

ANALYSIS OF THE PROVISION OF METEOROLOGICAL SERVICES IN THE FRAMEWORK OF THE SINGLE EUROPEAN SKY

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1 Introduction

The following paper provides a review of a high level assessment undertaken by Booz Allen Hamilton Ltd in response to a request by the European Commission's DGTREN to further investigate the provision of Meteorological (MET) Services within the framework of the Single European Sky.

The assessment seeks to confirm whether the provision of MET services can be organised under market conditions and/or what special features of this service would justify exclusive rights for service provision.

2 Overview of MET Services for International Civil Aviation

Each ICAO contracting State is responsible for establishing one or more aerodrome and/or other Meteorological Watch Offices to meet the operational needs of those involved in international air navigation.

Aerodrome and other Meteorological Watch Offices are responsible for maintaining a continuous watch on the weather conditions affecting flight operations within their area of responsibility. As such these offices can produce a wide range of products to meet the requirements set out under the Convention on International Civil Aviation. An overview of these products is described below.

2.1 Meteorological Observations

METARs (METeorological Aerodrome Reports) are a report of current weather conditions at an airport and normally comprise of observations of the following elements:

- Surface Wind (including variations of speed and direction)
- Horizontal Visibility (including directional variation)
- Present Weather
- Cloud amounts and heights
- Air Temperature
- Dewpoint
- QNH (Pressure at the aerodrome relative to mean sea level)
- Supplementary Information

METARs are disseminated both to operators at the aerodrome concerned and where required internationally to all those who may need to use the airfield concerned.

2.2 Forecasts

Forecasts issued to those involved in international air navigation fall broadly into two categories; those provided for a single aerodrome site and those provided for an area, region or route.

Aerodrome Forecasts

There are two basic categories of aerodrome forecast, the aerodrome forecast itself, commonly referred to as a TAF and a landing forecast commonly known as a Trend forecast.

- **TAFs** are forecasts issued for a given aerodrome at a specified time, which contains a concise statement of the expected meteorological conditions that will apply at a specific site. The elements forecast in a TAF include

surface wind, visibility, weather, cloud and expected changes to these elements over the period of validity of the forecast.

- **Landing Forecasts or Trends** are a forecast appended to the METAR of the expected changes in one or more of the elements for surface visibility, weather and cloud contained in the METAR.

Area and Route Forecasts

Forecasts of the meteorological conditions which are expected to prevail over an area or route are generally referred to as AIRMETS or GAMETS. The main elements forecast include mean surface wind speeds, areas of surface visibility, areas of significant weather such as thunderstorms, areas of broken or overcast cloud, mountain obscuration, icing, turbulence, mountain waves and SIGMETs for the Flight Information Region (FIR) concerned.

2.3 SIGMETs, Aerodrome Warnings and Wind Shear Warnings

- **SIGMETs** are short period warnings of hazardous weather expected to affect aircraft in flight within a specific area or FIR. Typical phenomena for which SIGMETs might be issued include: thunderstorm, tropical cyclone, turbulence, icing, mountain wave, dust storm, sand storm and volcanic ash.
- **Aerodrome Warnings:** give concise information of meteorological conditions which could adversely affect aircraft on the ground and aerodrome facilities and services. Typically they relate to the occurrence of thunderstorm, hail, snow, freezing precipitation, sandstorm, dust storm, strong surface winds, squall and frost.
- **Wind Shear Warnings:** give concise information of the observed or expected occurrence of wind shear which could adversely affect aircraft on the approach path, take-off path or during the landing or takeoff roll.

3 Relevant international Standards

Relevant to Community objectives, International Standards relating to the provision of MET services for the aviation community can be found in the following ICAO documents:

- Convention on International Civil Aviation: Doc 7300/7
- Annex 1 to the Convention on International Civil Aviation - Personnel Licensing
- Annex 3 to the Convention on International Civil Aviation - Meteorological Service for International Air Navigation
- Annex 5 to the Convention- Unit of Measurement to be used in Air and Ground
- Annex 10 Part II to the Convention - Aeronautical Telecommunication Procedures

- Annex 11 to the Convention - Air Traffic Services
- Annex 14 Part I and II to the Convention - Aerodromes, Aerodromes Design and Operations
- Annex 17 to the Convention - Security
- Air Navigation Plan European Region: Doc 7754

Some relevant articles from these publications are listed in Appendix A to this paper.

Primarily, the Convention on International Civil Aviation specifies that States provide, inter alia, MET services to facilitate international air navigation, whereas Annex 3 to the Convention details the Standards and Recommended Practices (SARPs) for MET services and specifies that each State designate a MET authority to provide or arrange for MET services on its behalf. Further, Annex 3 specifies that the States establish MET watch offices as appropriate for the preparation, supply and dissemination of information.

