

# Overview of AMBEX Scheme

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## **I. Introduction to AMBEX Scheme**

The Africa and Indian Ocean (AFI) of ICAO (AFI) MET Bulletins Exchange (AMBEX) (System) was established by the AFI Planning and Implementation Regional Group (APIRG) on 29 August 1986, and has since then successfully served the ICAO AFI Region in the exchange of the required OPMET information.

AMBEX scheme was intended initially only for TAF exchanges, AIREPs and METAR were added to the Scheme at a later stage and SIGMET, volcanic ash advisories (VAA) and tropical cyclone advisories (TCA) are being added in this edition. The operation of the AMBEX Scheme included exchange of OPMET bulletins between the originating tributary offices and the bulletin compiling centres, which, according to their functions and responsibilities, were classified as METAR Collection Centres, TAF Collection Centres and AIREP Collection Centres. The operational exchange has been carried out according to agreed transmission schedules; the contents of bulletin was specified in the AMBEX Handbook.

Due to the very limited capacity of communications (COM) facilities in the early seventies, the AMBEX Scheme was strictly planned to accommodate only those OPMET exchanges considered vital for flight operations. Over the years, the COM facilities have improved considerably and the AMBEX Scheme has been developed accordingly.

The AMBEX Handbook is the main guidance material providing details on the procedures for OPMET exchange under the AMBEX scheme. It defines the responsibilities of the AMBEX centres and the procedures to be followed. It also defines the content and format of the AMBEX bulletin.

The AMBEX Handbook is published and kept up-to-date by the ICAO ESAF and WACAF Offices.

### **1. Amendments to the AMBEX Scheme**

Any proposals for amendments to the AMBEX Scheme considered necessary by the States or international organizations concerned should be forwarded for consideration by the ICAO Regional Offices of Dakar, Senegal and Nairobi, Kenya as the case may be.

Major changes in the AMBEX Handbook shall lead to the issuance of a new edition number and minors changes of the Handbook shall be referred to as an “Amendment” or “Corrigenda” without any change to the edition number.

Major changes are any changes initiated through provisions in ICAO Annexes standards related to the AMBEX Scheme except editorial changes. Major changes shall be approved through Decisions of an AFI Planning and Implementation Regional Group (APIRG) meeting.

Amendments « or » corrigenda are minor editorial changes that have to be approved by meetings of the Information and Infrastructure Management Sub-group (IIM/SG).

### **2. Objective**

#### **a. Main objective of the AMBEX Scheme :**

The main purpose of the AMBEX Scheme is to :

- ensure the most efficient and economical exchange of operational meteorological (OPMET) information within the AFI Region as well as with the other ICAO Regions to meet the requirements of users of OPMET information, and

- ensure the implementation of the OPMET-related SARPs in Annex 3 and Annex 10, and the relevant provisions of the ICAO Air Navigation Plan (ANP) for the AFI Region in a highly efficient and standardized way.

### **3. Structure**

The above objective is achieved by establishing a number of AMBEX collecting and disseminating centres (AMBEX centres), Regional OPMET data banks (RODBs), and inter-regional OPMET gateways (IROGs). All these operational units form the AMBEX Scheme. In order to ensure seamless global exchange of the required OPMET information, the AMBEX Scheme shall be developed in compliance with similar structures in the other ICAO Regions, as well as with the aeronautical fixed system (AFS) satellite distribution system used to disseminate OPMET data.

*Note: The two AFI OPMET Regional Data Banks are currently located in Dakar, Senegal and Pretoria, South Africa.*

## **II. Definition of AMBEX Scheme**

The AMBEX Scheme is the scheme for the exchange of MET Bulletins in the AFI (Region).

## **III. Definition of Terms used in the AMBEX Scheme**

The following symbols and definitions are used in the AMBEX Scheme :

### **1. AMBEX Bulletin :**

A collection of AMBEX messages originating from MET offices within a collection area, always containing the same type of OPMET data and identified by an appropriate identifier. Bulletins should not exceed 1800 characters in length.

### **2. National OPMET Center (NOC) :**

This is the national OPMET collection centre.

