



International Civil Aviation Organization

AFI OPMET MANAGEMENT TASK FORCE FIRST MEETING (MTF/1)

(Dakar, Senegal, 19 - 20 October 2009)

Agenda Item 2: Review of the AFI Meteorological Bulletin Exchange (AMBEX) scheme

2.3: *Development of procedures for monitoring and management of the OPMET information exchange at AMBEX centres and the Regional OPMET Data Banks (RODBs)*

OPMET EXCHANGE MONITORING AND MANAGEMENT PROCEDURES AT BCC AND RODB

(Presented by the Secretariat)

SUMMARY

This paper presents the procedures for monitoring and management of the OPMET information exchange at AMBEX centres (BCC) and at the Regional OPMET Data Banks (RODB). The Task Force is invited to review the provisions in Chapter 12 of the AMBEX Handbook (management of OPMET Exchange under the AMBEX Scheme).

1. INTRODUCTION

1.1 Conclusion 16/54 of APIRG/16 meeting called for the establishment of an AFI OPMET Management Task Force (AFI MTF) with terms of reference to further develop the AMBEX scheme according to the new operational requirements. In this regard, procedures have been developed in the AMBEX Handbook for the monitoring and management of the OPMET information exchange at AMBEX Centres (or Bulletin Compiling Centre –BCC) and Regional OPMET Data Banks (RODBs).

1.2 This paper presents the procedures for monitoring and management of the OPMET information exchange at BCCs and RODBs for review by the meeting.

2. DISCUSSIONS

2.2 The management and monitoring of the OPMET information exchange at AFI BCCs and RODBs, described in the Appendixes A and A1 attached, as developed in the Chapter 12 of the AMBEX Handbook, is provided for review by the meeting for further implementation by the components of the AMBEX scheme as the requirements for the OPMET information exchange procedures at AFI BCCs and RODBs.

2.3 In this regard, the Task Force may wish to agree that the requirements OPMET information exchange procedures at AFI BCCs and RODBs as given in the **Appendixes A and A1** to this working paper, be implemented by Dakar and Pretoria RODBs and by the BCCs.

Recommendation 1/XX OPMET EXCHANGE MONITORING AND MANAGEMENT PROCEDURES AT BCC AND RODB

That, the OPMET management and monitoring procedures given in Appendixes A and A1 to this paper, be implemented by the RODBs and the BCC as the requirements for OPMET exchange monitoring and management procedures in the AFI region.

2.4 To facilitate exchange of technical and administrative information between the BCCs, a system of AMBEX focal points have been developed. Contact details of the persons designated as AMBEX focal points by the relevant State’s authorities is provided in **Appendix A2** to this working paper.

3. ACTION BY THE MEETING

The meeting is invited to:

- a) Note the information in this paper and;
- b) Suggest required actions to improve OPMET exchange in the AFI region.

APPENDIX A

MANAGEMENT OF OPMET EXCHANGE UNDER THE AMBEX SCHEME

1 OPMET Bulletins Update Procedure

1.1 Information for changes of AMBEX bulletins should be disseminated to all AMBEX centres and national OPMET centres (NOC) concerned well in advance in order to allow the centres to introduce the necessary changes to their message handling systems. In this regard, a lead time period of two months (*or two AIRAC cycles*) is considered appropriate.

1.2 The AMBEX centre planning the change, should send a notification by e-mail or fax to the ICAO Office, Dakar or Nairobi with copy to all AMBEX Focal Points. The notification should include detailed information of the changes and the proposed time schedule. The Regional Office should inform all other ICAO Regional Offices of the changes to be introduced and the effective date of implementation.

1.3 All requests by users for changes to AMBEX bulletins should be addressed to the ICAO Regional Office concerned. The Regional Office should carry out the necessary coordination with the Sates and AMBEX centres concerned. The duration of the coordination process should be minimized so that the period between the user request and the implementation of the change (if agreed) should normally be less than 3 months.