4 Modalities of National Provision

International SARPs and Air Navigation Plans are adopted by each Member State at various legislative levels throughout the Community¹, ranging from Constitutional levels, Parliamentary Laws, Executive Regulations or Administrative Rules, Orders or Procedures. In each case the MET authority and MET service provider will be specified as entities with corresponding roles and obligations. This has led to MET services being organised on a national basis, i.e., individual delegations for each State operate under various models in accordance with ICAO SARPs and the European air navigation plan. The existing arrangement of individual authorities, providers and recipients of the services in the Community are listed in Table 1.

High-level descriptions of some of these organisations further illustrate the range of implementations throughout the Community, examples of which are given in Appendix B to this paper.

5 Regional Arrangements

An overview of the regional infrastructure for MET services across the Community is given in Figure 1 and further described below.

5.1 World Area Forecast System (WAFS)

The WAFS was created in response to fundamental changes in the operational requirements that arose in the late 1970s. These trends dictated that operators increasingly required global meteorological route forecast information and, moreover, guaranteed standardised quality and format for the forecasts.

¹ Includes Switzerland and Norway in the context of the Single European Sky.

Responsibility for development of the system was coordinated between ICAO and WMO and it is developed to provide the following services:

- Global High Level (FL 250 - FL 630) Significant Weather Forecast Charts produced for some 10 areas (covering most of the earth's surface).
- Medium Level (FL 010 - FL 450) Significant Weather Forecast Charts for some 3 limited geographical areas (Europe, Middle East and South East Asia).
- Global Wind Temperature and Humidity Forecasts for some 9 flight levels from FL 050 - 600 over some 10 areas.

The WAFS is comprised of two World Area Forecast Centres (WAFCs) in London and Washington producing standardised global forecasts for upper winds and temperatures.

According to Annex 3, the actual extent to which a MET watch office makes use of regional infrastructures such as the World Area Forecast System (WAFS) is a responsibility of the designated MET authority. Within the ICAO European Region, Doc 7754 specifies that WAFS should meet the requirements for the provision of flight documentation for the EUR Region with the framework of Annex 3 and meet the requirements of users in a cost-effective manner. As such the WAFS in London is designed to serve users in EUR Region for all operations above Flight Level 100. The data for the WAFS is derived by the National Meteorological Services (NMSs), whereby each State recovers the cost of supporting this functionality through its own user charge recovery mechanism.

There are three satellite broadcasts providing global coverage and transmitting WAFS products as part of requirements Annex 10 Part II of the Convention. These are the International Satellite Communication System (ISCS) provided by the US, which operates two uplinks and the third uplink which is provided by the UK, the Satellite Distribution System for Aeronautical Information Relating to Air Navigation (SADIS). This third uplink serves the European, Middle East and African/Indian Oceans ICAO Regions together with the western part of the Asia Region.

Backup for WAFS in London is provided by WAFS in Washington. In this regard, the draft technical requirements/specification for WAFS back-up procedures are due for inclusion in Amendment 73 to Annex 3 in November 2004. It is worth noting that the outputs of the WAFSs are not yet harmonised and that further work is required for effective back-up procedures.

In terms of provision of cost-effective services, there is a proposal² that this be amended to introduce the notion that 'full advantage be taken of evolving technologies', to ensure that the WAFS maintains currency and cost effectiveness as relevant technologies advance in the future. As such the establishment of a WAFS Operations Group (WAFSOPSG) is proposed to oversee such developments.

²ICAO MET Divisional Meeting 9-27 September 2002

Information on the actual determined³ cost effectiveness of the WAFS has not been available during the development of this paper but it is noted that EUROCONTROL is involved as an observer in the European section of the Meteorology Group (METG) of the ICAO Air Navigation Planning Group. Further investigation should be undertaken through EUROCONTROL on the cost-effective development and monitoring of the WAFS.

5.2 Meteorological Office and Stations

The current distribution of meteorological stations at aerodromes and meteorological offices established to ensure the provision of meteorological services on a national basis are listed in Doc 7754 Table MET-1A.

5.3 VHF Volmet Broadcast

Annex 3 specifies that METAR information be issued by MET watch offices in accordance with regional air navigation agreements (Doc 7754), taking into account the density of air traffic operating below Flight Level 100. The air traffic service provider disseminates routine aerodrome reports for selected aerodromes to aircraft through VHF VOLMET broadcast. These are planned on a regional basis as detailed in Doc 7754 6-D-1.

