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Cost Recovery in Aviation Weather Service
and How It Works in Hong Kong

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Second Regional Seminar on Cost Recovery
and Administration in Regional Association II (ASIA),
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ABSTRACT

NMSs are looking to cost recovery for its aviation weather service as a source of financing. In recent years, with more and more parties involve in the delivery of aviation weather service, the recovery of cost for this service has become increasingly complex. This paper describes some of the key policies and principles of cost recovery for aviation weather service. Many possible models for a cost recovery system exist. More details could be found in the ICAO and WMO guidance documents. The way Hong Kong, China recovers the cost for its aviation weather service is discussed.

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Introduction

In recent years, National Meteorological Services (NMSs) are under increasing pressure to provide more accurate and timely forecast and warning services, especially in predicting severe weather and climate events such as typhoons, rainstorms and droughts which have tremendous impacts on the national development and economy as well as the safety of life and property. As a result of globalization and commercialization of meteorological services, NMSs are also facing increasing competition from private meteorological companies worldwide. Meanwhile, NMSs may face a reduction in government funding due to increasing demands on public expenditure from other areas. There is thus a need for NMSs to take a new look at the financial support for its service. Increasingly, NMSs are looking into the possibility of recovering cost for the services from the service users.

Historically aviation has been a significant user of meteorological services. Aviation has benefited from significant investments by NMSs in the infrastructure as well as improvement in forecasting systems and techniques. The legal basis established by ICAO in the area of airport and air navigation facility charges is contained in Article 15 of the Chicago Convention on International Civil Aviation. ICAO Doc 9082 - ICAO's policies on charges for airports and air navigation services has included meteorological service allocable to civil aviation as one of the facilities and services to be taken into account in determining the total cost of air navigation services. It is thus natural that NMSs recover from aviation the fair, equitable and agreed costs for providing the required services and facilities for international air navigation. Based on the cost recovery survey conducted by WMO in 2003, NMSs that recover costs from aviation say that the revenues constituted on average 24.7% of their overall budget.

In the old days, meteorological services for civil aviation were mostly delivered by NMSs. In the WMO 2003 cost recovery survey, 86% of the providers for aviation meteorological services are still the NMSs. The issue of cost recovery for these NMSs was relatively simple.

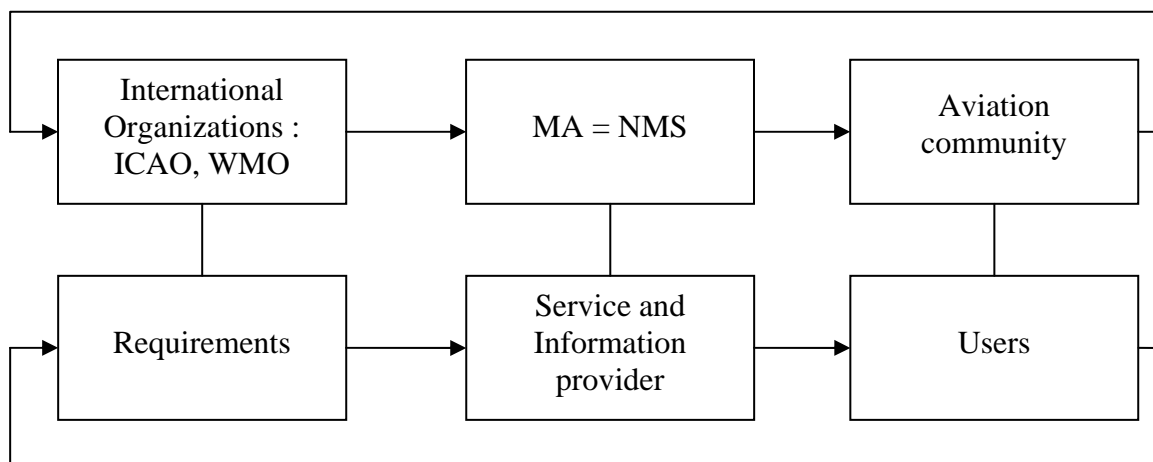


Fig. 1 Provision of aviation meteorological services in the old days

Recently there is an increasing tendency for aviation weather services to be provided by other entities. E.g. airport operator/authority, international and regional institutions such as ASCENA, EUROCONTROL, or even airlines themselves. The roles that these organizations perform vary. In some countries, the provision of meteorological service for