2 Quality Management of OPMET Exchange under the AMBEX Scheme**2.1 Objectives and Scope**

2.1.1 **Objectives:** Develop a management system that provides general guidance on procedures applied to OPMET exchange, which includes quality control aspects and introduces a non-real-time monitoring for OPMET exchange.

2.1.2 **Scope:** Management of OPMET data exchange will be organized in the following sections:

<i>Quality Control</i>	<i>Data quality control applies to OPMET validation and correction during data processing and during preparation of messages</i>
<i>OPMET monitoring</i>	<i>Monitor and evaluate the performance indicators for the scheduled OPMET data</i>

2.2 Quality Control – General Requirements

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

2.2.2 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: meteorological station, aerodrome meteorological office or meteorological watch office. 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.

2.2.3 The national OPMET centre (NOC) should apply QC procedures on the incoming messages from national sources and on the compiled national bulletins.

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

2.2.5 The checks that have already been performed by originating offices and AMBEX Centres are usually repeated at the OPMET data banks. Erroneous messages found by the RO DB should be either rejected or corrected by reference back to the source or by the data bank itself. Data corrected by the data banks should be flagged in the database for record purpose.

2.2.6 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 RO DBs should compile information with regard to errors that were found and compile records, such as the numbers and types of errors detected during quality control. Such non-conformities should be reported to ICAO Regional Office, Dakar or Nairobi for follow-up action.

2.3 Quality Control Procedures

2.3.1 General guidance on the quality control procedures for each type of OPMET is outlined in **Appendix A1**.

3 OPMET Monitoring

3.1 Monitoring of Scheduled OPMET Data

3.1.1 The monitoring shall focus on the measurement of three performance indicators (PIs), viz., Compliance, Availability and Regularity indices of the scheduled, routine OPMET data (SA, FT, FC) exchanged in the region. The PIs are described in detail in **Appendix A1**.

3.1.2 Monitoring Reference. The monitoring shall involve the recording and analysis of data provided by the AFTN circuit. The three PIs should be monitored against the respective AMBEX Tables.

3.1.3 Methodology: Data is monitored with reference to the procedures defined in **Appendix A1** the EUR OPMET Data Monitoring Procedures as produced by APIRG MET/SG (Bulletin Management Group).

3.2 Monitoring of Non-Scheduled OPMET data

3.2.1 Monitoring of non-routine OPMET data shall be executed for FK, FV, WC, WS, and WV.

3.2.2 Monitoring of SIGMET, VAA and TCA should be performed during the scheduled regional SIGMET tests in accordance with the procedures published by the Regional Offices, Dakar and Nairobi.

3.2.3 The monitoring results shall be presented in bulletin-oriented format, one line per bulletin indicating the abbreviated header (TTAAii CCCC YGGgg), the FIR/UIR where applicable, receipt time and originator.

4 AMBEX Focal Points

4.1 In order to facilitate exchange of information between the AMBEX centres a system of AMBEX focal points have been developed. Contact details of the persons designated as AMBEX focal points by the relevant State's authorities is provided in **Appendix A2**.

APPENDIX A1

OPMET Quality Control and Monitoring Procedures

(To be developed and confirmed by the QC team of the OPMET Management Task Force)

1 Quality Control Procedures

1.1 OPMET Data Validation

1.1.1 The AMBEX Centres and RODBs should not modify the content of the meteorological data, e.g. visibility, QNH etc., but only items contained in the WMO bulletin headings, such as, location indicators or observation times.

1.1.2 *WMO Abbreviated Heading (TTAAii CCCC YYGGgg BBB) Validation*

TT	Message Type, shall comprise two alphabetical characters
AA	Location Indicator, shall comprise two alphabetical characters
ii	comprise two digits, from 01 to 99
CCCC	A 4-letter ICAO location indicator shall comprise 4 alphabetical characters
YYGGgg	The date time group of the bulletin, shall be configured to validate it with the current time
BBB	BBB is an optional group. The use of BBB group shall comply with the rules in the WMO abbreviated heading, in regard to delayed, corrected and amended bulletins.