5.4 Volcanic Ash Advisory Centres (VAAC)

Any ICAO contracting state which has accepted responsibility on behalf of an ICAO region for providing a VAAC within the framework of the international airways volcanic watch, shall arrange for issuing advisory notices of the extent and forecast movement of volcanic ash to meteorological watch offices, area control centres, other VAACs, WAFCs and airlines. Within Europe there are two such centres (out of 9 globally) based in Toulouse (covering Europe & Africa) and London (covering the North Atlantic region including Iceland).

5.5 OPMET Databanks

Doc 7754 states that operational MET information be exchanged among ground stations and be made available to users to the extent necessary to meet operational requirements. It is currently up to the State to arrange exchange of operational meteorological information as necessary to meet the requirements of new flight operations by bilateral agreement. All operational meteorological information (excluding WAFS products) exchanged for use in the ICAO EUR Region is supplied to the international EUR OPMET data banks. These include the free exchange of synoptic information under an WMO agreement.

Within Europe, OPMET databanks are situated at Brussels, Toulouse, Offenbach, Vienna and Moscow, although it is noted the Brussels and Moscow sites are not official OPMET databanks.

³ *On the assumption that a cost effective appraisal has been undertaken under the auspices of ICAO/IMO*

Organisations for Aviation MET Authority and Services Provision in EU+

AVIMET 26.9.2002

State	Aviation MET Authority (ICAO)	Annex 3 Met Service Provider *1		Met Provider to ATC * 2	Met Provider *3 to Airlines & Apts	Met Provider Military
		observations+	forecasts			
Austria	GOV	COM	COM	COM	COM	MIL
Belgium	COM/GOV	COM	COM	COM	COM	MIL
Denmark	NMS	CAA Sp/NMS	NMS	NMS		NMS
Finland	CAA Sp	CAA Sp/NMS	NMS	NMS	NMS & COM C	NMS
France	NMS	NMS	NMS	NMS	NMS & COM C	NMS
Germany	NMS	NMS	NMS			MIL
Ireland	NMS	NMS	NMS			NMS
Italy	CAA Auth	NMS	NMS/COM	NMS & COM	COM	COM/MIL
Luxembourg	GOV	NMS	NMS			-
Netherlands	GOV	NMS	NMS	NMS	NMS	MIL
Portugal	NMS	NMS	NMS	NMS	NMS	MIL/NMS
Spain	NMS	NMS	NMS			NMS
Sweden	CAA Auth	CAA Sp/NMS/MIL	NMS/MIL	NMS	NMS & COM C	MIL
U.K.	CAA Auth	COM C/NMS	NMS		NMS & COM C	NMS
Norway	NMS	CAA Sp/NMS	NMS			NMS
Switzerland	NMS	NMS	NMS			NMS

CAA Sp

Civil Aviation Administration, ANS service provider

NMS:

National Meteorological Service

MIL:

Military Meteorological Service

COM:

Company, State Owned, ANS service provider

GOV:

Governmental Organisation

COM C

Commercial Company

Information based on:

EUROCONTROL / CRCO / Task Force on the Allocation of MET Costs to Civil Aviation Users, 10/2001 and discussions on WMO/CAeM and ICAO/Met. Div. meeting in Montreal 9/2002

