.

4. The proper approach for allocating aeronautical meteorological costs involves analysis of each element of the meteorological service concerned to determine the extent to which its functions are attributable to aeronautical requirements.

5. For this purpose it is necessary:

a) to establish an inventory of the facilities and services to be provided by the meteorological service provider concerned to meet the aeronautical requirements stated in ICAO Annexes, PANS, regional ANPPs and as specified and agreed by national aviation authorities;

b) to identify for each facility or service the costs (including costs of maintenance and supporting services) to be taken into account, as indicated in Chapter 4, Section B — *Determining costs;* and

c) to establish an appropriate basis for allocation (see also Chapter 4, Section *C — Allocation of costs).*

6. By the same kind of analysis, the total costs so attributed to aeronautical requirements can similarly be allocated as between airport (approach and aerodrome control) and en-route requirements.

7. The method of calculation of costs for the meteorological facilities and services provided and charged to aeronautical users should be available. Furthermore, the allocation of costs for the meteorological facilities and services should be done after consultation with the users. Such consultations between the meteorological authority, the service provider (if different from the meteorological authority) and the users should be held regularly and at least before the cost basis for charges are established or revised.

Inventory of facilities and services

8. The facilities and services comprising the inventory may be classified under the following categories:

a) facilities and services needed to serve exclusively aeronautical requirements; and

b) facilities and services which may be needed to serve both aeronautical and non-aeronautical requirements.

The above facilities and services are listed under 17 a) and 17 b) below.

Categories of costs

9. For guidance in establishing the costs of meteorological facilities and services and a description of the various cost categories involved reference should be made to Chapter 4, Section B.

Allocation of costs between aeronautical and non-aeronautical users

10. For the facilities and services needed to serve exclusively aeronautical requirements (8 a)), the costs are allocated 100 per cent to aeronautical use. (It is understood that the related services would not be provided to non-aeronautical users).

11. For any facilities or services needed to serve exclusively non-aeronautical requirements (e.g. agrometeorology, maritime meteorology, hydrology, etc., see also 3 above), the costs are allocated 100 per cent to non-aeronautical use and should not be allocated to the cost base of aeronautical charges.

12. The costs of facilities and services needed to serve both aeronautical and non-aeronautical requirements (core activities), listed in paragraph 8 b), if allocated at all (4.51 in Chapter 4 refers), may be allocated between aeronautical and non-aeronautical users using such methods as the following:

a) in proportion to the estimated aeronautical and non-aeronautical use made of the products supplied (applicable, e.g., to general analysis and forecasting offices);

b) in proportion to the estimated time of use of the computers for aeronautical and non-aeronautical purposes (applicable, e.g., to electronic data processing facilities);

c) in proportion to the estimated volume of information transmitted for aeronautical and non-aeronautical purposes (applicable, e.g., to telecommunications facilities);

d) in proportion to the personnel working on aeronautical and non-aeronautical data (applicable, e.g., to climatological services); and

e) on the basis of results from an analytical accounting system which ensures an equitable allocation of the costs concerned.

13. The aim should always be for the allocation of meteorological costs between aeronautical and non-aeronautical use to be based on one or more of the methods described above. However, in circumstances where the use made of meteorological facilities and services cannot be allocated on the basis of one of these methods, the necessary cost allocation should be approximated on the basis of the best data available. One possible approach would be to establish a ratio between the costs of those facilities and services needed to serve exclusively aeronautical requirements and the costs of those needed to serve exclusively non-aeronautical requirements; this ratio would then be applied to the costs of those core facilities which serve both aeronautical and non-aeronautical requirements (8 b)) in order to estimate the aeronautical portion of these costs.

Allocation of aeronautical meteorological costs

14. In the context of dual airport and en-route utilization of facilities or services, it is noted in Chapter 4, 4.57 that the costs of aeronautical meteorological services require particular attention. The Council Statements specifically recommend that the "costs of all meteorological services provided to civil aviation should, where appropriate, be allocated between air traffic services provided for airports and air traffic services provided en route. In States where more than one international airport is involved, consideration could be given, where possible, to allocating the costs attributable to airport utilization between the airports concerned" (Doc 9082/4, Appendix 2).

15. When developing criteria for the allocation of costs to airport and en-route, the following considerations should be taken into account:

a) the allocation of aeronautical costs among users should be carried out in a manner equitable to all users;

b) the allocation should be made in such a way that costs are recovered from the appropriate users; and

c) the allocation should be based on the phase of flight operation, in which the facilities or services are used.

Where allocation of aeronautical meteorological costs between airport and en-route utilization is required, the allocation criteria described in 10 to 13 above may be equally applied, with the terms "airport/en-route" being used instead of "aeronautical/non-aeronautical" as indicated below. As to facilities and services referred to above under Inventory of facilities and services, 8 a) and 8 b), those listed below indicate whether the requirement and utilization of the facilities or services concerned are en-route (E), mainly en-route (mE), airport (A), mainly airport (mA) or mixed en-route/airport (A/E).