Examples	After QC check
METAR with incorrect YYGGgg: SABM31 VYMD 100830 UTC VYMD 100830Z 18005KT 8000 FEW025 31/18 Q1000 =	SABM31 VYMD 100830 VYMD 100830Z 18005KT 8000 FEW025 31/18 Q1000 =
TAF without AHL: 112324 WIDDYMYX TAF WIDD 112324Z 1200/1224 00000KT 4000 RA BKNT017 BECMG 1203/1205 20010KT 9000 SCT017=	FTID31 WIDD 112300 TAF WIDD 112324Z 1200/1224 00000KT 4000 RA BKNT017 BECMG 1203/1205 20010KT 9000 SCT017=
TAF with invalid BBB:	

FTBN31 OBBI 030525 AMD TAF AMD OBBI 030525Z 0306/0406 16010KT CAVOK BECMG 0308/0312 33017KT 5000 PROB30 TEMPO 0308/0314 0800 DU=	FTBN31 OBBI 030525 AAA TAF AMD OBBI 030525Z 0306/0406 16010KT CAVOK BECMG 0308/0312 33017KT 5000 PROB30 TEMPO 0308/0314 0800 DU=
---	---

1.1.3 METAR/SPECI Validation

For each individual METAR or SPECI within a bulletin the following additional fields shall be validated:

Prefix checks	METAR METAR COR SPECI SPECI COR	SA SA SP SP
Observation Time YYGGggZ	The report shall have a valid date and time of observation, including the character 'Z'. In a SPECI bulletin, this group will be same as (or very close to) the YYGGgg, part of the abbreviated bulletin heading.	
End-of-message format “=”	Each METAR or SPECI report shall be terminated by the “=” character.	

Examples	After QC check
METAR with Observation Time error: SAPK31 OPKC 030159 RRA OPKC 030200 26004 8000 BKN020 27/23 Q1007 NOSIG=	SAPK31 OPKC 030200 RRA OPKC 030200 26004 8000 BKN020 27/23 Q1007 NOSIG=
METAR with mistyped observation time: SAID31 WADD 120100 METAR WADD 121000Z 17004KT 9999 FEW018CB SCT120 BKN300 28/26 Q1005=	SAXX31 WADD 120100 METAR WADD 120100Z 17004KT 9999 FEW018CB SCT120 BKN300 28/26 Q1005=
SPECI with incorrect Message Type, TT: SANZ31 NZKL 040000 SPECI NZWP 040000Z 17005KT 010V240 25KM FEW020 FEW020CB SCT035 BKN050 18/15 Q1018 NOSIG=	SPNZ31 NZKL 040000 AAA SPECI NZWP 040000Z 17005KT 010V240 25KM FEW020 FEW020CB SCT035 BKN050 18/15 Q1018 NOSIG=

1.1.4 TAF Validation

For each individual TAF within a bulletin, the following additional items shall be validated:

Prefix checks	TAF TAF COR TAF AMD	FT or FC FT or FC FT or FC
Issue Time YYGGggZ	If the field is included, it shall have a valid date and time of origin of forecast including 'Z'.	
Validity Y ₁ Y ₁ G ₁ G ₁ /Y ₂ Y ₂ G ₂ G ₂	Some TAFs are still produced with a 4-digit validity period. These shall be corrected by inserting a date consistent with the current date and the date time group of the bulletin header. If a TAF is received without a validity period it shall be discarded.	
End-of-Message format “=”	Each forecast shall be terminated by the “=” character:	

