

Guide to Aeronautical Meteorological Services Cost Recovery

Principles and guidance



**World
Meteorological
Organization**

WMO-No. 904

Weather • Climate • Water

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Note

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FOREWORD

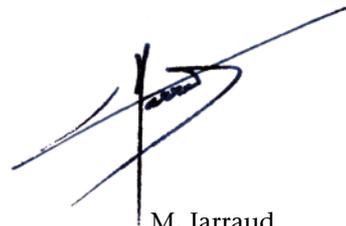
The Executive Council of the World Meteorological Organization (WMO), at its forty-ninth session held in June 1997, expressed the view that cost recovery was of profound importance to all National Meteorological Services, particularly in developing countries, and urged the further expansion of activities in that area. The Commission for Aeronautical Meteorology (CAeM) tasked the CAeM Co-rapporteurs on Economic Benefits of Meteorological Support to Aviation, Messrs J. Goas (France) and R.C. Flood (United Kingdom), to prepare a draft WMO *Guide on Aeronautical Meteorological Services Cost Recovery*.

The Guide was published in 1999 and proved very useful to Members. The Management Group of the Commission for Aeronautical Meteorology, after reviewing all documents under its responsibility, recommended publishing an update to the publication that had been worked on by the Expert Team on Cost Recovery. After inclusion of very relevant case studies received from several Members by the new Expert Team on Customer Relations, the update is now complete.

This Guide is designed to explain, in an informal and practical manner, the procedures and methods that a

National Meteorological Service can use to recover costs for providing aeronautical meteorological services to aviation. It concentrates on practical meteorological aspects of cost recovery and serves as a complement to the International Civil Aviation Organization's *Manual on Air Navigation Services Economics* (ICAO Doc 9161).

I wish to express my appreciation to Mr D. Lambergeon for his considerable work in preparing this document and the Expert Team on Customer Relations under the able leadership of Ms M. Petrova for finalizing the updated version of the Guide, to the president of CAeM, Mr Carr McLeod, for his leadership and encouragement in the finalization process, and to the editors.

A handwritten signature in black ink, consisting of a vertical line with a large, sweeping flourish that curves to the right and then back down.

M. Jarraud
Secretary-General

CHAPTER 1

INTRODUCTION

HISTORICAL BACKGROUND

1.1 National Meteorological Services are funded in many different ways. They can be funded by being part of the armed services of the country, or by being part of a government department such as transport or environment, and at least one National Meteorological Service is a corporation. This is partly a reflection of the history of Meteorological Services, many of which were set up to serve aviation, particularly military aviation in the First World War, and were subsequently found indispensable to service the rapidly expanding civil aviation industry following the war. Nowadays, Meteorological Services may have many more responsibilities but in the majority of States one of their primary tasks is still to service aviation and in many developing countries serving aviation is still their major task. Early on in the history of aviation, it was decided that in the interests of safety, regularity and efficiency, each State would provide agreed services for international civil aviation such as air traffic services, search and rescue, aeronautical telecommunications, and indeed meteorology, which would be paid for by international aviation usually through the collection of fees for landing at airports in a State (landing fees) and fees charged for overflying a State's territory (en-route charges).

THE ICAO CONVENTION

1.2 To formalize the provision for serving international civil aviation, the Convention on International Civil Aviation was drawn up in Chicago in 1944. This Convention, usually known as the Chicago Convention, is an international treaty and the provisions contained in its articles are legally binding on the governments signatories, known as Contracting States, without exception. In particular, unless otherwise officially notified to the International Civil Aviation Organization (ICAO) the Contracting States undertake to comply with ICAO standards. Since Contracting States have to deliver air navigation services according to ICAO standards, they must define a national policy for their financing that complies with the ICAO global charging

policy. The global policy established by ICAO in the area of airport and air navigation facility charges is contained in Article 15 of the Chicago Convention, which in summary sets out three basic principles:

- (a) Uniform conditions shall apply to the use of airport and air navigation facilities in one State by aircraft of all other States;
- (b) Charges for facilities shall not be higher for aircraft of other States than those paid by national aircraft; and
- (c) No charge shall be imposed by a State solely for granting authorization for a flight into, out of, or over its territory.

ANNEX 3 TO THE CHICAGO CONVENTION

1.3 The Convention has 18 annexes dealing with various aspects of aviation. The annex dealing with meteorology is Annex 3, entitled *Meteorological Service for International Air Navigation*. Annex 3, which contains what are known as "international standards and recommended practices", is amended, when required, by ICAO in consultation with WMO and is identical to WMO *Technical Regulations* (WMO-No. 49), Volume II, [C.3.1.], also entitled *Meteorological Service for International Air Navigation*. As this Guide is concerned with the recovery from aviation by National Meteorological Services of the costs incurred in providing meteorological services to international aviation (an ICAO concept, the details of which are decided in ICAO circles), reference throughout will be made only to Annex 3 instead of WMO *Technical Regulations* and also only to "States" rather than WMO "Members".

1.4 It is worth noting, at the outset, the first few paragraphs in Chapter 2 of Annex 3. The first paragraph (2.1.1) states that "The objective of meteorological service for international air navigation shall be to contribute towards the safety, regularity and efficiency of international air navigation." The second paragraph (2.1.2) indicates how this is to be achieved, that is "by supplying operators, flight crew members, air traffic services units, search and rescue services units, airport managements and others

concerned with the conduct or development of international air navigation, with the meteorological information necessary for the performance of their respective functions.”

1.5 The third paragraph in Chapter 2 of Annex 3 (2.1.3) specifies how the meteorological service which a country provides to meet the needs of international air navigation shall be determined, that is in accordance with the standards and recommended practices of Annex 3 and, where appropriate, with due regard to ICAO regional air navigation agreements. The meteorological service to be determined in this way shall be provided to meet the needs of international air navigation over international waters and other areas which lie outside the territory of the State concerned.

Notes:

1. *Standards and recommended practices* (SARPs). Annex 3 indicates those actions and services that “shall” be provided which in these terms are taken as being a “regulatory” standard. These standards are recognized as being necessary for the safety, regularity and efficiency of international air navigation to which a Contracting State must conform. On the other hand, actions and services that “should” be provided, as indicated in Annex 3, are recommended practices to which it is desirable for a State to conform.
2. National Services. It is important to recognize that Annex 3, as part of the Convention and related Regional Air Navigation Plans, only applies to international flights. The provision of services for domestic flights is wholly the responsibility of the State concerned. It is advisable that States adopt similar practices to those specified in Annex 3, but this is not mandatory. Similarly, it should be noted that the information given in this Guide relating to cost recovery applies solely to international services provided in accordance with Annex 3.

METEOROLOGICAL AUTHORITY

1.6 Another important concept is that of the role of the “meteorological authority”. The fourth paragraph in Chapter 2 of Annex 3 (2.1.4) states that “Each Contracting State shall designate the authority, hereinafter referred to as the meteorological authority, to provide or to arrange for the provision of meteorological service for international air navigation on its behalf.” Before setting out on the road to cost recovery, a National Meteorological Service must know whether it is in fact the designated meteorological authority with respect to ICAO. Only the meteorological authority can recover costs directly from aviation through air navigation charges. This may not be as simple as it sounds. In principle, information regarding meteorological authority can be found in ICAO Doc 7604 — *Directory of National Civil Aviation Administrations*.

Notes:

1. In many cases the authority responsible for providing the meteorological service to aviation is listed in ICAO Doc 7604. But, in some cases, it may simply indicate the civil aviation authority (CAA) as being responsible, or there may be no specific mention of which agency is responsible for the provision of a meteorological service to aviation.
2. For example, in the European Union the service provision is within the legal framework of its Single European Sky (SES). This framework lays down requirements for the distinction between the responsibilities of regulators, supervisors and providers of services for international air navigation. Consequently, at least a functional separation will exist between the supervision and provision of the services. A State has the possibility of designating a meteorological service provider on an exclusive basis, for safety considerations, but may also choose to leave the service open to several service providers provided that they have a certificate which guarantees that they comply with SES requirements. With this model in place, the meteorological authority could be designated as the provider on an exclusive basis, the supervisor or the regulator. When a European Union (EU) State decides to open meteorological service provision to several providers (possibly from the private sector), obviously one provider cannot be the meteorological authority, which will be placed at the regulatory or supervisory level. A majority of EU States choose to establish the ICAO recognized meteorological authority at regulatory/supervisory level and not at the level of the service provision.
3. There are advantages and disadvantages in each option, and which option is best for a country is a matter for the country and government to decide. However, it is probably easier for a National Meteorological Service providing services to aviation to recover those costs if it has been designated as the meteorological authority. Certainly, being the clear and undisputed negotiator with aviation users for the allocation of costs can only be to the benefit of the Meteorological Service. The first step is therefore to check the country’s entry in ICAO Doc 7604. If it states categorically that the National Meteorological Service is the entity providing meteorological service to aviation, there is no problem. If it is the civil aviation authority that is so designated, then it must be ensured that the National Meteorological Service has a contract with the civil aviation authority to provide meteorological service to aviation. If nothing is said about which entity provides meteorological services, steps should be taken with the national civil aviation authority to ensure that either the National Meteorological Service, or the national civil aviation authority, is designated for ICAO as the meteorological authority in the country. A simple letter to ICAO headquarters in Montreal from the national civil aviation authority advising ICAO of the designation is sufficient.

NATIONAL CHARGING POLICY

1.7 Given that all service has a cost, any air navigation service provider has to be financed in one way or another for the service it delivers. It is the responsibility of the meteorological authority to take appropriate cost recovery measures for such financing to be organized. The financing systems now observed throughout the world are:

- (a) Financing of all or part of the service provision by tax payers through the general State budget;
- (b) Financing of all or part of the service provision through specific taxes, part of which is directly allocated to the service provider; the decision to establish such taxes is a sovereign decision of the State and no justification is required;
- (c) Financing of all or part of the service provision through user charges (en-route charges or landing fees); it is generally understood that the level of charges is directly related to the service delivered and that it should be justified; in such cases, the service provider is generally requested to justify in a transparent manner the use of the funds allocated from air charges and its costs are carefully watched by the national authorities (this is sometimes called “economic regulation”);
- (d) Financing of all or part of the service purely under market conditions; this is particularly easy for direct services but may also raise safety issues;
- (e) A combination of the above options.