international air navigation might even be delegated to a commercial entity. The NMS is no longer solely responsible for the end-to-end production and dissemination of aeronautical meteorological information and services. For example, in the “Single European Sky” planned to be implemented in Europe in 2005, the service provider would be separated from the service regulator. An European country would be able to designate an exclusive service provider which operates in another country if that other country has not designated an exclusive service provider. This opens up the possibility of an NMS or even a commercial entity from one country to provide aviation meteorological services in another European country. The issue of cost recovery for these NMSs would be more complex and more consultation among the stakeholders would be necessary.

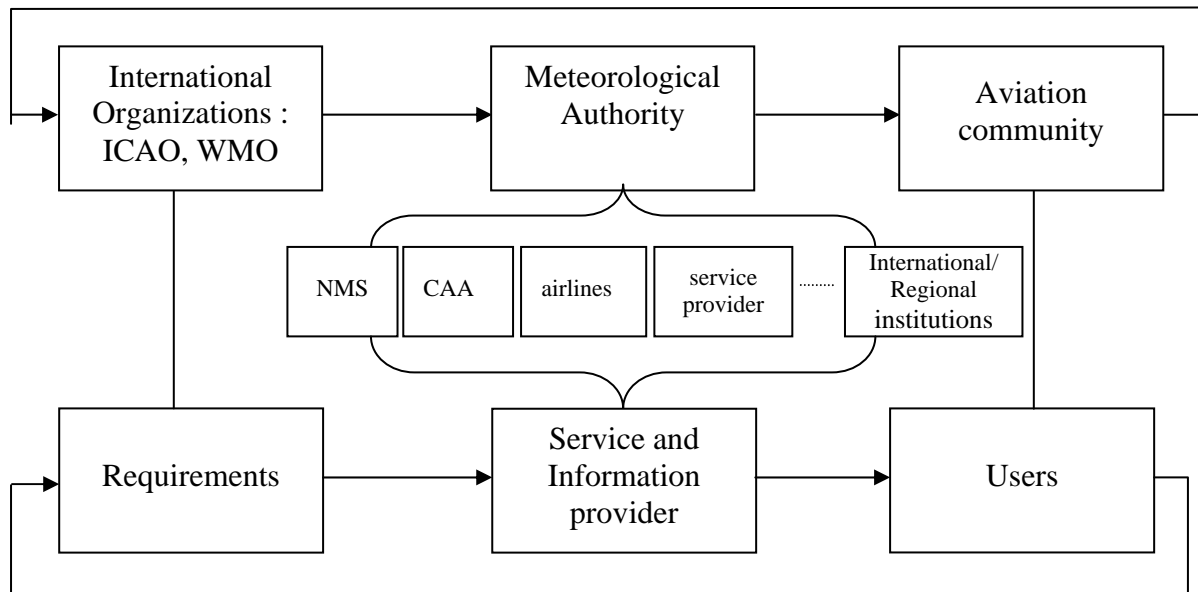


Fig. 2 Today’s complex model for provision of aviation meteorological services

Under the current policy¹, it is considered appropriate that apart from “direct” costs of providing services to aviation, the aviation community should still pay for their due share of the “core” services. Thus even if the NMS is not the direct service provider of the aeronautical meteorological service, as it usually is the key interface to international data through WMO and ICAO mechanisms and supports the national infrastructure, it is still possible for NMSs to recover part of the cost for these “core” services from the aviation community. So cost recovery concerns everyone, not just the immediate service provider in direct contact with the recipients of the service. However, as the “core” services are usually shared among a number of different users in addition to civil aviation, the costs of the shared infrastructures apportioned to aviation must be fair, equitable and agreed with the users. The key words here are “fair, equitable and agreed”. It is thus recommended that NMS

- (a) establish a transparent accounting system;
- (b) establish and collect data on standards, quality and level of services provided;
- (c) undertake consultations with users on a regular basis;
- (d) pursue economic valuation studies to strengthen the case for the recognition of their contribution to the aviation community.