Notes*

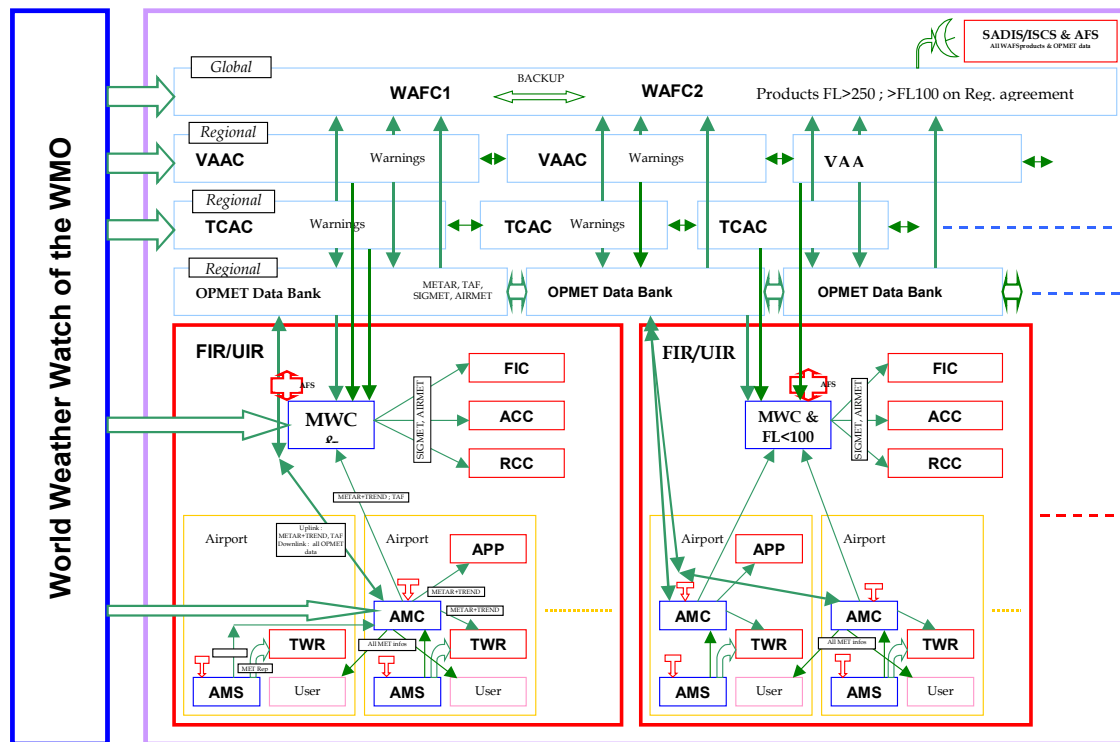
1

The vast majority of Annex 3 MET Services provided are intended for use by pilots - Those dedicated to ATC are a relatively small element

2 These services are the non Annex 3 customer or user specific services delivered to ATC

3 These services are the non Annex 3 customer or user specific services delivered to Airlines and Airport Operators

Table 1. National Organisation of MET Services across the Community



Legend : — Meteorological information circulation - [red box] air navigation structures - [blue box] meteorological structures
 [red box with cross] : AFS and/or GTS reception - [red box with cross] : AFS/GTS mission and reception

Note: - TCAC (Tropical Cyclone Advisory Centres) as not implemented within Europe

Figure 1. Regional Organisation of MET Services

6 Overall Impact of Single Sky Proposals

Under the framework for the creation of the Single European Sky, the European Parliament and the Council of the European Union have accepted that the Community framework provides a means of establishing common rules at Community level to optimise use of the airspace as a whole and the performance of the air navigation services on which this depends, and that, inter alia:

- The rules must cover organisation of the airspace, provision of air navigation services including the economic aspects, and air navigation equipment and systems with the associated procedures
- Use of airspace must be organised and managed efficiently and safely to meet needs of both civil and military users and allow equitable, non discriminatory allocation of the resources between all users
- The air navigation services provided must ensure uniform high safety standards for the air traffic which depends on such services: provision of these services must be optimised to guarantee the best use of Europe's airspace resources
- The technical and operational solutions must secure and increase safety standards, the overall capacity of the system, and full efficient use of capacity available
- The performance of the air navigation services system as a whole at the European level must be constantly examined to check the effectiveness of the measures and propose further measures.

6.1 Application of rules

Whilst the development of the regulatory activities under the Single Sky framework will be at the Community level, there should be an effective compliance review mechanism and to this extent the Member States will have to designate national supervisory authorities. No organisation providing a service must be responsible for such a function meaning that, as a minimum requirement the functional separation of supervision and operations must be implemented. This will impact the current organisation of the MET Authority and MET Service Provider in each State, except (as noted in Table 1) where separation is already implemented between the MET Authority and the MET Service Provider respectively.

6.2 Organisation of Airspace

The creation of a European flight information region in the upper airspace is desired as well as reconfiguration of such airspace into control areas across national boundaries. This is to provide for a more efficient use of airspace, systems and manpower, thus reducing the costs for airspace users. The Commission expects proposals on the appropriate size and location of 'functional blocks of airspace' by Member States in conjunction with service providers. In this context, it is to be noted that meteorological services for all flights above FL 100 can be provided through the London WAFC throughout the Community.

The organisation of MET services for functional blocks of upper airspace is therefore not seen as an issue from a technical or operational standpoint. Economic issues should continue to be addressed through an appropriate user consultation mechanism.

6.3 Air Navigation Service Certification

Member States shall issue and monitor certificates for the provision of air navigation services and such certificates may be granted for each separate air navigation service or bundle of services as listed below:

- Air traffic services; area control services, approach control service, aerodrome control service
- Meteorological (MET) services, aeronautical information services
- Ancillary services; communication services, navigation services, surveillance services

As stated previously, verification of compliance by air navigation service providers and other relevant operators with Community requirements will remain predominantly a task for the Member States.