Hence, a National Meteorological Service which delivers meteorological service to air navigation may well be financed from several sources for this service, depending on the national policy. In any case, it is increasingly necessary for a meteorological service provider to properly assess the cost of the service it delivers.

RELEVANT ICAO DOCUMENTS

1.8 Before any cost-recovery exercise, the following ICAO documents should be obtained either from the national civil aviation authority or directly from ICAO, as they provide the necessary detailed, official information:

- (a) ICAO Doc 7604—*Directory of National Civil Aviation Administrations*. Necessary to determine which entity is designated to ICAO by the government as the meteorological authority in each country;
- (b) Annex 3 to the Convention on International Civil Aviation—*Meteorological Service for International Air Navigation*;^{*}
- (c) Annex 11 to the Convention on International Civil Aviation—*Air Traffic Services*;^{*}
- (d) ICAO Doc 4444—*Procedures for Air Navigation Services—Air Traffic Management (PANS-ATM)*;^{*}

^{*} These documents detail the meteorological services that States agree are necessary for aviation.

- (e) The country's own Regional Air Navigation Plan (ANP) publication;^{*}
- (f) ICAO Doc 9082—*ICAO's Policies on Charges for Airports and Air Navigation Services*. The basic philosophy and principles expressed in this document, namely fairness and equity in the determination and sharing of air navigation costs, have remained unchanged over the years;
- (g) ICAO Doc 9562—*Airport Economics Manual*. Guidance material for those responsible for airport management including the setting and collection of charges on air traffic;
- (h) ICAO Doc 9161—*Manual on Air Navigation Services Economics*. The most important document in the context of cost recovery, this manual contains a number of appendices, including one which gives detailed guidance on determining and allocating aeronautical meteorological costs;
- (i) ICAO Doc 9377—*Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services*. This document includes a description of the operational structure to provide air traffic and meteorological services, including coordination of actions between air traffic services (ATS) and meteorological offices. This information should be used for making an inventory of facilities and services needed to meet aviation user requirements.

CONSULTATION

1.9 In order to ensure relevance in services and transparency in costs, consultation between the meteorological service provider(s), the authorities, and the users should take place on a regular basis, at least once a year.

These consultations should cover:

- (a) Required service level to be provided;
- (b) Planned significant changes in services and products of relevance to the costs;
- (c) The cost allocation system used, including expected changes;
- (d) Discussions on the cost basis and the cost recovery process.

The aims of the consultation process are to ensure that:

- (a) The services provided meet user expectations;
- (b) Services and costs are transparent and accepted by the users;
- (c) No users are burdened with costs not allocable to them.

CHAPTER 2

GENERAL PRINCIPLES

2.1 Meteorological services have many users, including aeronautical users. This is cost-efficient for all users involved but creates specific relationships between the different user groups and the national meteorological service provider with respect to costs, amongst other aspects. Aeronautical meteorological services are fully dependant on facilities such as the World Weather Watch (WWW), and National Meteorological Services which provide services to international air navigation are bound by the general policy concerning air navigation service charges. These relationships must therefore be acknowledged when establishing general principles for cost allocation and recovery.

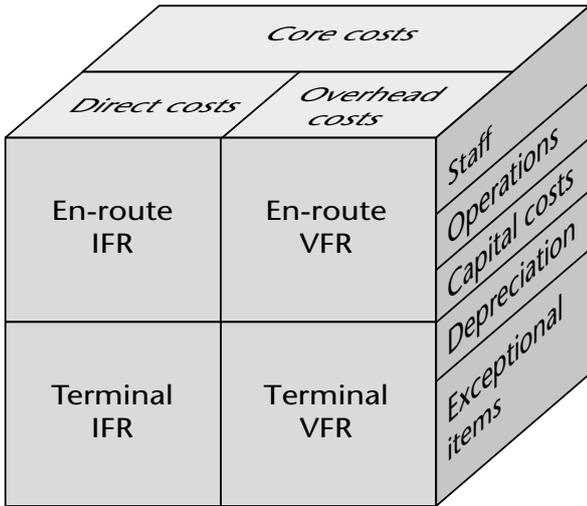
2.2 Furthermore, when establishing general principles for the determination, recovery and allocation of the cost of meteorological services to international air navigation, a clear distinction vis-à-vis other air navigation services should be made by all authorities and users involved. Indeed there is no correlation between the level of the full cost associated with meteorological services provided and the amount of aircraft landing at an airport in a State or overflying a State's territory.

2.3 Where meteorological services provided are solely for aviation (direct services), as agreed by the users, national civil aviation authority, meteorological authority (if not the provider) and the National Meteorological Service, the full costs (100 per cent) of providing these services can be recovered from users. In these circumstances, the arrangements for cost recovery may vary from one State to another. However, under the ICAO guidelines, it is necessary to ensure that where a service is solely for an aerodrome the costs are solely recovered from airport fees, whilst if the service solely applies to aircraft in flight (en-route) the costs are solely recovered from air navigation fees. If this clear distinction cannot be made, costs should be apportioned between aerodrome and en-route services. Some of these services are indicated in Annexes I and II to this Guide. Besides differentiating between airport and en-route utilization, it may appear necessary to allocate costs among categories of users. A further

distinction is made between a service solely for flights operating under Instrument Flight Rules (IFR flights), to ensure that the costs are recovered only from IFR users, and flights solely operated under Visual Flight Rules (VFR flights), whose costs should be recovered from VFR users. Annexes III and IV to this Guide, indicate services used solely for IFR flights, solely for VFR flights or for both in varying proportions if a clear distinction cannot be made.

2.4 National Meteorological Services in most States generally provide services to a number of different users in addition to international civil aviation. In these cases it becomes necessary to consider an equitable apportionment of the costs of the shared facilities and products (core services). For instance, the central infrastructure and facilities of any National Meteorological Service, such as the WWW observing network and equipment, Global Telecommunication System (GTS) meteorological communications, central administration, central training, central computing facilities, central research and development (R&D), are all used to provide services to several user groups, including aeronautical users. They are also essential for national service providers designated or contracted by a State that provide services to international aviation without being part of a National Meteorological Service. By apportioning the costs of these core services amongst all users, the total costs to be recovered from each user are reduced. It would be advisable for each State to clearly define and agree on the core services after consultation with all user groups. The diagram below gives a schematic breakdown of cost elements.

2.5 Special recognition should be given to the relationship between the core services of National Meteorological Services and the ICAO World Area Forecast System (WAFS). The WAFS fully relies on the core services provided by National Meteorological Services, such as the WWW observing network. Thus, even in cases where the services to international air navigation by a National Meteorological Service are very limited, it is still appropriate for a



Breakdown of cost elements

portion of the cost of core services to be recovered through the national recovery system from international air navigation.

2.6 The cost of providing an aeronautical meteorological service will vary considerably from country to country. Some countries may have only one or two international airports, whereas others may have many airports and be responsible for providing a meteorological watch office (MWO) or international aeronautical service. The cost of providing the required services will obviously be much higher in the latter case.

CHAPTER 3

GENERAL PROCEDURES FOR ALLOCATING COSTS

3.1 When evaluating the full costs, it is first necessary to look closely at each element of the meteorological services concerned to determine the extent to which its functions are attributable to aeronautical requirements. To do this, it is necessary to:

- (a) Establish and agree on an inventory of the facilities and services to be provided by the meteorological authority or the National Meteorological Service, as appropriate, to meet the international aeronautical requirements stated in the ICAO documents listed under paragraph 1.8, and any additional requirements specified and agreed at national level by the national civil aviation authority;
- (b) Determine general costs for the basic items and identify the costs (including those of maintenance and support services) for each facility and service;
- (c) Establish an appropriate basis for allocating costs of the core services between all user groups.

These steps are described below in more detail.

INVENTORY OF FACILITIES AND SERVICES NEEDED TO MEET AERONAUTICAL REQUIREMENTS

3.2 It is necessary to specify all the meteorological facilities and services needed to meet the international requirements as given in the various ICAO documents listed in paragraph 1.8. The services for international civil aviation include aerodrome meteorological observations, aerodrome warnings and aviation forecasts, briefing and flight documentation, SIGMET and AIRMET information, WAFS digital grid-point data for computerized flight planning, meteorological information for inclusion in broadcasts such as VOLMET and Operational Flight Information Service (OFIS), aeronautical meteorological communications and any other meteorological service required by States for aeronautical use. The facilities required to provide such services include Volcanic Ash Advisory Centres (VAACs), Tropical Cyclone Advisory Centres (TCACs), meteorological watch offices, aerodrome meteorological offices, aeronautical meteorological

stations, meteorological equipment for aeronautical purposes (including observing instruments) and telecommunications equipment for aeronautical meteorological purposes. Additionally, the inventory may include various supporting facilities and services that also serve meteorological requirements in general. These include surface and upper-air observing networks, meteorological communication systems, data-processing centres and supportive core research, training and administration. In the case of the facilities and services used for many different purposes, the costs must be split between aeronautical and non-aeronautical users.

3.3 Additional services may be specified and agreed by the national civil aviation authority in consultation with the meteorological authority (or the designated/contracted meteorological service provider) and the users. These could include detailed low-level forecasts to meet national general aviation requirements. Any additional special facilities or services provided at the request of a single or limited number of users which are not approved and agreed to by the meteorological authority are outside these cost-recovery arrangements and should be charged to the user(s) concerned.

3.4 Obviously the inventories of facilities and services will vary from country to country depending on the aeronautical requirements to be met. They can be divided into:

- (a) Facilities and services needed to serve exclusively aeronautical requirements;
- (b) Facilities and services needed to serve both aeronautical and non-aeronautical requirements.

3.5 Annexes I and III list facilities and services intended to serve aeronautical users exclusively, as related to their utilization. Annexes II and IV list the products and functions to be provided by the Meteorological Service to meet these aeronautical requirements, as related to their utilization. Annex V lists the core facilities and services of the Meteorological Service which may serve both aeronautical and non-aeronautical users.