¹ The matter was recently re-examined at the global “Conference on the Economics of Airports and Air Navigation Services” held in Montreal 19-28 June 2000. The meeting re-affirmed that this was appropriate. Nonetheless, the ICAO Air Navigation Services Economics Panel (ANSEP) has been re-activated in 2003 to review policy and principles.

For those who have yet to recover costs for their aviation meteorological services, you might wonder why the aviation community is willing to pay, especially in the current economic climate. Indeed it does not. It is thus important for the NMSs to impress upon the users the benefits they gain from paying for the services. First and foremost, as the paying customer, they would be entitled to specify the kind and level of services required. In turn the NMSs as service providers would have to be more accountable for the services provided. Also with more steady resources not affected by government funding, the service level would not be vulnerable to reductions or uncertainty in that funding. With more transparency in the accounting practice, the users could better assess the efficiency and efficacy of the service providers.

Involvement of WMO on Cost Recovery

WMO has long had a working arrangement with ICAO – Working Arrangements between the International Civil Aviation Organization and the World Meteorological Organization (Doc 7475) to collaborate on matters relating to aeronautical meteorology. In respect of cost recovery, WMO had included in its 6th Long Term Plan – applying from 2004-2007, to

“Assist Members in the implementation of cost-recovery and other changes to national service arrangements. Guidance and assistance will be provided to Members undergoing review of their national arrangements for aeronautical meteorological service delivery including the implementation of cost recovery. WMO will participate in the re-activated ICAO Panel (ANSEP) dealing with cost recovery matters.”

To meet this goal, WMO has undertaken several missions and have conducted seminars and workshops on practical applications of the guidelines concerning the recovery of costs for aeronautical meteorological services. Subject to funding, CAeM hopes to meet the demands for additional seminars in various Regions on aviation cost recovery.

Subsequent to CAeM-XII in 2002, a new structure for CAeM was implemented. It has 2 Open Programme Area Groups (OPAGs). Under one of the OPAGs – PROMET –an Expert Team was devoted to the issue of cost recovery.

WMO is also working closely with ICAO to extend the current guidance material on cost recovery taking due account of the experience gained from regional seminars and missions to Member/Contracting States.

Cost Recovery Framework

It should be noted that only the designated Meteorological Authority as defined under ICAO Annex 3 to the Convention on International Civil Aviation (ICAO Annex 3) can recover costs directly from aviation. If the NMS is not the designated Meteorological Authority, consultations on cost recovery should be conducted among the NMS, the Meteorological Authority, the national Civil Aviation Authority and representatives of the users.

The cost recovery framework has been laid down in the document attached to the letter from Secretary General to all Permanent Representatives on 28 April 2003. Under ICAO guidance on cost recovery Doc 9161 - Manual on Air Navigation Services Economics, it is possible to have a range of funding mechanisms ranging from straight recovery of costs incurred to fully commercial arrangements including elements of profit. The key issue is that the sums recovered must relate to the service supplied. Policies and guidelines on cost recovery have also been established and promulgated by ICAO and WMO. These include :

- WMO-No. 904 - Guide on Aeronautical Meteorological Services Cost Recovery Principles and Guidance
- ICAO Doc 9562 - Airport Economics Manual
- ICAO Doc 9161 - Manual on Air Navigation Services Economics

As the details have already been laid down in the above documents, only the 3 key stages would be discussed here.

Stage 1 : Establishing the inventory of facilities and services needed to meet aeronautical requirements

Meteorological services to meet the stated requirements for international air navigation have been laid down in ICAO Annex 3. Additionally, the list may include various supporting facilities and services that also serve meteorological requirements in general, i.e. the core facilities and services. The list of facilities and services will vary from country to country depending on the aeronautical requirements that have to be met. Annex I lists the facilities and services intended to serve aeronautical requirements exclusively, Annex II the products and functions needed to be provided by the meteorological service to meet aeronautical requirements; and Annex III the core facilities and services which may serve both aeronautical and non-aeronautical users. The list should be agreed after consultation with the users.