### **3. AMBEX Bulletin Compiling Centre (BCC) :**

This is the AMBEX bulletins compilation centre.

### **4. Inter-regional OPMET Gateway (IROG) :**

This is a centre for OPMET exchanges between regions.

### **5. Regional OPMET Data Bank (RODB):**

This is the regional OPMET databank charged with task to collect the required OPMET bulletins from AMBEX centres, handle all types of OPMET bulletins, provide facilities for “request-reply” service to authorized users, maintain a catalogue of bulletins, quality control the incoming bulletins and inform AMBEX centres on any deficiencies, monitor the OPMET traffic and report to the ICAO Regional Office on the results.

### **6. TCA**

A TCA is a Tropical Cyclone Advisory.

### **7. TCAC**

A TCAC is a Tropical Cyclone Advisory Centre.

## 8. VAA

A VAA is a Volcanic Ash Advisory.

## 9. VAAC

A VAAC is a Volcanic Ash Advisory Centre.

## IV. OPMET - Definition

OPMET stands for Operational Meteorological (*information*) which represent all operational meteorological data.

### V. Types of OPMET data

#### 1. The following types of OPMET data are handled by the AMBEX Scheme

Data type	Abbreviated name	WMO Data Type Designator
Aerodrome reports	METAR SPECI	SA SP
Aerodrome forecasts	TAF: 24 and 30 hour	FT
SIGMET information	SIGMET SIGMET for TC SIGMET for VA	WS WC WV
Volcanic ash and tropical cyclone advisories	Volcanic ash advisory Tropical cyclone advisory	FV FK
Air reports	AIREP SPECIAL (ARS)	UA
Administrative	ADMIN	NO

## VI. OPMET bulletins

The exchange of OPMET data is carried out through bulletins containing one or more meteorological messages (METAR, SPECI, TAF or other OPMET information). An OPMET bulletin contains messages of the same type.

The format of OPMET bulletins is determined by:

- ICAO Annex 10, *Aeronautical telecommunications*, as regards the AMHS/AFTN envelope of the bulletin;
- WMO-No.386, *WMO Manual on the Global telecommunication System*, as regards the WMO abbreviated heading of the bulletin;
- ICAO Annex 3 and WMO-No.306, *Manual on Codes*, as regards the format and coding of the information included in the bulletin.

## **VII. Types of OPMET exchange**

### **1. Regional exchange–AMBEX Scheme**

The AMBEX Scheme covers the exchange of OPMET information in the AFI region. It includes several types of exchanges as described below.

#### ***a. Regular Exchange under AMBEX***

This is a scheduled exchange that encompasses collection of messages from the originating stations, compiling of bulletins and their dissemination according to predetermined distribution schemes. The collection and distribution is carried out at fixed times and the bulletin content is defined in the current Handbook.

#### ***b. Non-Regular Exchange***

This includes:

- i.** Exchange on request (request-reply service). The RODBs store OPMET data and make them available on request ; and
- ii.** *Exchange of non-routine reports:* SPECI; TAF AMD; SIGMET; TCA and VAA; ADMIN messages.

### **2. Inter-regional OPMET exchange**

Exchange of OPMET data between the AFI and the other ICAO Regions is carried out via designated centres, which serve as Inter-regional OPMET Gateways (IROG). An IROG is set up for sending/receiving specified OPMET data between AFI and every other ICAO region for which AFI OPMET data are required.

*Note: These centres were formerly called ODREP*

Inter-regional OPMET exchange via IROGs is carried out through the ground segment of the AFS (currently, through the AMHS/AFTN).

### **3. Exchange of OPMET information through the satellite segment of the AFS**

The satellite broadcast provided by the United Kingdom (Satellite Distribution Systems for Aeronautical Information Relating to Air Navigation - SADIS) is another type of OPMET exchange, which is global in nature and is intended to cover the emerging requirement for global access to all available OPMET data.

All AFI data handled by the AMBEX Scheme are relayed to the SADIS for global broadcast.