The certificates should be mutually recognised by all Member States in order to allow air navigation service providers to provide services in a Member State other than where they obtain their certificates. Under the current proposals, the provision of MET services, along with aeronautical information services and ancillary services may be organised under competitive conditions under the current Single Sky proposals, whilst taking into account the special features of such services. These are further elaborated in Section 7 to this paper.

6.4 Safety of Service Solutions

In order to ensure mutual recognition of certificates, it will be necessary to establish a certification system, including common requirements and harmonised conditions concerning the air navigation services (air traffic services, other services and ancillary services). For the MET service provider this will entail a certification given by the designated national supervisory authority. Conditions of the certification will also be a pre-requisite of the use a MET service provider by the air navigation service providers, airports or airlines. This process will ensure compliance of safety obligations in line with international standards by both air navigation services providers and providers of support services, such as MET services.

Another area of certification will be on the conditions of operational data exchange. The introduction of harmonised principles and conditions for access to operational data should facilitate the provision of air navigation services and the operations of the airspace user and airports. Here it is noted that the existing arrangements for the exchange of operational MET information, including the OPMET banks, should be further developed to meet such capability for MET

services in line with the evolving nature of air navigation service provision across the Community.

6.5 Performance of the Air Navigation Services System

Under the Single Sky proposals, user charges should provide remuneration for the facilities and services provided by the air navigation service. As such services by their nature, can only be provided by air navigation service themselves, the level of user charges should be proportionate to the cost incurred of such facilities and services, taking into consideration the objective of economic efficiency. The impact of the cost of ancillary and other services (including MET services) is therefore part of overall cost base for the air navigation service provider and will be subject to similar periodic review.

7 Considerations for Special Features of MET Services

Following a more detailed examination of the provision of MET services across the Community and consultation with MET service Stakeholders (as detailed in Appendix C), the following can summarised as specific considerations within the context of the Single Sky:

- i. The nature of MET services to international aviation requires coordination on a regional basis to allow effective and efficient provision of resources and associated infrastructure.
- ii. Although the actual provision of MET services and associated supervisory authorities is currently organised according to various national models, as detailed in Table 1, there is a general acknowledgement from the stakeholders that the separation of the authority and service provider for MET services is of benefit to all concerned to ensure conflicts of interest are negated.
- iii. Service provision may be further coordinated on a Community scale through the application of common transportable certifications, which will incorporate those contributions for the operation and use of the WAFC and other regional elements, as determined essential for effective service provision across the Community.
- iv. As the State will remain responsible for determining MET services and associated supervisory authorities, the State will continue to be the responsible party for determining the introduction of market mechanisms for MET services along Community guidelines.
- v. Although a detailed technical assessment is beyond the scope of this paper, it is noted that ICAO standards do not explicitly detail that there be only one MET provider in a given unit of airspace and that compliance may be used to encourage competition for services within and beyond national boundaries for the most effective use of resources.
- vi. However, it is also acknowledged that there are widely differing views on the application market mechanisms for MET service and that it is a view of the MET service representatives consulted that there may be significant

safety issues in the application of conflicting synoptic or observational information in a given airspace, therefore requiring that only one service provider be active in a given airspace or specific aerodrome site at any given time.

- vii. Given the range of views and operating models across Member States, the system of designation as determined for air traffic service provision, may be deemed appropriate for MET service provision by a given State providing it does not contradict the application of efficient and effective service provision from a Community perspective. In particular, it is clear that the provision of MET services will have to maintain compatibility with any reorganisation of air traffic service provision in a given airspace.
- viii. The creation of functional blocks of airspace in the upper airspace is not expected to make any significant impact to the above, however there may be opportunity for some reorganisation to meet such services in the more cost effective way, while meeting the safety obligations.