3.6 Not every National Meteorological Service is required to provide all the facilities and services listed in Annexes I to V. However, apart from any extra services agreed nationally, a subset of these inventories should describe, for every Meteorological Service, the facilities, services and products required.

3.7 The process of establishing an inventory of services needed for aeronautical use is based on a common understanding between users, authorities and provider on what is needed to ensure safety, efficiency and regularity of the air transport system in the area of responsibility. Where this common understanding is not feasible, the civil aviation authority and the meteorological authority will institute the service level based on a list of required meteorological services for aeronautical use. As a result, there is always a formal state requirement for the services to be provided by the National Meteorological Service and therefore a solid core for full cost recovery.

IDENTIFYING THE COST OF EACH FACILITY OR SERVICE

3.8 A cost should be identified for each facility or service that has, after discussion with the national civil aviation authority and users, been agreed as being necessary for providing the required meteorological services. This cost, attributed wholly to the aviation users, should be at full cost (100 per cent) which may include "overhead" charges at the point of delivery. The items listed in Annexes I to IV to this Guide, or those specified as a national requirement, are exclusively for aviation and the total cost is allocated to aeronautical users. They must not be provided to non-aeronautical users unless so agreed, since this could have consequences for the cost allocation to aviation.

The costs of aeronautical meteorological research and training should typically be about 10 per cent of all aeronautical weather service costs. In order to ensure that aviation-related research and development remains focused on user needs, consultation with users is advised. It is possible that additional research may be funded through national (and transnational) science funds.

3.9 A full list of the meteorological core facilities and services used by all user groups should be agreed after consultation with each user group. Once the list and the full cost of each item have been agreed, it will be necessary to negotiate an appropriate apportionment of the costs amongst all the users, which may be a complex process. It

must be based on sound, equitable cost sharing, considering the use of core services and products made by each group of users. Those listed in Annex V to this Guide are suggested as being appropriate core services required to support the provision of meteorological services to all users. There are some States that do not allocate core costs to any specific user and in this case costs for these items can be ignored in determining the full cost. Once again, consultation with the national civil aviation authority and users should ensure that a method of calculating these costs is agreed and further consultations should take place regularly, and certainly before any changes or revisions of the costs are made.

ESTABLISHMENT OF AN APPROPRIATE BASIS FOR ALLOCATING COSTS BETWEEN USER GROUPS

3.10 The costs of facilities and services serving different purposes can be divided between aviation and other users by using any one or a combination of the following methods:

- (a) In proportion to the estimated aeronautical and non-aeronautical use made of the products supplied or facilities used. For example, general analysis and forecasting offices may be serving a number of users with perhaps only about 25 per cent of the effort being directly for aeronautical users. In this case, 25 per cent of the costs would be charged to aviation;
- (b) In proportion to the estimated time used by computers for aeronautical and non-aeronautical purposes. For instance, electronic data-processing facilities, although generally carrying out core activities, usually produce output for direct use by users. The proportion of time dedicated to aeronautical and other user groups' products may be used in calculating the allocation of the core costs of the facilities;
- (c) In proportion to the volume of information transmitted for aeronautical and non-aeronautical purposes. Most meteorological telecommunication facilities handle both general meteorological information and information specifically for aeronautical purposes. The latter could be encoded reports of aeronautical data such as METAR, TAF and ROFOR, or more sophisticated coded data in GRIB or BUFR code form such as WAFS products. The proportion of such aeronautical data to other general meteorological data would then form the basis of charges to aviation;
- (d) In proportion to the number of personnel working on aeronautical and non-aeronautical services;

- (e) On the basis of results from an analytical accounting system which ensures an equitable allocation of the costs. This is the method preferred by ICAO.

3.11 Ideally, the allocation of meteorological costs between aeronautical and non-aeronautical use should be based on one or more of the above methods. However, there may be circumstances when these suggested methods are not applicable and, in these cases, some other methods should be agreed upon. For instance, one possible approach could be to establish a ratio between the cost of facilities and services needed to serve exclusively aeronautical requirements and the cost of those intended to serve exclusively non-aeronautical requirements. This ratio could then be applied to the costs of those core facilities that serve a number of user groups in order to estimate the aeronautical proportion of these costs.

3.12 It is most important to note that costs should include the depreciation and capital cost of items such as equipment and buildings. These are necessary when building up reserves to replace the equipment and buildings concerned, once their useful life is over. 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 should not commence until a facility is put into service. National legislation may in some countries prescribe the length of time over which equipment, buildings and infrastructure may be depreciated. Where such regulations are not in force, National Meteorological Services may wish to use the practical examples of depreciation periods listed in Annex VI.

3.13 In principle, the allocation of costs should be determined in such a way that no users are burdened with costs not properly allocable to them. For this reason, it is necessary to have frequent discussions with all parties to agree on a full definition of “user requirements” which includes the quality of service provision and the range of products and facilities required to support the dedicated service.

3.14 ICAO Doc 9082 recommends 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.” This can prove a difficult exercise but guidance on how this should be done is given in the *ICAO Manual on Air Navigation Services Economics* (ICAO Doc 9161) and its appendices. Again it is essential that the method of allocating these costs should be agreed with the national civil aviation authority and discussed with the stakeholders concerned. When developing criteria for this cost sharing, the following should be taken into account:

- (a) The allocation of aeronautical costs among users should be carried out in a manner equitable to all;
- (b) The allocation should be made in such a way that costs are recovered from the appropriate user;
- (c) The allocation of facilities or services should be based on the flight utilization.

3.15 Where costs are being allocated between airport and en-route phases of flight, the criteria described earlier with reference to aeronautical and non-aeronautical use may again be applied here. The facilities and products listed in Annexes I, II and V to this Guide can be qualified to indicate whether they refer to en-route (E), mainly* en-route (mE), airport (A), mainly airport (mA), or airport and en-route (A/E).

3.16 A particular difficulty may arise where an aeronautical meteorological office provides a service to a number of aerodromes. The amount of resources required to prepare and disseminate TAFs, aerodrome warnings, for example, may well be the same for each airport served, despite the fact that one airport may have more flights than another. Users may feel unfairly treated if the costs were shared equally between each airport resulting in a higher user charge at a smaller, less busy, airport. Annexes VII and VIII to this Guide show in some detail how to calculate the costs to aviation of providing meteorological services at typical aerodrome meteorological stations and aeronautical meteorological offices.

3.17 Where appropriate for reasons of equity and where the necessary basic data including all required statistics are available, consideration

* “Mainly” is a share of 75 per cent, as described in ICAO Doc 9161

could be given to allocating the costs between international IFR and VFR flights. In doing so, care should be taken that meteorological cost recovery mechanisms permit the financing of the meteorological service needed for safety, regularity and efficiency of air navigation and all the user categories. When developing criteria for the allocation of costs to IFR and VFR flights, the following could be taken into account:

- (a) The allocation of aeronautical costs among users should be carried out in a manner equitable to all;
- (b) The allocation should be made in such a way that costs are recovered from the appropriate user;

- (c) The allocation of facilities and services should be based on the type of flight, IFR or VFR.

3.18 Where allocation of aeronautical meteorological costs between IFR and VFR traffic is required, the allocation criteria described earlier in reference to aeronautical and non-aeronautical use may be equally applied here. The facilities and products listed in Annexes III and IV to this Guide can be qualified to indicate whether the requirement and utilization of the facilities or products concerned are IFR (I), mainly IFR (mI), VFR (V), mainly VFR (mV) or IFR and VFR (I/V). However, this indication may vary significantly between States owing to different national policies on VFR flights.

CHAPTER 4

GENERAL PROCEDURES FOR RECOVERING AERONAUTICAL METEOROLOGICAL COSTS

4.1 Having established how to calculate the meteorological costs to be allocated to aeronautical users, the recovery of these costs must be considered. The method adopted will vary from State to State but it is strongly recommended that, wherever possible, the National Meteorological Service should not try to recover the costs directly from the users and airport authorities. In all probability, the national civil aviation authority will have a system in place, in accordance with ICAO Doc 9562 and ICAO Doc 9161, for the recovery of air navigation (traffic) services costs and adding the meteorological costs to these is an efficient and convenient method of recovering these costs. The above-mentioned documents give guidance on charging and tariff determination with respect to airspace, airports, aircraft type or flight distance. Again, close cooperation between the National Meteorological Service and/or meteorological authority and the civil aviation authority is indispensable. Special care should be taken, when allocating costs between IFR and VFR flights, to ensure sound arrangements for cost recovery from the “VFR users”. Cost recovery from VFR flights is normally a matter for the civil aviation authority to decide within each State. When cost recovery from VFR flights is a responsibility of the civil aviation authority, clear and transparent arrangements should be established between the authorities concerned to ensure full recovery of the costs for the National Meteorological Service concerned. Furthermore, it should be stressed that all the services provided to aeronautical users contribute towards the safety of the air transport system. For this reason, the need to allocate costs between IFR and VFR use, with its associated difficulties, by no means lessens the State’s obligation to provide all aeronautical users with the relevant meteorological services.

4.2 The procedures to recover aeronautical meteorological costs will vary to some extent from State to State but the following steps seem to be essential:

(a) From ICAO Doc 7604 ascertain which entity is the meteorological authority for your State. If it is not indicated in the document, request the government department representing the State as signatory to the Chicago Convention to

nominate the meteorological authority and advise ICAO accordingly;

- (b) If the meteorological authority is the National Meteorological Service, consult with the national civil aviation authority and other aeronautical users to agree on “user requirements” based on the facilities and services listed in Annexes I to IV to this Guide;
- (c) Where the National Meteorological Service is not the meteorological authority, but is the meteorological service provider for international air navigation, carry out the inventory of services required, as suggested in Annexes I to VI to this Guide;
- (d) Where the National Meteorological Service is neither the meteorological authority nor the national aeronautical meteorological service provider, it should be made clear that the infrastructure of the National Meteorological Services, i.e. telecommunications and observing networks, will likely be an essential requirement for the national aeronautical meteorological service provider. Consequently, a proportion of these costs will be allocated to aeronautical users as part of the full costs recovered by the national meteorological service provider concerned and transferred to the National Meteorological Service;
- (e) Because of the capital expenditure involved, it should be formally agreed that the contract to provide the required meteorological services for civil aviation should cover an initial period of not less than five years, as this will enable depreciation charges and expenditure on dedicated equipment to be amortized over the period concerned; suggested depreciation periods are given in Annex VI. After this initial period, however, contracts may be due for review at much shorter intervals.
- (f) Once a fair and equitable allocation of the cost of the required meteorological services for civil aviation has been agreed, arrangements should be made with the national civil aviation authority for the costs to be recovered. Some authorities may collect air navigation (traffic) service costs from users and airports on an annual basis,

while others may collect them quarterly or even monthly. In either case, the costs due to the National Meteorological Service should be collected at the same time.