16. The allocation of aeronautical meteorological costs should be determined in such a way as to ensure that no users are burdened with costs not properly allocable to them. Where deemed necessary for reasons of equity and where the necessary basic data, including all required traffic statistics, are available, consideration should be given to allocating the aeronautical meteorological costs between IFR and VFR traffic.

Inventory of facilities and services and their allocation between airport and en-route use

17. The inventory of the facilities and services and their allocation between airport and en-route use are presented below.

a) Facilities and services intended exclusively to serve aeronautical requirements.

Legend indicating utilization:

A airport;
E en-route;
mA mainly airport;
A/E airport and en-route;
mE mainly en-route.

World area forecasts **centres (WAFCs)** . . . . . E
Regional area forecast **centres (RAFCs)** . . . . . E
Volcanic ash advisory **centres (VAACs)** . . . . . E
Tropical cyclone advisory **centres (TCACs)** . . . . . E
Meteorological watch offices **(MWOs)** . . . . . E
Aerodrome meteorological offices . . . . . A/E
Aeronautical meteorological stations . . . . . **A/E**
Operation of a regional **OPMET** data bank . . . . . E
Telecommunications for aeronautical meteorological purposes, including **VSAT** stations to receive **WAFS** products and **OPMET** data (if not included in **COM)** . . . . . A/E
Facilities to provide meteorological data-processing of **WAFS** products . . . . . **mE**
Provision of **VOLMET** broadcasts . . . . . E
Observing instruments provided for aeronautical purposes (e.g. **transmissometers, ceilometers)** . . . **mA**
Specific aeronautical meteorological research . . . A/E
Specific aeronautical meteorological training . . . . A/E
Specific aeronautical technical support (including administration) . . . . . A/E

The above facilities and services provide the following products and functions. Their utilization is indicated in brackets:

Meteorological observations and reports for local **ATS** units . . . . . (A)

Meteorological observations and reports disseminated beyond the **aerodrome (METAR, SPECI)** . . . . . **(mE)**

Aerodrome forecasts **(TAF,** including amendments thereto) . . . . . **(mE)**

Landing forecasts (including TREND) and forecasts for take-off . . . . . (A/E)

Area and route forecasts, other than those issued within **WAFS** (including **ARFOR, GAMET, ROFOR, WINTEM)** . . . . . (E)

Aerodrome and wind shear warnings . . . . . (A)

SIGMET, AIRMET, volcanic ash advisories, tropical cyclone advisories . . . . . (E I

Aerodrome climatological information . . . . . (A

Flight documentation **(WAFS** products, **SIGWX** charts/forecasts for low-level flights and required **OPMET** data) . . . . . **(mE**

Meteorological watch by **MWOs** over **FIR/UIR** for the issuance of **SIGMETs** and **AIRMETs** . . . . . **(E)**

Aerodrome weather watch by the meteorological office concerned for the issuance of amendments to **TAFs, aerodrome** and wind shear warnings . . . . . **(A/E)**

Volcanic ash and tropical cyclone watch by **VAACs** and **TCACs** for the issuance of VA and **TC** advisories . . . . . **(E)**

Meteorological watch by **WAFCs** and **RAFCs** for the issuance of amendments to **WAFS** products . . . . . **(E)**

Briefing and consultation (including display of **OPMET** and other meteorological information) . . . . . (A)

Provision of information to meteorological information systems and local operators . (including the use of remote briefing/ consultation systems) . . . . . (A/E)

Provision of information for **ATS** and **AIS** units (including **NOTAM)** . . . . . **(A/E)**

Provision of information for **SAR** units . . . . . **(E)**

Provision of **WAFS** and **OPMET** data to operators . . . . . **(mE)**

*Note.— An ultimate goal would be the **identification** **of** the costs attributable to the individual products **and** **functions** where this is feasible.*

b) Core facilities and services which may serve both aeronautical and non-aeronautical requirements.

Legend indicating utilization:

A airport
E en-route
mA mainly airport
A/E airport and en-route
mE mainly en-route

General analysis and forecast offices . . . . . A/E

Meteorological data processing (including maintenance of **climatological** data base) . . . . . A/E

Commonly used meteorological telecommunications facilities and services . . . . . A/E

Surface observation stations (making synoptic and **climatological** observations) . . . . . **mE**

Upper-air observation stations . . . . . E

Weather radar . . . . . A/E

Meteorological satellite reception . . . . . **mE**

Core training . . . . . **A/E**

Core research . . . . . A/E

Core technical support (including administration) . . . . . A/E

Appendix 7

APPLICATION OF PARAMETERS FOR THE ALLOCATION OF COSTS

1. ALLOCATION OF COSTS AMONG CATEGORIES OF USERS

Two examples of how en-route cost could be allocated among different categories of users are given below. Both examples are based on the same scenario but show the difference in the allocation shares arrived at for each user category depending on whether the allocation is based on the number of flights only, or on the number of flights multiplied by distance flown. The number of flights by each user category concerned and the respective distances flown are as follows:

	Number of Flights				
	User Category				
Distance flown (km)	*Domestic civil commercial*	*International civil commercial*	*General aviation*	*Other (State, military, etc.)*	*Total All categories*
200	2 000	0	5 550	200	7 750
500	4 500	100	1 000	400	6 000
800	200	200	100	300	800
1 000	150	1 100	30	150	1 430
1 500	50	1 500	20	50	1 620
Total	6 900	2 900	6 700	1 100	17 600