Appendix A – Significant Articles from International Standards

SOURCE	DETAIL
Article 28 to the Convention on International Civil Aviation	<p>Each contracting State undertakes, so far as it may find practicable, to:</p> <p>(a) Provide, in its territory, airports, radio services, metrological services and other air navigation facilities to facilitate international air navigation, in accordance with the standards and practices recommended or established from time, pursuant to this Convention.</p>
Article 4.1 in Annex 11 to the Convention	<p>4.1.1 Flight information service shall be provided to all aircraft which are likely to be affected by the information and which are:</p> <p>a) provided an air traffic control service; or b) otherwise known to the relevant air traffic services units</p> <p>4.2.1 Flight information service shall include the provision of pertinent:</p> <p>a) SIGMET and AIRMET information; b) information concerning pre-eruption volcanic activity, volcanic eruptions and volcanic ash clouds; c)</p> <p>4.3.1.1 The meteorological information and operational information concerning navigation and aerodromes included in the flight information service shall, whenever possible, be provided in an operationally integrated form.</p> <p>7.1.1.1 Air traffic services units shall be supplied with up-to-date information on existing and forecast meteorological conditions as necessary for the performance of the respective functions. The information shall be supplied in such a form as to require a minimum of interpretation on the part of the air traffic services personnel and with a frequency which satisfies the requirements of the air traffic services units concerned. Recommendation – Meteorological offices should be so situated as to facilitate personal consultation between meteorological personnel and air traffic services personnel. Where collocation is not practicable, the required consultation should be achieved by other means.</p>
Article 2.1 in Annex 3 to the Convention	<p>2.1.3 Each contracting State shall determine the meteorological service which it will provide to meet the needs of international air navigation. This determination with the provisions of this Annex and with due regard to regional air navigation agreements; it shall include the determination of the metrological service to be provided for international air navigation over international waters and other areas which lie outside the territory of the State concerned.</p> <p>2.1.4 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. Details of the meteorological authority so designated shall be included in the State aeronautical publication, in accordance with Annex 15, Appendix I, GEN 1.1</p>
Article 3.5 in Annex 3 to the Convention	<p>3.5.1 A contracting State, having accepted responsibility for providing air traffic services within a flight information region or a control area, shall establish one or more meteorological watch offices, or arrange for another Contracting State to do so.</p> <p>3.5.2 A meteorological watch office shall:</p> <p>a) maintain watch over meteorological conditions affecting flight operations within its area of responsibility; b) prepare SIGMET and other information relating to the area of responsibility;</p>

SOURCE	DETAIL
	<p>c) supply SIGMET information and, as required, other meteorological information to associated air traffic service units</p> <p>d) disseminate SIGMET information;</p> <p>e) when required by regional air navigation agreement, in accordance with 7.3.1:</p> <ol style="list-style-type: none"> 1) prepare AIRMET information related to its area of responsibility; 2) supply AIRMET information to associated air traffic services units; and 3) disseminate AIRMET information <p>f) supply information received on pre-eruption volcanic activity, a volcanic eruption and volcanic ash cloud for which a SIGMET has not already been issued</p> <p>3.5.3 The extent to which a meteorological watch office makes use of products from the WAFCs and/or RAFCs and other sources shall be determined by the meteorological authority concerned.</p>
Article 4.1 in Annex 3 to the Convention	4.1.1 Each contracting shall establish at aerodromes and other points of significance to international air navigation, in its territory, such aeronautical meteorological stations as it determines to be necessary. An aeronautical station be a separate station or may be combined with a synoptic station.
Article 7.3 in Annex 3 to the Convention	7.3.1 AIRMET information shall be issued by a meteorological watch office in accordance with regional air navigation agreement, taking into account the density of air traffic operating below flight level 100. AIRMET information shall give a concise description of
Part VIII, Air Navigation Plan for European Region	<p>1.1 The world area forecast system (WAFS) should meet the requirements for the provision of flight documentation for the EUR Region with the framework of Chapter 3 of Annex 3 meet the requirements of users in a cost-effective manner.</p> <p>1.2 The WAFc London is designated to serve the users in the EUR region Note:- Backup is provided by WAFc in Washington</p> <p>1.6 Where low-level significant weather charts (below FL100) required, they should be provided on a sub-regional basis and not form part of WAFS.</p>

Appendix B - Examples of MET Services Organisation within the Community

Belgium

In Belgium, Belgocontrol, an autonomous State owned company, is by law the air navigation service provider who is also responsible for the provision of the aeronautical MET services, as described in Annex 3, related to observations, forecasts, meteorological watch office for the BR FIR (including Luxembourg), provision of WAFS products to users, MET briefing and consultation services, flight documentation and aeronautical climatology. The MET service of Belgocontrol provides additional MET information to ATS and airport authorities to fulfil their role concerning safety, efficiency, regularity and capacity of air navigation, such as special warnings, supplementary forecasts and MET daily briefing meetings (Annex 11 obligations). They also provide MET information for environmental noise studies to the airport authority and some special products are also produced for general aviation user groups. Belgocontrol manages also the Brussels EUR OPMET Databank. The costs of the Belgocontrol MET service are recovered via the normal EUROCONTROL cost recovery mechanism.

Finland

The CAA being also ANS service provider is the MET Authority in Finland. The provision of aviation observation is split between the CAA and the National Meteorological Service (NMS). Aviation forecast and meteorological watch based on Annex 3 is produced by NMS by contract between the CAA and NMS. The services delivered and their costs are negotiated on a yearly basis and the CAA recovers costs through airline charges. There is some internet non-Annex 3 service to general aviation made by a commercial company.