4.3 The principle that the cost of providing a required meteorological service for civil aviation should be met by the users is very important, having been agreed by ICAO hence by all the signatories to the Chicago Convention. However, it is imperative that these costs be properly allocated

and in accordance with sound accounting principles. Past disputes, if any occurred, can be smoothed over if all concerned discuss the problems fully and, using the official guidance provided, arrive at an agreed, equitable allocation of costs.

4.4. Annexes IX to XIII to this guide give examples of aeronautical meteorological services cost recovery in France, the United Kingdom, the Russian Federation, Germany and the United Republic of Tanzania, respectively.

ANNEX I

FACILITIES AND SERVICES INTENDED EXCLUSIVELY TO SERVE AERONAUTICAL USERS

<i>Facilities and services</i>	<i>Utilization*</i>
World Area Forecast Centres (WAFCs)	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 databank	E
Telecommunications for aeronautical meteorological purposes, including VSAT stations to receive WAFS products and OPMET data (if not included in the communication cost allocation)	A/E
Facilities to provide meteorological data processing of WAFS products	mE
Provision of D-VOLMET or VOLMET broadcasts	E
Observing instruments provided for aeronautical purposes (such as ceilometers, transmissometers, forward scatterometers)	mA
Specific aeronautical meteorological research	A/E
Specific aeronautical meteorological training	A/E
Specific aeronautical technical support (including administration)	A/E

* E = en-route, mE = mainly (75%) en-route (and 25% airport), A = airport, mA = mainly (75%) airport (and 25% en-route), A/E = airport (50%) and en-route (50%)

ANNEX II

PRODUCTS AND FUNCTIONS INTENDED EXCLUSIVELY TO MEET AERONAUTICAL REQUIREMENTS

<i>Products and functions</i>	<i>Utilization*</i>
Meteorological observations and reports for local air traffic services (ATS) units	A
Meteorological reports disseminated beyond the aerodrome (METAR, SPECI)	mE
Aerodrome forecasts (TAFs, including amendments thereto)	mE
Landing forecasts (including TREND) and forecasts for take-off	A/E
Area and route forecasts, other than those issued with WAFS (including GAMET, ROFOR)	E
Aerodrome and wind shear warnings	A
SIGMET, AIRMET, volcanic ash advisories, tropical cyclone advisories	E
Aerodrome climatological information	A
Flight documentation (WAFS products, SIGWX forecasts for low-level flights and required OPMET data)	mE
Meteorological watch by MWOs over flight information region (FIR)/upper flight information region (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 (VA) and tropical cyclone (TC) watch by VAACs and TCACs (for the issuance of VA and TC advisories)	E
Briefing and consultation (including display of OPMET and other meteorological information)	A
Provision of information to meteorological information systems (for use in remote briefing/consultation systems)	A/E
Provision of information for ATS and aeronautical information services (AIS) units	A/E
Provision of information for search and rescue (SAR) units	E
Provision of WAFS and OPMET data to operators	mE

* E = en-route, mE = mainly (75%) en-route (and 25% airport), A = airport, mA = mainly (75%) airport (and 25% en-route), A/E = airport (50%) and en-route (50%)

ANNEX III

FACILITIES AND SERVICES INTENDED EXCLUSIVELY TO SERVE AERONAUTICAL USERS AND THEIR ALLOCATION BETWEEN IFR AND VFR

<i>Facilities and services</i>	<i>Utilization*</i>
World Area Forecast Centres (WAFCs)	I
Volcanic Ash Advisory Centres (VAACs)	I
Tropical Cyclone Advisory Centres (TCACs)	I
Meteorological watch offices (MWOs)	I
Aerodrome meteorological offices	I
Aeronautical meteorological stations	I
Operation of a regional OPMET databank	I
Telecommunications for aeronautical meteorological purposes, including VSAT stations to receive WAFS products and OPMET data (if not included in the communication cost allocation)	I
Facilities to provide meteorological data processing of WAFS products	I
Provision of D-VOLMET or VOLMET broadcasts	I
Observing instruments provided for aeronautical purposes (such as ceilometers, transmissometers, forward scatterometers)	I
Specific aeronautical meteorological research	I
Specific aeronautical meteorological training	mI
Specific aeronautical technical support (including administration)	mI

* I = IFR, V = VFR, mI = mainly (75%) IFR (and 25% VFR), mV = mainly (75%) VFR (and 25% IFR), I/V = IFR (50%) and VFR (50%)

ANNEX IV

PRODUCTS AND FUNCTIONS INTENDED EXCLUSIVELY TO MEET AERONAUTICAL REQUIREMENTS AND THEIR ALLOCATION BETWEEN IFR AND VFR

<i>Products and functions</i>	<i>Utilization*</i>
Meteorological observations and reports for local air traffic services (ATS) units	I
Meteorological reports disseminated beyond the aerodrome (METAR, SPECI)	I
Aerodrome forecasts (TAFs, including amendments thereto)	I
Landing forecasts (including TREND) and forecasts for take-off	I
Area and route forecasts, other than those issued with WAFS (including ROFOR)	I
Area and route forecasts, other than those issued with WAFS (including GAMET)	I/V
Forecasts for VFR aviation and air sports (such as GAFOR)	V
Aerodrome and wind shear warnings	I
SIGMET, volcanic ash advisories, tropical cyclone advisories	I
AIRMET	I/V
Aerodrome climatological information	I
Flight documentation (WAFS products, SIGWX forecasts for low-level flights and required OPMET data)	I/V
Meteorological watch by MWOs over flight information region (FIR)/upper flight information region (UIR) (for the issuance of SIGMETs)	I
Meteorological watch by MWOs over flight information region (FIR)/upper flight information region (UIR) (for the issuance of AIRMETs)	I/V
Aerodrome weather watch by the meteorological office concerned (for the issuance of amendments to TAFs, aerodrome and wind shear warnings)	I
Volcanic ash (VA) and tropical cyclone (TC) watch by VAACs and TCACs (for the issuance of VA and TC advisories)	I
Briefing and consultation (including display of OPMET and other meteorological information)	I/V
Provision of information to meteorological information systems (for use in remote briefing/consultation systems)	mI
Provision of information for ATS and aeronautical information services (AIS) units	I
Provision of information for search and rescue (SAR) units	I
Provision of WAFS and OPMET data to operators	I

* I = IFR, V = VFR, mI = mainly (75%) IFR (and 25% VFR), mV = mainly (75%) VFR (and 25% IFR), I/V = IFR (50%) and VFR (50%)

ANNEX V

CORE FACILITIES AND SERVICES WHICH MAY SERVE BOTH AERONAUTICAL AND NON-AERONAUTICAL USERS

Allocation between airport and en-route use

<i>Core facilities and services</i>	<i>Utilization*</i>
General analysis and forecast offices	A/E
Meteorological data processing	A/E
Commonly used meteorological communication facilities and services	A/E
Surface synoptic observation stations	mE
Climatological observation stations (precipitation stations to be excluded)	mE
Upper-air observation stations	E
Weather radar	A/E
Meteorological satellite image reception	mE
Core training	A/E
Core research	A/E
Core technical support (including administration)	A/E

* E = en-route, mE = mainly (75%) en-route (and 25% airport), A = airport, mA = mainly (75%) airport (and 25% en-route), A/E = airport (50%) and en-route (50%)

Allocation between IFR and VFR use

<i>Core facilities and services</i>	<i>Utilization*</i>
General analysis and forecast offices	mI
Meteorological data processing	mI
Commonly used meteorological communication facilities and services	mI
Surface synoptic observation stations	mI
Climatological observation stations (precipitation stations to be excluded)	mI
Upper-air observation stations	mI
Weather radar	mI
Meteorological satellite image reception	mI
Core training	mI
Core research	mI
Core technical support (including administration)	mI

* mI = mainly (>90%) IFR as identified in the States concerned

ANNEX VI

EXAMPLES OF DEPRECIATION PERIODS

<i>Item</i>	<i>Depreciation period</i>
Buildings (freehold)	20–40 years
Buildings (leasehold)*	Period of the lease
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	5–10 years
Computer software	3–8 years

* Buildings built on leased land

ANNEX VII

ALLOCATING THE COSTS OF A TYPICAL AERODROME METEOROLOGICAL STATION

1. As discussed in Chapter 2, there are four stages in the allocation process, though not all will be appropriate in every case:

- (a) Identify the total cost;
- (b) Allocate costs between aeronautical and non-aeronautical users;
- (c) Allocate costs between airport and en-route services;
- (d) Allocate costs between IFR and VFR operations (if possible and if required).

2. In the first instance, let us assume that the aeronautical meteorological station serves only aviation, carries out observation duties including a continuous weather watch, encodes the information in METAR/SPECI reports and gives these reports to the users. The total cost of the station would be the sum of the costs of the staff, accommodation (including heating, lighting and cleaning), furniture and equipment (including the observation equipment), general maintenance and repair, depreciation, and so on. Because only METAR/SPECI reports are prepared, the total cost (100 per cent) of the station is allocated to aeronautical users.

3. Allocating these costs between airport and en-route services will vary depending on an agreement within the State between the meteorological authority and the civil aviation authority on the apportionment of costs between the provision of observations for airport usage and the provision of METAR/SPECI reports for pre- and in-flight planning. If reports are included in a VOLMET broadcast to

aircraft then a larger proportion of the cost should be allocated to en-route. In addition, where appropriate, the costs for documentation services and provision of meteorological data to information systems deployed on the airport both for pre-flight as well as in-flight services will need to be considered during negotiations on shared costs.