### **4. Management of OPMET**

Monitoring of OPMET exchange under the AMBEX Scheme, planning for improvements and preparation of proposals for any changes that may be necessary, are carried by the APIRG. To that end, the AFIMET Sub-group, the MET/SG, is tasked with the AMBEX implementation status and planning, which forms part of its agenda.

**Note :**

*When necessary, contributory bodies may be established by APIRG or the MET Sub-group to deal with OPMET specific issues. The AFI OPMET Management Task Force, established by APIRG/16 is currently tasked to deal with all OPMET related issues in the AFI Region.*

Any proposals for amendment to the AMBEX Scheme , considered necessary by the States or international organizations concerned, due to changes in operational requirements for OPMET data or to developments of the AFS, should be forwarded for consideration by the ICAO Regional Offices of Dakar, Senegal and Nairobi, Kenya as the case may be.

## **VIII. AFTN address of a BCC or NOC**

YPYX: fifth, sixth, seventh and eighth letter of an addressee indicator to be used:

- with the normal four-letter location indicators, to designate BCCs;
- with indicators for pre-determined distribution within a BCC collection area.

## **IX. Quality control (QC)**

### **1. General requirements**

Quality control (QC) consists of examination of OPMET data at NOCs, BCCs and RODBs to check the messages for formatting and coding errors, as well as, for time and space consistency.

OPMET data should be checked in real time or as close to it as possible, at the first point, i.e., the originator, which may be: a meteorological station, an aerodrome meteorological office or a meteorological watch office, etc. Errors may occur during coding or transcription of meteorological messages by the observer or forecaster. The originating office should apply quality control procedures during data processing and preparation of messages, in order to eliminate the main sources of errors.

The National OPMET Centre (NOC) should apply QC procedures on incoming messages from national sources and on compiled national bulletins.

It is also advisable to apply QC checks at AMBEX Centres, where AMBEX bulletins are received or compiled. If automation is available it should be used, or QC should be partly assisted by computing facilities. The principle is that every message should be checked, preferably at the various points along the data chain.

The checks already performed by originating offices and AMBEX centres are usually duplicated at the OPMET data banks. Erroneous messages spotted by the RODB should be either rejected or corrected by reference back to the source or by the data bank itself. Data corrected by the data bank should be flagged in the database for investigation purpose.

As a result of the quality control process described above, OPMET data of established quality will be used in the exchange and stored in the data banks. The RODBs shall compile information with regard to errors found and compile records, such as the numbers and types of errors detected during quality control. Such non-conformities shall be reported to the ICAO Regional Office, Dakar or Nairobi, for follow-up action.

### **2. AMBEX Scheme Quality Control procedures**

In accordance with Conclusion 19/42 of APIRG/19 :

**That,**

- a. Dakar and Pretoria RODBs shall :**

- conduct within their respective areas of responsibilities, the monitoring of OPMET received from AFI BCCs;
- analyze the monitoring results and identify shortcomings and deficiencies;
- develop and forward to the involved BCCs on a quarterly basis, the monitoring results and the recommendations to be implemented;
- collaborate directly with the concerned States to assist in addressing the shortcomings which can be resolved quickly; and
- issue on a semester basis, a report on the above four actions to be forwarded to ICAO Dakar and Nairobi regional offices.

**b. ICAO Dakar and Nairobi Regional Offices shall :**

- distribute the reports through State Letters to AFI States with particular emphasis on the States concerned with the deficiencies ;
- visit the concerned States during State missions to provide further advice and awareness ; and
- organize when required, training workshops for the personnel of the AMBEX Centres (RODBs, BCCs and NOCs), to assist the States concerned to address deficiencies related to the implementation of the AMBEX scheme.

**3. Coordination with EUR Region for the Monitoring of Non-AFI SIGMETs**

In accordance with Conclusion 18/45 of APIRG/18, the two RODB provider States shall monitor the reception of SIGMET information during the regular (twice yearly) EUR Region SIGMET tests and report.

**X. AMBEX Focal Points**

In order to facilitate exchange of information between AMBEX centres a system of AMBEX focal points has been developed. Contact details of the persons designated as AMBEX focal points by the relevant State's authorities is provided **in Appendix G to the AMBEX MANUAL**.