France

The regulatory MET service to aviation in France is defined according to Annex 3 and by agreement between the CAA and the MET Authority (Meteo-France), after consultation with users organised under the authority of the Ministry of Transports. Meteo-France is the designated MET service provider and delivers the MET service directly to all aeronautical users. The full cost of this MET service is included in the airline charges collected by the CAA. The service is paid for by the CAA on the basis of a 4-year contract after agreement of all ministries involved. The regulatory non-Annex 3 MET services provided to ATM and ATC are included in this financing. Any non regulatory additional meteorological service which would be requested by any aeronautical user would be provided by any provider under market conditions.

Germany

The German meteorological service (DWD) has the responsibility for the aviation MET services in Germany at the basis of German laws (Law on Air Traffic, Law on German Meteorological Service). In line with Annex 3 the Ministry of Transport,

Building and Housing has given the DWD the responsibility to act as the “Aviation MET Authority” in Germany. Furthermore DWD is the designated MET service provider and provides all aviation MET services as laid down in international and national regulations (Annex 3, EURPLAN, AIPs and others) to all aviation users (Airlines, Airports, ATS, General Aviation and others). These services contain:

- Weather Watch and Warning (MET Watch Office function)
- Weather observation and reporting at Airports
- Consultation and Briefing
- Weather Forecasting

In line with the ICAO Manual on Air Navigation Services Economics and the EUROCONTROL Principles Germany recovers the costs for these aviation MET activities from the users after user consultations.

Italy

The provision of MET Information to Aeronautical users (Air Companies) flows from the NMS to the State Owned Company who is responsible for AIS. Costs of MET services are paid as charge for tax en route through EUROCONTROL to the Treasury and back to the NMS proportionally.

The Netherlands

The Royal Netherlands Meteorological Institute has been designated as the MET service provider by law. The products, according to the Annex 3, are made available to all the users such as ATC, airlines and the airport authority and disseminated beyond the aerodrome for those products as required in the Annex 3. All the data measured on and around the aerodrome are available for all the users on a separate system. Separate contracts are established with the airport authority to support their operations. The costs of the MET Service including the infrastructure and development are recovered via the EUROCONTROL cost recovery mechanism agreed upon with the CAA and IATA

Portugal

The Portuguese meteorological service (IM) has the responsibility for the aviation MET service in Portugal on the basis of Portuguese law (Law on Portuguese Meteorological Service). The Portuguese NMS (IM) in line with ICAO Annex 3 has been designated “ Aviation Met Authority ” and service provider and provides all aviation MET services as laid down in international and national regulations (Annex 3, EURPLAN, AIPs and others) to all aviation users (Airlines, Airports, ATS, General Aviation and others). These services contain:

- Weather Watch and Warning (MET Watch Office function)
- Weather observation and reporting at Airports
- Consultation and Briefing
- Weather Forecasting

In line with EUROCONTROL Principles Portugal recovers the costs of MET services as charge for tax en route through EUROCONTROL to the treasury and back to the NMS (IM).

Sweden

The CAA is the MET Authority in Sweden, while the NMS (SMHI) by contract is the main MET service provider for both Annex 3 defined services as well as other value added services for ATS and other users. Other service providers are the CAA themselves (aerodrome observations and pre-flight briefing) and the Swedish military weather service (aerodrome forecasts for a few civil/military aerodromes). The services delivered and their costs are negotiated on a yearly bases and the CAA recover costs through airline charges.

By contract, the CAA finances a share of the core MET services (e.g. observations systems, data handling, and basic forecasts). Other users (e.g. the government, the military weather service) also contribute to the cost of these services.

The CAA has, within its organisation, separated the role of regulator and service provider of ANS. SMHI has also a role of regulator as well as provider of aviation weather services.

United Kingdom

In the UK the CAA is the Aeronautical Meteorological Authority designated to ICAO. The CAA arranges for the provision of aeronautical MET services to meet the UK's national (as specified under the UK element of the European Air Navigation Plan) and international obligations (as specified under ICAO Annex 3) by contracting the Met Office to provide these services. The contract between the Met Office and the CAA is an incentivised contract containing both an annual uplift in price based on a national earnings index and a requirement for the Met Office to achieve an annual 2.5% efficiency saving in the price of continuing services. The cost of this contract to the CAA is recovered through the UK unit rate via Eurocontrol Central Route Charges Office.

The provision of all non Annex 3 aeronautical meteorological services to Pilots, Airlines, ATS and Airports within the UK are organised under market conditions.