Allocation shares based on number of flights only

User category				*Allocation share*
Domestic civil aviation	=	6 900/17 600	=	.39
International civil commercial	=	2 900/17 600	=	.17
General aviation	=	6 700/17 600	=	.38
Other (State, military, etc.)	=	1 100/17 600	=	.06
		Total	=	1.00

Allocation shares based on number of flights multiplied by distance flown

Domestic civil commercial	=	(2 000 x 200) + (4 500 x 500) + (200 x 800) + (150 x 1 000) + (50 x 1 500)
	=	400 000 + 2 250 000 + 160 000 + 150 000 + 75 000
	=	3 035 000
International civil commercial	=	(loo x 500) + (200 x 800) + (1100 x 1000) + (1 500 x 1 500)
	=	50 000 + 160 000 + 1 100 000 + 2 250 000
	=	3 560 000
General aviation	=	(5 550 x 200) + (1 000 x 500) + (100 x 800) + (30 x 1 000) + (20 x 1 500)
	=	1 110 000 + 500 000 + 80 000 + 30 000 + 30 000
	=	1 750 000
Other (State, military, etc.)	=	(200 x 200) + (400 x 500) + (300 x 800) + (150 x 1 000) + (50 x 1 500)
	=	40 000 + 200 000 + 240 000 + 150 000 + 75 000
	=	705 000
Sum total of number of flights multiplied by distance flown	=	3 035 000 + 3 560 000 + 1 750 000 + 705 000
	=	9 050 000

User category					*Allocation share*
Domestic civil commercial	=	3 035 000/9 050 000	=	.34	
International civil commercial	=	3 560 000/9 050 000	=	.39	
General aviation	=	1 750 000/9 050 000	=	.19	
Other (State, military, etc.)	=	705 000/9 050 000		=	.08
		Total		=	1.00

2. ALLOCATION OF COSTS AMONG SERVICES

One method of allocating total costs is for the allocation to be based upon the cost of providing services to users, including for tower and approach services by location (if required). This requires taking the budgeted or actual annual costs of the organizational units and allocating these costs by appropriate parameters to services. Some costs, e.g., tower staff costs, can be allocated easily to a particular service. Allocation of other costs, e.g., engineering, communications, etc., is more difficult and requires the selection of appropriate allocation parameters.

For a hypothetical air navigation services organization comprising a tower at two airports and en-route services, Table A7-1 illustrates a basic approach to allocating costs among services. The form of the organization, the nature and extent of services provided and the availability of accounting and operational information will influence the selection of appropriate allocation parameters.

Table A7-1. A basic approach to allocating costs among services

Organizational unit/ cost category	*Budgeted and/or actual cost*	*Direct/indirect cost*	*Basis of allocation (Examples)*	*Service provided*		
				Tower	*Approach*	*En route*
	$			$	$	$
Air traffic services engineering and maintenance services		Direct	Staff number			
		Indirect	Asset value and usage			
Communications		Indirect	No. of transmission frequencies			
Administrative services depreciation and cost of capital		Indirect	Staff number			
		Direct and indirect	Asset value			
		Allocated cost				

Note.— "Direct" costs are those that can be unambiguously assigned to services (e.g. air traffic controlle related staff costs, capital costs for assets used solely for a particular service). "Indirect" costs are joint o incurred in supporting more than one service.

— END —

ICAO PUBLICATIONS
IN THE AIR TRANSPORT FIELD

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

International Standards and Recommended Practices on Facilitation ***(designated as Annex 9 to the Convention)*** which are adopted by the Council in accordance with Articles 37, 54 and 90 of the Convention on International Civil Aviation. The uniform observance of the specifications contained in the International Standards on Facilitation is recognized as practicable and as necessary to facilitate and improve some aspect of international air navigation, while the observance of any specification contained in the Recommended Practices is recognized as generally practicable and as highly desirable to facilitate and improve some aspect of international air navigation. Any differences between the national regulations and practices of a State and those established by an International Standard must be notified to the Council in accordance with Article 38 of the Convention. The Council has also invited Contracting States to notify differences from the provisions of the Recommended Practices;

Council Statements on policy relating to air transport questions, such as charges for airports and air navigation services, taxation and aims in the field of facilitation;

Digests of Statistics which are issued on a regular basis, presenting the statistical information received from Contracting States on their civil aviation activities;

Circulars providing specialized information of interest to Contracting States. They include regional studies on the development of international air passenger, freight and mail traffic and specialized studies of a world-wide nature;

Manuals providing information or guidance to Contracting States on such questions as airport and air navigation facility tariffs, air traffic forecasting techniques and air transport statistics.

Also of interest to Contracting States are reports of meetings in the air transport field, such as sessions of the Facilitation Division and the Statistics Division and conferences on the economics of airports and air navigation facilities. Supplements to these reports are issued, indicating the action taken by the Council on the meeting recommendations, many of which are addressed to Contracting States.