Examples	After QC check
<p>TAF with issue time error (wrong date):</p> <p>FCID31 WIII 181630 TAF WIII 041630Z 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=</p>	<p>FCID31 WIII 181630 TAF WIII 181630Z 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=</p>
<p>TAF with mistyped Validity Period:</p> <p>FTPH31 RPLL 132200 TAF RPLC 132200Z 1400/1428 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 -SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=</p>	<p>FTPH31 RPLL 132200 TAF RPLC 132200Z 1400/1424 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 -SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=</p>
<p>TAF with Validity error (wrong date):</p> <p>FCMS33 WMKK 170748 TAF WMKK 170700Z 3009/3018 30005KT 9999 FEW017CB SCT140 BKN270=</p>	<p>FCMS33 WMKK 170748 TAF WMKK 170700Z 1709/1718 30005KT 9999 FEW017CB SCT140 BKN270=</p>
<p>TAF with 4-digit Validity period:</p> <p>FTXX31 WIDD 170121 TAF WIDD 0618 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000=</p>	<p>FTXX31 WIDD 170121 TAF WIDD 1706/1718 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000</p>

1.1.5 SIGMET Validation

CCCC on the AHL	A valid 4-letter ICAO location indicator indicating the FIR for which the SIGMET was	
Prefix checks	SIGMET for TS, CB, TURB, ICE, MTW, DS and SS SIGMET for VA SIGMET for TC	WS WV WC
Validity Period DDHHMM/DDHHMM	Shall have a valid period of validity. Validity periods may be corrected if: <ul style="list-style-type: none"> • Missing VALID string • Incorrect SIGMET number format • Incorrectly formatted validity period 	
<p><i>Note: For SIGMET validation, please refer to the format described in the AFI (WACAF or ESAF) Regional SIGMET Guide</i></p>		

Examples	After QC check
<p>SIGMET without TTAAii:</p> <p>SIGMET OYSN 121525Z OYSC SIGMET 1 VALID 121530/122130 OYSNSANAA FIR EMBD TS OBS/FCST OVER WESTERN AND SOUTHWESTERN MOUNTAINS AND COASTAL AREAS CB TOPS FL36 NC=</p>	<p>WSXX31 OYSN 121525Z OYSC SIGMET 1 VALID 121530/122130 OYSNSANAA FIR EMBD TS OBS/FCST OVER WESTERN AND SOUTHWESTERN MOUNTAINS AND COASTAL AREAS CB TOPS FL36 NC=</p>
<p>SIGMET with incorrect number format</p> <p>WCPH30 RPLL 210445 SIGMET NO 01 VALID 210000/210600 RPLL TC OBS N0830 E12900=</p>	<p>WCPH30 RPLL 210445 SIGMET 01 VALID 210000/210600 RPLL TC OBS N0830 E12900 ... =</p>
<p>SIGMET with incorrect formatted validity period:</p> <p>WSIN90 VIDP 181800 VIDP SIGMET 06 VALID 18/1600 TO 18/2000 UTC VIDPDELHI FIR ISOL TS ... =</p> <p>WSSD20 OEJD 220503</p>	<p>WSIN90 VIDP 181800 VIDP SIGMET 06 VALID 181600/182000 VIDPDELHI FIR ISOL TS ... =</p> <p>WSSD20 OEJD 220503</p>

OEJD SIGMET 01 VALID 220500 TO 220900 OEJN- JEDDAH FIR=	OEJD SIGMET 01 VALID 220500/220900 OEJN-JEDDAH FIR
---	--

1.2 Quality Control Methods

OPMET Data	Elements Defining	Control Methods
METAR METAR COR SPECI (SA,SP)	<ul style="list-style-type: none"> • AHL • Code name • Observation date/time 	Software verification Manual validate Periodic Quality Control & PI Monitoring
TAF TAF AMD TAF COR (FT,FC)	<ul style="list-style-type: none"> • AHL • Code name • Originating station ICAO location indicator • Date/time of issue • Date, time of starting, time of end of the period the forecast refers to 	Software verification Manual validate Periodic Quality Control & PI Monitoring
SIGMET (WS, WC, WV)	<ul style="list-style-type: none"> • AHL • SIGMET Sequence No • Date/time groups indicating the period of validity Additional Checks (recommended): <ul style="list-style-type: none"> • Name of the FIR or the CTA the message is issued for • Location indicator of the MWO originating the message 	Software verification Manual validate Periodic SIGMET Quality Control Monitoring
Volcanic Ash Advisory FV	<ul style="list-style-type: none"> • Type of message • Issue date and time Additional Checks (recommended): <ul style="list-style-type: none"> • Location indicator or name of the VAAC centre originating the message 	Software verification Manual validate Periodic VA Quality Control Monitoring
Tropical Cyclone Advisory FK	<ul style="list-style-type: none"> • Type of message • Issue date and time Additional Checks (recommended): <ul style="list-style-type: none"> • Location indicator or name of the TCAC centre originating the message 	Software verification Manual validate Periodic TC Quality Control Monitoring