4. Where allocating costs between IFR and VFR is possible (preferably based on traffic statistics) and considered necessary, an estimate of the proportion of use and effort to each must be made.

5. Now let us look at cases where the aeronautical meteorological station is also required to prepare SYNOP messages which are used generally within the National Meteorological Service and exchanged internationally as agreed within WMO. In this case, only part of the total cost of the station should be allocated to aeronautical users. The proportion will vary depending on the amount of time and effort spent on each task. In some instances it may be that only 50 per cent of the total cost will be allocated to aeronautical users. In other cases, where only encoding the observation as a SYNOP report is required, approximately 85 per cent of the total cost may be appropriate. In each case, aviation should be charged accordingly.

6. In every case, the costs of instruments related to specific aeronautical requirements, such as runway visual range (RVR) systems, should be allocated totally to aviation, in this particular case IFR.

ANNEX VIII

ALLOCATING THE COSTS OF A TYPICAL AERONAUTICAL METEOROLOGICAL OFFICE

1. Again it is necessary to look at the four stages in assessing the allocation of costs. The aeronautical meteorological office may be on the airport or located elsewhere, it may be dedicated to aeronautical services or it may be multi-functional. Whatever the situation, it is necessary to identify the total costs of the office, including the costs of staff, accommodation, furniture and equipment, communications, and so on. If the office is exclusively dedicated to aeronautical services then all the costs (100 per cent) can be allocated to aeronautical users. If, however, the office is multi-functional then the total costs of the office should be divided among the users, using an agreed method, as discussed in paragraphs 2.4 and 3.10. For instance, if it is determined that 60 per cent of the operational staff are dedicated to aeronautical services then 60 per cent of the total costs are allocated to the aeronautical users.

2. Aeronautical meteorological offices provide services to both airport and en-route users, being responsible for aerodrome forecasts, landing and take-off forecasts, area and route forecasts (other than the messages provided by the WAFS),

aerodrome and wind shear warnings, briefings and consultations, aerodrome weather watch, and so on. The allocation of costs between airport and en-route users will vary from office to office, depending on the number of flight movements and the number of airports being served.

3. Many aeronautical meteorological offices support more than one airport and, where necessary, the total costs allocated to airports generally should be shared between the airports serviced. The amount of effort spent by the aeronautical meteorological office on supporting each airport is probably very similar despite the fact that the amount of traffic at each aerodrome may vary considerably. As discussed earlier, allocating costs between individual airports using effort spent as the guide may not be considered equitable by the users. In consultation with all the stakeholders concerned and the civil aviation authority, an acceptable and fair method of sharing the costs should be arrived at. Costs should also be allocated between IFR and VFR if sufficient data are available to make such a distinction and where this distinction is required.

ANNEX IX

AERONAUTICAL METEOROLOGICAL SERVICES COST RECOVERY IN FRANCE

INTRODUCTION

In France, the government department responsible for aviation services, including the meteorological service, is the Direction générale de l'aviation civile (DGAC), which is also the officially designated meteorological authority according to Annex 3 to the Chicago Convention. Météo-France, being the French National Meteorological Service, is a public agency under the Ministry of Transport and is considered as a meteorological service provider.

The SES regulations are applicable in France. Air navigation services, including meteorological ones, must therefore comply with them. Météo-France has been SES-certified and is now authorized to provide meteorological services to air navigation in the civil sector, but it is also responsible for services provided to military forces and works in close cooperation with the Ministry of Defence. The costs corresponding to the military services are covered under the budget allocated to Météo-France by the State.

Under SES regulations, meteorological services may be provided under different rules. France, like many other EU countries, decided to charge aeronautical users for the full cost of the air navigation services provided (such as air traffic control, aeronautical information, meteorology), including a share of core costs where appropriate. For example, air navigation charges in France amounted to €1 471 million in the 2006 Financial Law, of which €77 million (5.23 per cent) were allocated to Météo-France and represent 23.5 per cent of its budget.

The State (DGAC) requests Météo-France to provide the necessary meteorological services to ensure the safety of air navigation within a specified airspace (perimeter of the service area) and a given set of services. That whole service is charged to air navigation through the general mechanism approved by ICAO. The share of meteorology in the airline charges covers the full cost of the service, including a share of core costs. According to SES regulations, Météo-France must justify the meteorological costs charged to air navigation through airline charges. The associated

meteorological costs are assessed by Météo-France as described below.

Outside the perimeter defined by the State, Météo-France provides certain services to various users, including aeronautical users, on a purely commercial basis, in full compliance with the SES regulations for services defined by the State as necessary for air navigation safety. The present text does not describe the financial aspects of services provided by Météo-France to air navigation on a commercial basis.

The SES regulations require transparency in the costs charged by the State to air navigation and to associated aeronautical users through the definition of those costs. This transparency is ensured by close cooperation between Météo-France and the DGAC through regular consultative meetings on technical and financial matters, which also involve the users. Periodical formal meetings are organized within the Conseil supérieur de la météorologie (CSM), an entity presided over by the Ministry of Transport. The aeronautical commissions of the CSM consider the needs of all users, including commercial aviation, general aviation and sporting aviation (such as gliders, ultra-light motorized aircraft, balloons). Users may express their wishes and Météo-France must provide an answer (if negative, this must be justified).

METEOROLOGICAL SERVICES PROVIDED TO AIR NAVIGATION FOR SAFETY REASONS

Meteorological services to aviation provided by Météo-France cover the airspace under the responsibility of France; they mainly comprise the following, as required by Annex 3 to the Chicago Convention:

- (a) En-route meteorological forecasting and warning services for both international and national flights;
- (b) Provision of low-level significant weather charts for general aviation;
- (c) Aerodrome meteorological services;
- (d) Provision of delivery system facilities;
- (e) Provision of aviation-specific R&D;

- (f) Provision of a Volcanic Ash Advisory Centre and Tropical Cyclone Advisory Centre as agreed with ICAO.

Moreover, some additional data and services beyond the Annex 3 requirements were defined by the State as being necessary for air navigation safety.

The comprehensive list of all the data and products which are necessary for air navigation safety is annexed to the SES certificate of Météo-France.

The DGAC has defined the perimeter for meteorological service delivery (with costs charged to air navigation through airline charges, and properly assessed) as being (including overseas):

- (a) The list of aerodromes published yearly in the French Official Journal;
- (b) All air traffic control (ATC) and aeronautical information units serving the flight information region under the responsibility of France.

As stated above, the cost of services delivered outside the perimeter is recovered on a commercial basis, and therefore not charged through air navigation charges.

COSTS AND ACCESS POLICY

From an accounting point of view, Météo-France serves three main categories of users:

- (a) State services (mainly civil defence and safety), financed by the national budget/national taxes (58.6 per cent of the 2006 Météo-France budget);
- (b) Air navigation sector under safety requirements, financed through the meteorological share of air navigation charges (23.5 per cent);
- (c) Commercial sector, fully financed by commercial income (14.8 per cent) and not subsidized from the state budget.

Allocation of meteorological costs between user groups is based on an analytical accounting system that ensures an equitable allocation of costs.

Given that state air navigation products and services are prepaid through air navigation charges by the aeronautical user community, the policy of Météo-France is to restrict access to those products to aeronautical users only. Being prepaid, those products and services seem to be “free of charge” for those users and their use, including redistribution, is free and unrestricted within the aviation community.

When facilities are available that are accessible from individual homes, such as fax servers, telematics servers or Internet, access to services provided by Météo-France is controlled and restricted by an access code. The cost of delivery provided in this context can be recovered on a global basis through agreements with users’ federations, or on an individual basis through individual billing. Nevertheless, the main services provided are paid through aeronautical charges.

METEOROLOGICAL COST ASSESSMENT

The analytical accounting system adopted by Météo-France is based on a functional model distinguishing between:

- (a) “Upstream” activities, with associated costs, for which an appropriate share has to be allocated to aviation;
- (b) Activities dedicated to air navigation services, with associated direct costs fully allocable to aviation.

It is necessary to parameterize the “upstream” costs. An in-depth analysis of the upstream activities was made which identified approximately 500 homogeneous activities distributed over six levels. The costs associated with each activity at a given level are distributed to the “downstream” levels.

The cost allocation can be direct when there is an obvious, unambiguous link between the activity and the cost. It is indirect through a cascade of allocations, based on allocation keys, towards downstream levels in the following areas:

- (a) General infrastructure and logistics, with allocation keys based on the surface area of the buildings/facilities;
- (b) General management, with allocation keys based on the number of staff dedicated to that task;
- (c) Training, with allocation also based on staff;
- (d) Support costs including:
 - (i) Data processing, with allocation keys based on computer hours allocated to each sector of activity for the mainframes; the costs of distributed data processing are allocated according to the staff of each unit;
 - (ii) Telecommunications for which each link has been analysed in detail in order to allocate costs according to the relevant customer;
- (e) Cost of meteorological general-purpose activities serving a variety of applications which cannot be allocated to a single user, with the allocation keys based on operational considerations, according to the nature of the activity; for air navigation services:

- (i) The allocation keys for observation, general forecasting and general production are based on the ratio between the number of staff devoted to air navigation services and the total number of staff involved in the user's products;
- (ii) The allocation key for the cost of climatology is the ratio between the number of meteorological stations at airports and the total number of observing stations in the main network (declared as part of the RBSN) operated by Météo-France;
- (iii) R&D activities are allocated to air navigation with the same keys as for observation, general forecasting, and general production, except when the R&D obviously has no link with air navigation (for example climate change, hydrology, agrometeorology, urban meteorology).

Once the model is parameterized with the appropriate allocation keys and with the actual expenses borne by Météo-France, it gives the overall meteorological cost of the service provided to air navigation

by Météo-France. Some adjustments are made in order not to allocate to air navigation the costs of the services provided to general aviation and services which are under the responsibility of the State (technical enquiries and state flights).