Stage 2 : Allocation of meteorological cost

Having established the inventory, it is necessary to identify the costs and human resources for each facility or service. For facility and services that are exclusively for aviation (i.e. Annex I and II), the total cost should be allocated to aeronautical users which may include “overhead” charges. For the core services and facilities (i.e. Annex III), only an equitable apportionment of the costs should be charged to aviation after consultation with the users. The basis for the apportionment can be either one or combination of the following methods :-

- (a) in proportion to the estimated aeronautical, and non-aeronautical use made of the core service;
- (b) in proportion to the estimated time used by computers for aeronautical and non-aeronautical purposes;
- (c) in proportion to the volume of the information transmitted for aeronautical and non-aeronautical purposes;
- (d) in proportion to the number of personnel working on aeronautical and non-aeronautical purposes;
- (e) on the basis of results from an analytical accounting system which ensures an equitable allocation of the costs.

Apart from apportioning the cost between aeronautical and non-aeronautical users, it is necessary to allocate the cost between air traffic services provided for airports and that provided en-route so that users would not be charged for services or facilities that they do not require. Criteria described above for “aeronautical/non-aeronautical” can be similarly applied for “airport/en-route” apportionment (see Annex I – III for the recommended quantification).

Stage 3 : Recovering aeronautical meteorological costs

The methods to recover these costs will vary from state to state but WMO strongly recommended that the NMSs 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 for the recovery of air navigation services costs and adding the meteorological costs to these is an efficient and convenient method of recovering these costs. It may be necessary to enter into contractual agreement to ensure appropriate redistribution of revenues and to ensure that a portion of the levied charges is identified to maintain the basic national infrastructure and international framework upon which the aeronautical meteorological services are founded. This is particularly important if the NMS is neither the provider of aeronautical meteorological services, nor the designated meteorological authority.

Cost Recovery of Aviation Weather Services in Hong Kong

The Hong Kong Observatory, the NMS in Hong Kong, China, is also the designated meteorological authority and the direct service provider of aeronautical meteorological services in Hong Kong covering all requirements under ICAO Annex 3 in respect of aeronautical meteorological station, aerodrome meteorological office and meteorological watch office. So our implementation is also one of the simpler kind.

The full costs to the Observatory for the facilities and services dedicated for aeronautical purposes are recovered from aeronautical users. For core facilities and services of the Observatory, only those parts which are allocated to support the airport are charged. For example, our weather observer at the airport also prepares the SYNOP, the staff time (which translate into staff cost) involved in encoding the observation would not be charged to aviation users. For allocation between 'airport' or 'en-route' costs, the Observatory follows the apportioning recommended in the WMO Guide, reproduced here in Annex I-III.

The Hong Kong Observatory has established a contract with the Airport Authority on the provision of aeronautical meteorological services at the airport. The Observatory is one of two government departments providing services to the Airport Authority, the other being Civil Aviation Department regarding air traffic control service. En-route aviation weather services provided by the Observatory for aircraft in flight are delivered via the Civil Aviation Department.

The cost is calculated following Government's costing principles and consists of 7 components, namely, staff cost, administrative overhead, accommodation cost, departmental expenses, services by other departments, depreciation of equipment, and amortization of one-off planning cost. Owing to the overnight switching from the old Kai Tak airport to the new airport at Chek Lap Kok in 1998, a completely new set of aeronautical meteorological facilities were installed for the new airport. Because of the significant capital cost involved, depreciation of equipment and that of staff cost involved in planning for the new airport were amortized over the estimated life time of the equipment and 16 years respectively.

Since each meteorological system and staff takes on many functions and services, the costs involved are apportioned on the following basis :-

- (i) Meteorological systems - The capital cost of meteorological systems is apportioned according to the number of core functions and output products of each system which are used for 'en-route' and 'airport' operations, taking into consideration the complexity of the functions or products.
- (ii) Staff cost - The cost of operation staff (forecasters, observers, system operators and dispatchers) and associated accommodation cost are apportioned according to the percentage of time each post spends

respectively in providing 'en-route' meteorological service and 'airport' meteorological service.

- (iii) Planning and maintenance staff - The cost of the planning and maintenance staff and associated accommodation cost is apportioned according to the apportionment factors determined from (i) above.
- (iv) Administrative overhead - The administrative overhead is apportioned based on the ratio of the staff cost for 'en-route' and 'airport' operation.