2 OPMET Monitoring

2.1 Monitoring of Scheduled OPMET data

2.1.1 Performance Indicators (PIs). The indices to be used by the RODBs are based on those developed by the European BMG for monitoring the SADIS distribution (ref. SADISOPSG/8, IP/5 – *SADIS OPMET Performance Indices*).

(i) Compliance Index

The AMBEX Compliance index can be calculated from:

$$V_{bul\ compliance} = \frac{\text{No of reports received for a bulletin}}{\text{No of reports required for the bulletin}}$$

The Compliance Index is to assess the level of compliance to the AMBEX scheme. The determination of the compliance index is performed as follows:

- Total number of reports received for AMBEX bulletin during the monitoring period, include reports in the retard bulletins.
- Weed out correction and amendment bulletins, as these are re-transmitted messages, can be disregarded.

(ii) Availability Index

The availability index measures the current coverage of the OPMET distribution against the AMBEX exchange requirements. The determination of the availability index is performed on a daily basis from the data captured during the monitoring period. If at least one non-NIL report is received from the aerodrome during the 24-hour period, that aerodrome is considered to have been available. The daily availability index of a particular bulletin can be calculated as:

$$V_{bul\ availability} = \frac{\text{No of aerodromes for which one or more non-NIL data type are received}}{\text{No of aerodromes required in the bulletins}}$$

(iii) Regularity Index

The regularity index measures the consistency in the number of reports provided by an aerodrome. The computation of Regularity Index assumes that the number of report follows a normal distribution and attempts to ascertain the distribution characteristics (mean and standard deviation) from a set of data. These characteristics are used to determine if subsequent number of reports from an aerodrome is “regular”.

Denoting mean and standard deviation by μ and σ , a threshold report numbers (τ) can be established as:

$$\tau = \mu - \sigma$$

The threshold is a reporting characteristic of an aerodrome. If the subsequent daily number of reports meets or exceeds the threshold, it is considered “regular”. The daily regularity index for a bulletin can be expressed as:

$$V_{bul\ regularity} = \frac{\text{No of aerodromes for which the number of reports equals or exceeds the threshold}}{\text{No of aerodromes required in the bulletin}}$$

2.2 Monitoring of non-scheduled OPMET data

2.2.1 Monitoring of non-scheduled OPMET data should be executed for FK, FV, WC, WS, and WV types of bulletins.

2.2.2 The monitoring results should be presented in bulletin-oriented format, one line per bulletin indicating the abbreviated header (TTAAii CCCC YGGgg), the FIR/UIR where applicable, receipt time and originator.

2.2.3 Example non-routine OPMET monitoring result file formats:

TT	AAii	CCCC	YYGGgg	FIR/UIR Rx	Time	Origin
WS	PF21	NTAA	271004	NTTT	271004	NTAAYMYX
WS	IN90	VIDP	271000	VIDP	271007	VECCYMYX
WS	BW20	VGZR	271100	VGZR	271030	VGZRYMYX
WS	CI31	RCTP	271150	RCTP	271150	RCTPYMYX
WS	MS31	WMKK	272013	WBFC	272013	WMKKYMYX
WS	CI35	ZGGG	272225	ZGZU	272228	ZGGGYZYX
FV	AU01	ADRM	270323		270330	YMMCYMYX
FK	PQ30	RJTD	270500		270504	RJTDYMYX

Explanations to the table:

- TT: Type of bulletin FK, FV, WC, WS, WV
- AAii: Bulletin ID
- CCCC: Compiling Station
- YYGGgg: Standard time of report
- FIR/UIR: ICAO Location indicator of the FIR/UIR or blank (4 spaces) as applicable
- RxTime: Time of receipt
- Origin: Originator address.