As the regulations require dividing meteorological costs between en-route and terminal costs, the distribution is made according to ICAO Doc 9161. Core costs are also computed by subtracting direct costs from the total meteorological cost.

CONCLUSION

The above method to assess the meteorological costs charged to air navigation has now been used for several years by Météo-France and users have to date never made any complaints about it. The results are formally presented to the aeronautical users twice yearly:

- (a) At the beginning of the year for the executed budget of the previous year;
- (b) At the end of the year for the provisional budget of the following year.

ANNEX X

AERONAUTICAL METEOROLOGICAL SERVICES COST RECOVERY AT THE UNITED KINGDOM MET OFFICE

INTRODUCTION

The government department responsible for aviation services in the United Kingdom is the Department for Transport. This department appoints the UK Civil Aviation Authority (CAA) as the national supervisory authority for the UK.

In accordance with the functions conferred on the CAA under the SES (Functions of the National Supervisory Authority) Regulations 2006, the CAA has designated the United Kingdom Met Office (UKMO) under Article 9 of Regulation (EC) No. 550/2004 to provide meteorological services subject to various rights and obligations. This includes:

- (a) The UKMO shall at all times hold a certificate issued under Article 7 of Regulation (EC) No. 550/2004 demonstrating compliance with the common requirements for the provision of air navigation services under Regulation (EC) No. 2096/2005;
- (b) The UKMO shall provide the services referred to in this designation on an exclusive basis in relation to UK airspace. Additionally the UK has accepted the responsibility for the provision of the World Area Forecast Centre (WAFc) London and Volcanic Ash Advisory Centre London. As a result, the provision of WAFS data and products, as well as volcanic ash advisories are included within the designation under Article 9 of Regulation (EC) No. 550/2004.

SERVICES PROVIDED BY UKMO

- (a) International and national aeronautical meteorological services and products in accordance with Annex 3 to the Chicago Convention as set out in the Service Specification. The User Requirement is updated annually by the CAA, as the UK's meteorological authority, in consultation with the UKMO and the Met User Forum.

International services comprise WAFS GRIB coded data, SIGWX data in BUFR format and PNG chart form, backup facilities between WAFc London and WAFc Washington, and the London Volcanic Ash Advisory Centre products. National services include spot wind and temperature and SIGWX charts for various levels for the UK region; a European low-level significant weather chart; SIGMETs for UK FIRs; forecast QNH data for the UK; TAFs, Trends and warnings for UK civil aerodromes; local area forecasts for specific aerodromes; regional AIRMET and ballooning forecasts; a clarification and amplification of forecasts service for pilots; and take-off forecasts and London FIR winds;

- (b) Provision of adequately trained staff in compliance with Annex 3 to the Chicago Convention and relevant WMO publications to conduct the defined services in an accurate, reliable and timely manner to achieve the targets set out in the annually agreed specification;
- (c) Implementation of the National Meteorological Programme that allows the international and national forecasting (formerly known as "core") services to be provided. The National Meteorological Programme is a programme ensuring maintenance and development of the underpinning infrastructure required to operate a National Meteorological Service and delivery of direct services to UKMO civil aviation customers. It generates three main types of output: data, model products and guidance on their interpretation. These outputs are subject to additional processes to generate customer-specific direct services. The programme contains a range of activities related to infrastructure support, observations, numerical weather prediction, central forecasting, research and development and their associated overheads;
- (d) The R&D agreed by the Aeronautical Meteorological R&D Steering Group and set out in the

User Research and Development Programme. The purpose of the aviation meteorology R&D programme is primarily to meet users' needs to develop new or enhance existing aeronautical meteorological services, as agreed by industry, such as the current European FLYSAFE project. The programme is reviewed and updated annually in consultation with the R&D steering group and the UKMO;

- (e) Keeping of records of all aeronautical meteorological forecasts products in the service specification for a period of two years, to assist with any subsequent investigations, and to provide this information to the CAA, Air Accidents Investigation Branch (AAIB) or National Air Traffic Services (NATS) within 10 working days of a written request;
- (f) Maintenance of a record of all official routine aerodrome meteorological observations (METARs) at UK aerodromes received by the UKMO. These are retained for a period of five years to assist with any subsequent investigations and for climatological purposes (note that all aerodrome observations in the UK are made by NATS and not by the UKMO);
- (g) National and international distribution of data. The UKMO is required to distribute aeronautical data and products via the Aeronautical Fixed Telecommunication Network (AFTN) and the Satellite Distribution System (SADIS) and, where agreed with the meteorological authority, via fax and Web-based systems;
- (h) Provision of professional staff support to the Head, meteorological authority within the Directorate of Airspace Policy, CAA as mutually agreed;
- (i) Attendance at user fora and other meetings concerned with present and future meteorological service provision and agreements, as agreed with the CAA;
- (j) Aerodrome meteorological liaison visits to ensure that meteorological observing practices are in accordance with Annex 3 to the Chicago Convention.

COST CALCULATION

The UKMO has been running a detailed accounting system for over 20 years whereby each activity can be identified by a unique code. Within this system, each activity accrues costs based on the staff time devoted to the task, equipment and depreciation charges, any services bought in from outside the UKMO plus an appropriate allocation of overheads and corporate services. This determines the prices on which all services are based.

DETERMINATION OF CHARGES FOR DIRECT SERVICES AND THE NATIONAL METEOROLOGICAL PROGRAMME

The determination of the inclusion of aeronautical meteorological service costs is in line with ICAO Council guidelines as well as European legislation and related guidance. Reference is made to Appendix 6 of the *Manual on Air Navigation Services Economics* (ICAO Doc 9161), Regulation (EC) No. 794/2006, "the charging regulation", and Appendix IV of the Eurocontrol *Principles for establishing the cost-base for route facility charges and the calculation of the unit rate* (November 2004 edition). Charges and costs reflect generally accepted accounting and costing principles.

The charge for aeronautical direct meteorological services is calculated using the following formula:

$$C2 = (C1 - D) * I * E + N$$

where C2 is the charge for aeronautical meteorological services in year 2, C1 the charge for aeronautical meteorological services in year 1, D the charge for discontinued meteorological services at year 1 prices, I the inflation factor (for example 1.03), E the efficiency factor (for example 0.975) and N the charge for new meteorological services at year 2 prices. The inflation factor is based on UK government statistics for the average annual change in pay costs for public service workers. An efficiency factor of 2.5 per cent per annum ensures that users continue to get value for money each year.

A similar charging calculation is used for the National Meteorological Programme element, however there are no changes applied for new or discontinued services and the efficiency factor is smaller reflecting the higher proportion of capital and equipment costs to staff costs associated with providing the National Meteorological Programme. In 2007, the CAA contribution to this programme represented 24 per cent of the total programme funding. Aviation services as a whole represent 15 per cent of total UKMO income.

SADIS

SADIS forms part of the ICAO aeronautical fixed service (AFS) and is run by the UKMO on behalf of ICAO. The operational requirements for SADIS are coordinated by the SADIS Operations Group (SADISOPSG) which specifies the needs for data on SADIS requested by ICAO Regional Planning

Groups. The cost of running SADIS is recovered through the SADIS Cost Recovery Administration Group (SCRAG) which comprises users in the ICAO Europe, Middle East, Africa-Indian Ocean and Asia Pacific regions. Each year the UKMO, NATS (which runs the SADIS Gateway), ICAO and UK CAA present their actual and predicted costs for running

SADIS to the SCRAG for scrutiny and approval. Once agreed, the UKMO is then delegated by UK CAA to recover these costs through the agreed SCRAG cost-sharing mechanism from SADIS user States. United Nations Least Developed Countries are exempted from making any payments towards SADIS.

ANNEX XI

AERONAUTICAL METEOROLOGICAL SERVICES COST RECOVERY AT THE RUSSIAN FEDERAL SERVICE FOR HYDROMETEOROLOGY AND ENVIRONMENTAL MONITORING

INTRODUCTION

The government department responsible for state hydrometeorological services within the Russian Federation is the Russian Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet).

In accordance with Annex 3 to the Chicago Convention, Roshydromet is officially designated meteorological authority by the Government of the Russian Federation to provide meteorological services for international air navigation.

This mandate is carried out through a contractual agreement on the provision of meteorological services to civil aviation between Roshydromet and the Federal Air Navigation Service of the Russian Federation, which acts as the executive body to provide state services for air navigation and the single air transport system in the Russian Federation. The agreement covers the following areas:

- (a) Provision of aeronautical meteorological services;
- (b) Cost recovery for aeronautical meteorological services by Roshydromet;
- (c) Terms of reference for Roshydromet and the Federal Air Navigation Service to provide aeronautical meteorological services;
- (d) Coordinated activities by these organizations to provide aeronautical meteorological services.

METEOROLOGICAL SERVICES FOR CIVIL AVIATION

Meteorological services for aviation are provided in accordance with the *Наставление по метеорологическому обеспечению гражданской авиации России* (Manual on meteorological services for Russian civil aviation). Which was developed and introduced jointly by Roshydromet and the Russian Federal Air Navigation Service. The Manual in turn complies with the standards and recommendations of Annex 3 to the Chicago Convention and national requirements for meteorological services to ensure flight regularity, efficiency and safety in Russian airspace.

The meteorological services mainly comprise the following activities:

- (a) Aeronautical meteorological observations;
- (b) Reporting on aerodrome present weather, and en-route and flight area forecasting;
- (c) Provision of SIGMET information and aerodrome warnings;
- (d) Provision of SIGWX charts;
- (e) Crew briefing during pre-flight preparations;
- (f) Delivery of meteorological information to air traffic control;
- (g) Provision of meteorological information to the central flow management unit;
- (h) Provision of climate descriptions for aerodromes and air routes;
- (i) Provision of the latest techniques for aeronautical meteorological forecasts, for example.

Meteorological services for civil aviation are provided by the following entities:

- (a) The 310 aeronautical meteorological stations acting as aerodrome meteorological offices and meteorological watch offices;
- (b) World Meteorological Centre Moscow (WMC Moscow) dealing with SIGWX charts;
- (c) A number of research institutes and other organizations.