To minimize the amount of accounting work, the Observatory does not recover costs directly from the individual aviation users. The cost of aviation weather services at the airport is recovered through the Airport Authority which in turn recovers it from landing fees which they charge airlines for aircraft landing at the airport. In the 2003/04 financial year, the Hong Kong Observatory charged the Airport Authority HKD 83.16 million (or USD 10.66 million) for its service.

The cost for en-route services (HKD 10.96 million or USD 1.41 million in the 2003/04 financial year) is recovered through the Civil Aviation Department, the local civil aviation authority, who charges each aircraft passing through but not landing in Hong Kong an en-route air navigation charge. The total cost of aviation weather services, i.e. including both 'airport' and 'en-route', represents about one-third of the annual budget of the Observatory.

Satisfied customers are more willing to pay. It is important that the users see the value of the service provided and that the meteorological service provider is seen to be willing to listen and respond to expression of requirements. A meeting with the Airport Authority is thus held every year to review the contract and to discuss the cost and level of services provided and our future development effort. In parallel, the Observatory holds liaison meetings with the ultimate users of our services viz. airline and pilot representatives twice a year. The meeting provides a forum for the direct exchange of views between the aviation users as "customers" and the Observatory as the "service provider". Apart from these liaison group meetings, the Observatory also regularly publishes newsletters and electronic news bulletin on aviation weather service to keep the users abreast of our latest development. Through establishing closer liaison with the users, customer satisfaction has consistently remained above 90% in recent years.

Whatever the means of cost recovery, the key principles are that the service provider is customer focused, that the recovery process is seen to be "fair and equitable" and that the customers feel that they have a say in what services are to be delivered.

Annex I

Facilities and services exclusively needed to serve aeronautical users

<u>Facility and services</u>	<u>Utilization</u>
World area forecast centers (WAFCs)	E
Regional area forecast centers (RAFCs)	E
Volcanic ash advisory centres (VAACs)	E
Tropical cyclone advisory centres (TCACs)	E
Meteorological watch offices (MWOs)	E
Aerodrome meteorological offices	A/E
Aeronautical meteorological stations	A/E
Operation of a regional OPMET data bank	E
Telecommunications for aeronautical meteorological purposes, including VSAT stations to receive WAFS product and OPMET data	A/E
Facilities to provide meteorological data-processing of WAFS products	m/E
Provision of VOLMET broadcasts	E
Observation instruments provided for aeronautical purposes m/A	
Specific aeronautical meteorological research	A/E
Specific aeronautical meteorological training	A/E
Specific aeronautical technical support (including administration)	A/E

Key:

E - en-route

m/E - mainly en-route

A - airport

m/A – mainly airport

A/E – mixed en-route/airport

Annex II

Products and functions exclusively needed to meet aeronautical requirements

<u>Products and functions</u>	<u>Utilization</u>
Meteorological observations and reports for local ATS units	A
Meteorological reports disseminated beyond the aerodrome	m/E
Aerodrome forecasts	m/E
Landing forecast and forecasts for take off	A/E
Area and route forecasts, other than those issued with WAFS	E
Aerodrome and low-level wind shear warnings	A
SIGMETS, AIRMETS, VA and TC advisories	E
Aerodrome climatological information	A
Flight documentation	m/E
Meteorological watch by MWOs over FIR/UIR	E
Aerodrome weather watch	A/E
VA and TC watch by VAACs and TAACs	E
Meteorological watch by WAFCs and RAFCs	E
Briefing and consultation	A
Provision of information to meteorological information systems and local operators	A/E
Provision of information for ATS and AIS	A/E
Provision of information for search and rescue	E
Provision of WAFS and OPMET data to operators	m/E

Key:

E - en-route

m/E - mainly en-route

A - airport

m/A – mainly airport

A/E – mixed en-route/airport

Annex III

Core facilities and services which may serve both aeronautical and non-aeronautical users

<u>Core facilities and services</u>	<u>Utilization</u>
General analysis and services	A/E
Meteorological data processing (including climatology)	A/E
Meteorological Communication facilities and services	A/E
Surface observation stations	m/E
Upper-air observation stations	E
Weather radar	A/E
Meteorological satellite reception	m/E
Core training	A/E
Core research	A/E
Core technical support (include administration)	A/E

Key:

E - en-route

m/E - mainly en-route

A - airport

m/A – mainly airport

A/E – mixed en-route/airport