Appendix C – Views of the Stakeholders

IATA Requirements for MET Services

The following provides a high level overview of the users requirements as coordinated on behalf of the members of IATA in terms of the contents of Annex 3 to the Convention:

- IATA generally supports the Standards and Recommended Practices as laid down in Annex 3, Chapter 2, with the following proposals for amendment: - 2.1 Objective, determination and provision of meteorological services - add "and economy" after "efficiency", 2.2 Supply and use of meteorological information add extra sentence "This information should be supplied at a location easily accessible to operators".
- IATA supports the objectives of the World Area Forecast System as laid down in Annex 3, Chapter 3. 1, however emphasizes that the WAFS should be organized and operated in the most cost-effective manner possible and any redundancies and duplication of facilities, communication circuits, services, etc. due to non-technical reasons should be strongly opposed.
- IATA endorses the requirements for the Ground Exchange of Operational Meteorological Information as specified in ICAO PANS-OPS, Attachment A to Part IX.
- IATA has no requirement for Aeronautical Meteorological Stations not at aerodromes as these Stations are mainly along air routes and considered to serve low-level VFR flights only.
- In respect to the exchange of aerodrome forecasts, IATA states the preferable means of distribution of the TAFs is the WAFS satellite distribution systems SADIS and ISCS. Where this is not possible any other component of ICAO AFS should be the primary communication means.
- IATA proposes separating SIGMETs into categories that reflect the broad division between major airspace users as follows; SIGMET for IFR Medium and High Level Operations and SIGMET for VFR and Medium/Low Level Operations

Non Annex 3 applications:

- IATA is against the proliferation of data banks in excess of the basic requirement, and the number of such data banks within an ICAO Region should be kept to a minimum consistent with the cost-effectiveness principle.
- It is the view of IATA that the cost allocated to international civil aviation should be limited to those facilities and services provided solely for aviation purposes.

Views of the MET service representatives on the Single Sky proposals

In view of the context of the Single Sky proposals and the concerns raised by ICWED (Informal Council of Western European Directors) of NMS, consultation was held between MET service representatives in Belgocontrol, DWD (Deutscher Wetterdienst), FMI (Finnish Meteorological Institute), KNMI (Royal Netherlands Meteorological Institute), Meteo France, Met Office, SMHI (Swedish Meteorological and Hydrological Institute), UGM, Italy and Booz Allen Hamilton.

These representatives of the MET services have agreed the following statements:

- i) That in regard to the proposal to separate the role of service provider from that of regulator and in particular the consequences for the role of the designated aeronautical meteorological authority within European Member States, whilst there are currently a range of practices within European Member States, it is accepted that this separation will have no negative impacts on the delivery of aeronautical meteorological services and indeed may have some benefits in regard to clarity and transparency of the service provider and regulator roles.
- ii) That in regard to the introduction of market based solutions within the field of aeronautical meteorological services this must continue to be a matter solely for the individual European Member States to decide. In particular it should be noted that there are strongly differing views within European Member States as to what extent the introduction of market based competition in the field of aeronautical meteorological service provision may have an impact on the safety and efficiency of air navigation.
- iii) That in regard to the introduction of a common standard for certification of aeronautical meteorological service providers, this would be acceptable, subject to the rights of individual European Member States noted in point (ii) and in line with the responsibilities of the designated MET authority as recommended under ICAO Annex 3.
- iv) That in regard to the provision of services detailed by ICAO in Annex 3 to the Chicago Convention within any single airspace or at any aerodrome there can be only one provider of the specified Annex 3 services active at any given time.

This requirement is a reflection of the natural monopoly situation that has been adopted almost globally by ICAO contracting states in regard to the provision of both Annex 3 meteorological services and air traffic control services designed to ensure the safety and regularity of air navigation.

- v) That in regard to aeronautical meteorological services provided to Airlines, ATC and Airport Authorities to ensure safety, efficiency and regularity of air navigation services there is a need to ensure that the products provided are wholly consistent for a given time and place. It is because of this need to ensure consistency that we [the above mentioned MET service

representatives] believe these services form a natural monopoly which can only be sourced from a single provider at any given time.

- vi) That in regard to the financing of Annex 3 aeronautical meteorological services the principles followed by European Member States should be those set out in the ICAO document 9161/3 Manual of Air Navigation Services Economics. In particular, regardless of the adoption of market based solutions, European Member States must retain the right to recover, from the aviation community, the costs of aeronautical facilities and services designed wholly to support air navigation and a fair share of the costs of the facilities and services designed to support both aeronautical and non aeronautical services.