The following facilities are used to obtain aeronautical meteorological information:

- (a) Aeronautical meteorological equipment, including instruments, remote-sensing apparatus, aerodrome automatic weather stations, VSAT units);
- (b) Upper-air and weather radar stations;
- (c) Aeronautical meteorological communications equipment;
- (d) Boundary-layer wind profiles;
- (e) Instrument calibration facilities;
- (f) Computing facilities.

COST RECOVERY POLICY

Currently, the cost of aeronautical meteorological services in the Russian Federation is recovered for two types of service (see Appendix A):

- (a) Provision of meteorological information for air routes, local airlines and aerial work regions. Roshydromet charges for these services through a central agreement between the MeteoAgency of Roshydromet and the State Corporation for Air Traffic Management. The agreement covers the total annual cost estimate for offices providing aeronautical meteorological services for air routes, local airlines and aerial work regions through Roshydromet and Russian Federal Air Navigation Service, as appropriate. This cost estimate is based on cost of services provided the previous year, the inflation rate, changes in the volume of air transport operations, and cost of aeronautical meteorological operations depending on changes in the list and volume of services provided, and is agreed with the Federal Air Navigation Service. The charges for the meteorological information thus provided form part of the aeronautical fee for air routes and for local airlines and aerial work regions.
- (b) Provision of aerodrome meteorological information. This service is costed in each airport for both domestic and international users.
- (i) For domestic users, that is Russian airlines, meteorological services at an aerodrome are charged for each departure as part of the airport fees. These charges depend on the type of aircraft, identified by specific coefficients according to the maximum take-off mass. The coefficient for aircraft and helicopters up to 12 tons is 0.5, and for aircraft and helicopters over 12 tons it is 1.0. The services include meteorological information delivery to crews and air traffic control bodies at airports. Estimates are made by direct agreements between airlines (operators) and Roshydromet institutions based on fixed tariffs for airport meteorological services, which are developed by Roshydromet annually and agreed with the Russian Federal Air Navigation Service.

These tariffs are published regularly by the Russian Timetable and Tariff Centre.

- (ii) For international users, meteorological services are charged for as part of the aeronautical airport fees which are published in the aeronautical information publications. These charges are fixed in dollars per ton of the maximum take-off mass. Estimates are made by agreement between Roshydromet institutions providing services at international airports and branches of the State Corporation for Air Traffic Management.

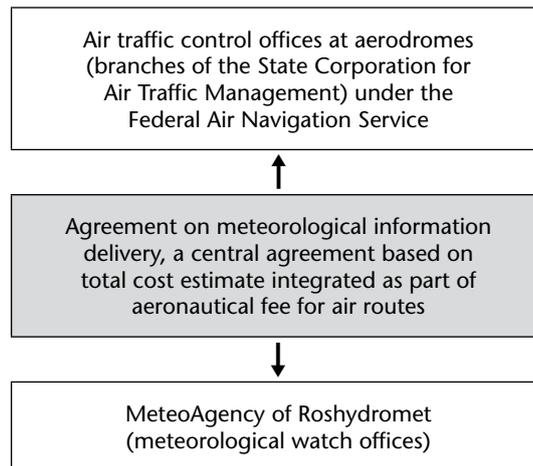
Aeronautical meteorological services provided by Roshydromet are non-profit making based on a cost recovery principle whereby income is used to cover the cost of information generation, processing and transmission, as well as to maintain the observing network, and improve the services to civil aviation.

Costs are allocated in line with the meteorological costs estimates for each entity and for Roshydromet as a whole. Cost estimates are compiled regularly and approved on a special form by Roshydromet (see Appendix B). Such cost estimates help to maintain cost transparency for the administrations of aviation users and to eliminate duplicated accounting for meteorological services. It also provides a basis for evaluating the airport and en-route components of its costs of providing information.

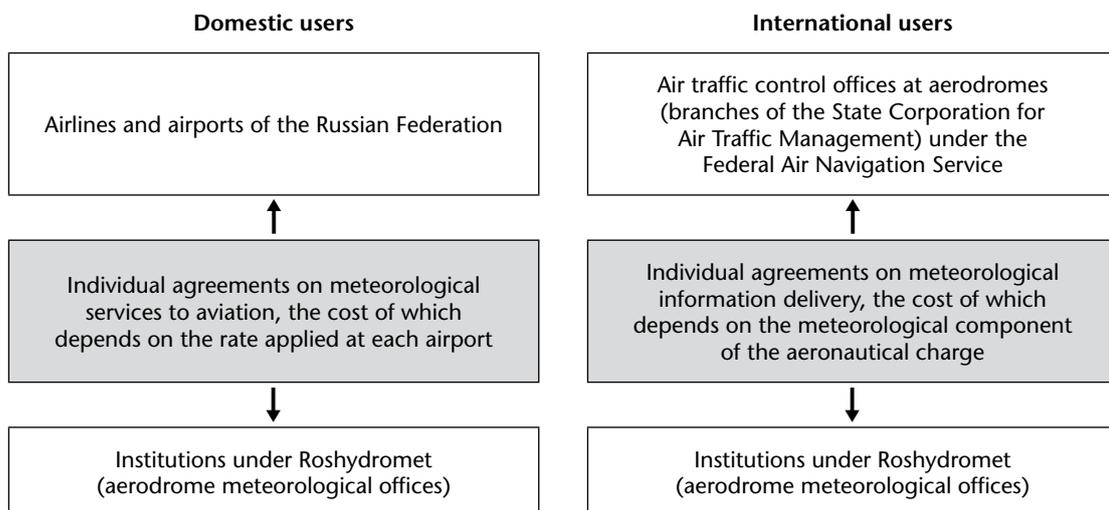
The current ratio of the airport to en-route components in the Russian Federation is 3:1 for Roshydromet as a whole. However for each aeronautical meteorological station, the ratio may differ, given the territorial peculiarities of the Russian Federation and different amounts of related activities carried out by the aeronautical meteorological units for example, an aeronautical meteorological station may fulfil the functions of an aerodrome meteorological office or a meteorological watch office.

APPENDIX A — AGREEMENTS ON AERONAUTICAL METEOROLOGICAL SERVICES

Aeronautical meteorological services for air routes, airlines and aerial work regions



Aeronautical meteorological services for users at an aerodrome



APPENDIX B — ANNUAL ESTIMATE

Cost estimate for aeronautical meteorological services (model)

AMS (MWO): _____
 Name (name of institution serving as an AMS)

No.	Item	Cost of maintenance activities in the year _____		
		Meteorological information delivery		
		Aerodrome	En-route	Total
1	Total costs (Nos. 2 to 12, inclusive)			
2	Payroll			
3	Staff costs			
4	Procurement of spares and consumables			
5	Travel expenses			
6	Transport costs, including:			
	– In-house service			
	– Provided by civil aviation offices (Name of institution)			
	– Provided by branches of State Corporation for ATM (Name of institution)			
7	Communications costs, including			
	– In-house service			
	– Provided by civil aviation offices (Name of institution)			
	– Provided by branches of State Corporation for ATM (Name of institution)			
8	Utilities costs, including			
	– In-house service			
	– Provided by civil aviation offices (Name of institution)			
	– Provided by branches of State Corporation for ATM (Name of institution)			
9	Rent, including			
	– Premises (Name of lessor)			
	– Equipment (Name of owner)			
10	Cost of other services, including			
	– Cost of meteorological information			
	– Miscellaneous.			
11	Grants and current transfers (in accordance with Russian legislation)			
12	Acquisition of meteorological equipment			

Head (director) of institution: _____

ANNEX XII

AERONAUTICAL METEOROLOGICAL SERVICES COST RECOVERY IN THE FEDERAL REPUBLIC OF GERMANY

INTRODUCTION

In Germany, the government department responsible for aviation services is the Aviation and Aerospace Directorate of the Federal Ministry of Transport, Building and Urban Affairs.

The National Meteorological Service—Deutscher Wetterdienst (DWD)—is the officially designated meteorological authority in line with Annex 3 to the Chicago Convention. As a statutory task, the DWD is also responsible for the provision of meteorological services for civil aviation in Germany.

METEOROLOGICAL SERVICES FOR CIVIL AVIATION

The meteorological services for aviation provided by the DWD are as follows:

- (a) Provision of data (such as METAR);
- (b) Provision of national forecast products (such as TAFs);
- (c) Provision of warnings (such as SIGMETs);
- (d) Provision of information and consultation;
- (e) Other services (such as education and training, contribution to international organizations).

COST ALLOCATION AND RECOVERY

The products required to provide the meteorological services for aviation are defined in the ICAO *Manual on Air Navigation Services Economics* (Doc 9161) relating to:

- (a) IFR and VFR;
- (b) En-route and airport.

The provision of these services entails basic tasks which can be separated into two groups:

- (a) Those required solely for aeronautical meteorological services (such as monitoring of TAF and wind shear);
- (b) Those which are also applied to other services such as value-added services (such as the work of the measuring network and the telecommunication network, administrative and additional IT services).

ALLOCATION OF THE COSTS OF AERONAUTICAL METEOROLOGICAL SERVICES

A modern analytical accounting system redesigned in 2003 ensures an equitable allocation of costs. In this accounting system, which is structured as a multi-level system, all services and products are defined as cost units:

- (a) External cost units are either meteorological services for aviation or other users;
- (b) Internal cost units represent the basic tasks (solely, proportionally or not applied to aeronautical meteorological services).

First, all costs of the DWD are allocated to these internal and external cost units, preferably to external cost units.

A cost allocation base is generated for every internal cost unit; this makes it possible for overhead distribution to allocate 100 per cent of each internal cost unit to external cost units. Examples of the preferred individual overhead cost allocation bases employed in the DWD are statistics, studies, expert knowledge, increase in databases, records of use/users, requirements of users, staff times and costs, and returns.

Internal cost units which contribute to meteorological services for aviation can represent either specific direct or core costs for aviation.

- (a) If an internal cost unit represents exclusively aeronautical meteorological services, 100 per cent of the costs are allocated to external cost units representing meteorological services for aviation. These costs are both specific direct costs for aviation and the costs of the aeronautical meteorological services;
- (b) If an internal cost unit contributes to both aeronautical and non-aeronautical meteorological services, the costs are attributed as core costs.

The full costs for each external cost unit are calculated by summing up the specific direct costs and the proportional costs of the internal cost units.

SERVICE CHARGES FOR INSTRUMENT FLIGHT RULES (IFR) AND VISUAL FLIGHT RULES (VFR)

The full costs for all meteorological services for aviation are generated by adding together the costs of all meteorological services for aviation.

According to an external study about the allocation between IFR and VFR use in Germany, the costs of aeronautical meteorological services are allocated on the basis of specific direct personnel costs of aviation. All specific direct IFR costs are attributed to IFR costs; likewise all specific direct VFR costs are attributed to VFR costs. The remaining overhead costs are allocated in a corresponding proportion between IFR and VFR. The division between IFR and VFR use leads currently to 90 per cent IFR use (based on the year 2005).

ALLOCATION OF THE COST FOR IFR USE BETWEEN EN-ROUTE AND AIRPORT USE

Allocation of aeronautical meteorological services between en-route and airport use is based on the identified cost units. For every internal and external cost unit related to aviation, an allocation between en-route and airport use is made as follows:

- (a) If such a cost unit represents exclusively en-route use, 100 per cent of the costs are allocated to en-route; similarly, all specific airport costs are attributed to airport use;
- (b) If such a cost unit represents both en-route and airport use in line with ICAO Doc 9161, the

costs are proportionally allocated to en-route and airport.

The full cost for en-route use and airport use is calculated by adding together specific en-route costs (or airport costs) and the proportional en-route costs (or airport costs) of the cost units related to aviation.

BUDGET INFORMATION (BASED ON THE YEAR 2005)

Currently, aeronautical meteorological services amount to 18.9 per cent of the total costs of DWD (17.0 per cent being related to IFR). The contribution of the core cost of aeronautical meteorological services amounts to 18.2 per cent of the total DWD core costs (16.4 per cent being related to IFR).

Deutscher Wetterdienst's core costs for aviation (based on the year 2005)

<i>Type of core costs</i>	<i>Contribution: IFR and VFR use (per cent)</i>	<i>Contribution: IFR share (per cent)</i>
Core personnel	15.6	14.0
Core operations	15.9	14.3
Core international subscriptions	24.3	21.9
Core write-offs, rent and interest	16.8	15.1
Overall core contribution	18.2	16.4

ANNEX XIII

AERONAUTICAL METEOROLOGICAL SERVICES COST RECOVERY IN THE UNITED REPUBLIC OF TANZANIA

INTRODUCTION

Tanzania Meteorological Agency (TMA) is the designated meteorological authority of the United Republic of Tanzania. It took over from the Directorate of Meteorology which operated under the Act of Parliament No. 6 of 1978 and became an Agency in December 1999 under the Executive Agency Act No. 30 of 1997.

For many years up to the 1990s, airlines operating over Tanzanian airspace and airports used to pay charges for aeronautical services and funds went directly to the government reserves against which the government paid fully for the cost of running aeronautical services in the country.

The national executive agency policy mandates executive agencies in the country to collect funds and use them judiciously for performing their activities in order to deliver services cost-effectively and efficiently. TMA started implementing this mandate then.

There are four major airports in the country: Mwalimu Julius Nyerere International Airport (NIA) in Dar es Salaam, Zanzibar Airport, Kilimanjaro International Airport (KIA), and Mwanza, all handling international traffic on a regular basis and TMA provides all international services and products as defined by ICAO. One international airport (KIA) is privately run and a Service Level Agreement is in the final stages of becoming a legal document for service provision between TMA and the company operating there, the Kilimanjaro Airport Development Company (KADCO).

There are about a dozen smaller airports that handle regional and domestic traffic. In most of these airports, the official weather reports (METARs) are provided on regular basis or as agreed by the Tanzania Civil Aviation Authority (TCAA) and/or operators. Low-level significant weather forecasts, aerodrome forecasts (TAFs), landing forecasts (TRENDS) and pre-flight documentation are also provided on request.

In calculating costs, account is taken of all the route air navigation facilities and services for which the United Republic of Tanzania is responsible by virtue of the ICAO Regional Air Navigation Agreement and associated ICAO Regional Air Navigation Plan on the basis of which national plans are established. This means that only those facilities and services provided for civil traffic operating in accordance with ICAO rules and regulations (General Air Traffic: GAT) are included.

PRINCIPLES OF COST RECOVERY

The principles for taking into account expenditure for route services are based on those described in the *Statements by the Council to Contracting States on Charges for Airports and Air Navigation Facilities* as contained in ICAO Doc 9082 and in the *Manual on Route Air Navigation Facility Economics* (ICAO Doc 9161).

The categories of costs recovered are those defined in the Appendix to ICAO Doc 9082 and in the *Manual on Air Navigation Services Economics* (ICAO Doc 9161), and Appendix 5 to the *Airport Economics Manual* (ICAO Doc 9562). The TMA established its cost-base in order to account for the costs of aeronautical meteorological services. Appropriate forecast operating accounts are established on the basis of available information, particularly budget forecasts. In order to be taken into account, facilities and services must either be in operation or expected to be put into service in the year concerned. Any temporary shutdown of a facility (because of failure or maintenance) is ignored for the purpose of determining whether the facility is operational.

The accounting period matches the financial year from 1 July to 30 June of the following year. The cost-base is established in the national currency (Tanzanian shilling) or its equivalent. The TCAA management consults users of route facilities and services on the cost-base of the preceding year, and on the estimated cost-base for the following year. The TMA assists in evaluating the aeronautical meteorological costs allocated to en-route

and terminal navigation and landing. Consultation takes place well in advance of the charging year concerned.

Accounting principles to be applied

In the TMA, depreciation is given in full in the year of acquisition but not at all in the year of disposal. In order to establish the cost-base, the TMA ensures that all costs are determined in accordance with the generally accepted accounting principles (GAAP).

According to instructions from the Tanzanian National Board of Accountants and Auditors (NBAA), the accounting principles assume International Financial Reporting Standards (IFRS), which came into effect as of 2004.

INVESTMENT EXPENDITURE

Investment (capital) expenditure comprises expenditure on equipment and buildings, including related works and services, expenditure on land, basic software and, where appropriate, application software.

Basic software comprises the integral standard software components of any computer system, which are essential for its basic functioning but which do not by themselves enable the individual computers, or the system itself, to process specific data for a specific task.

The method of amortizing investment expenditure is the diminishing balance method according to IFRS instead of the earlier straight-line method used.

The percentages applied in calculating the amortization of investment expenditure by the said method are determined according to the expected operating life.

OPERATING COSTS

Gross operating costs are taken into account after deduction of income other than non-recoverable taxes.

Operating costs comprise:

- (a) The actual costs of operational staff, including those in central services, trainees, supervisors

and technical support staff but excluding maintenance staff, cover not only salaries but also pension costs (such as contributions paid to the pension fund in respect of serving staff) and insurance costs, amongst others;

- (b) The total actual rental for land transmission lines (excluding terminal equipment which is entered under investment expenditure;
- (c) The actual costs of energy and water;
- (d) The total actual rental for Aeronautical Fixed Telecommunications;
- (e) The total actual rental or operating costs of other operational and technical support facilities;
- (f) The cost of application software unless considered as an investment;
- (g) Cost of consumables, as well as the cost and operation of motor vehicles.

Groups of facilities and services included in the cost-base

Aeronautical meteorological functions

The cost of carrying out the following aeronautical meteorological functions is included in the cost-base:

- (a) Services by Meteorological watch offices as specified in ICAO Annex 3 to the Chicago Convention;
- (b) Services by (aerodrome) meteorological offices as specified in Annex 3 to the Chicago Convention;
- (c) Aeronautical meteorological observations;
- (d) Transmission and dissemination of OPMET data;
- (e) Internal airport meteorological information transmissions;
- (f) Specialist training of aeronautical meteorological staff;
- (g) Aeronautical climatological services as specified in Annex 3 to the Chicago Convention.

As aeronautical meteorological services are used for airport and en-route operations, assistance could be provided to the TCAA to apportion these costs.

Classification of costs

Maintenance costs

This category of costs includes costs relating to staff (including trainees, supervisors and technical support staff) and equipment (such as spare parts, operational equipment) used for the maintenance of facilities.

Costs of basic and advanced training

Costs of basic and advanced training comprise costs of basic instruction of aeronautical meteorological personnel and costs of advanced training in the use of maintenance and operating systems including costs of accommodation and other facilities.

Administrative costs

The administrative costs are actual costs of administrative staff and facilities as there is a connection between such costs being allocated to users and the concept of services rendered by both operational and technical support staff.

The administrative costs include the costs of maintaining aeronautical meteorological offices.

ALLOCATION OF COSTS BETWEEN AERONAUTICAL AND NON-AERONAUTICAL USERS

To establish the costs of meteorological facilities and services, reference is made to the guidance contained in Chapter 1, Section C of the *Manual on Air Navigation Facility Economics* (ICAO Doc 9161).

ALLOCATION OF AERONAUTICAL METEOROLOGICAL SERVICES COSTS TO EN-ROUTE AND AIRPORT

In the United Republic of Tanzania en-route and airport services are provided by two distinct institutions, the TCAA and the Tanzania Airports Authority, respectively. It is therefore necessary to allocate aeronautical meteorological costs between airport and en-route utilization as described in ICAO Doc 9082.

In this regard, the TMA may assist the TCAA to allocate the costs based on criteria described in ICAO Doc 9562, Attachment 6, paragraphs 4 and 5.

ARRANGEMENTS FOR PAYMENT

The TCAA will pay to the TMA all costs invoiced, on a monthly basis or as agreed between the Directors General of the TMA, TAA and the TCAA. Presently, the TCAA pays the TMA 17.5 per cent of air navigation revenue while TAA pays 10 per cent of landing and parking fees earned. The present percentage for air navigation charges was reached after two reviews which resulted in a raise from 12.5 per cent to 15 per cent and then to the present 17.5 per cent. Another review, was underway at the time of printing and was to include charges from KADCO.

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