2.2.4 Analysis of Monitoring Results:

2.2.4.1 Each RODB collects and analyses the relevant result in order to determine the effectiveness and suitability of the quality management system and to highlight any possible improvement to ICAO Regional Offices, Dakar and Pretoria.

2.3 Examples of Monitoring Results – PI Measurements

The following tables show values of Compliance, Availability and Regularity Index for ASIA/PAC OPMET bulletins compiled by Singapore RODB in March 05:

TABLE A	ROBEX Compliance Index		
	SA	FT	FC
AE31 VECC	0.81	--	
AS31 VABB	---	0.99	
AS31 VTBB	0.96	0.99	
SA32 VABB	--	0.98	
AS32 VTBB	--	0.85	
AU31 YBBN	1.00	0.99	0.97

Note: Entry dashed out (--) means no reports of this type (SA or FT) are required

TABLE B	Availability Index		
	SA	FT	FC
AE31 VECC	0.98	--	
AS31 VABB	---	1.00	
AS31 VTBB	0.99	1.00	
SA32 VABB	--	0.99	
AS32 VTBB	--	0.96	
AU31 YBBN	1.00	1.00	1.00
.	.	.	.
.	.	.	.

TABLE C	Regularity Index		
	SA	FT	FC
AE31 VECC	0.86	--	
AS31 VABB	---	0.96	
AS31 VTBB	0.93	0.96	
SA32 VABB	--	0.96	
AS32 VTBB	--	0.96	
AU31 YBBN	0.90	0.90	0.96
.	.	.	.

ATTACHMENT A

AMBEX FOCAL POINTS (*update*)

STATE/ ADMINISTRATION	NAME/DESIGNATION AND ADDRESS	TEL/FAX AND E-MAIL
CAMEROUN	Cyrille Abondo Autorité Aéronautique du Cameroun (C.C.A.A.) Chef de service de la météorologie aeronautique – Point Focal	BP : 6998 Youndé, Cameroun Tel : + 237 22303090/237 99448802 Fax : + 237 22303362 E.mail : abondocyrille@yahoo.com
CONGO	Olembe Alexis Laurence Chef CRT – ASECNA Point Focal	BP : 128 - Brazzaville Tel _ : + 242-9625764 /4118895 Fax : + 242-281 02 27 E.mail : aolembe@yahoo.fr
GAMBIA	Seedy K. Jobe Aviation Meteorological Coordinator – GCAA, Banjul	Tel _ : + +220-9988419 Fax : + +220-4472190 E.mail sidmariejob@yahoo.co.uk
KENYA	Truphosa A. Chocho Manager ANS/MET/Aerodromes Standards	BP : 30163 00100, Nairobi, Kenya _ Tel : + 254-20-827474 Fax : + 254-20-822300 E.mail : tchocho@kcaa.or.ke
LIBERIA	Akoi T. Vanyanbah Liberia MET Officer	BP : Monrovia, Robertsfield _ Tel : + 2316 913751/231 684 7011 Fax : + E.mail avanyanbah@yahoo.com
MADAGASCAR	Nirison Rakotoarimanana Inspector of ATS/MET	BP : 4414, 13 rue Fernard Kasanga Tel _ : + 2610202222438/2610320/24007 Fax : + 2100202224726 E.mail : nira@acm.mg
MALAWI	Akimu Phiri Meteorologist-Aviation Weather Forecaster	BP : 2 Chileka, Blantyre _ Tel : + 265 1692 201/265 999 002 462 Fax : + 265 1 822 215 E.mail akimuh07@yahoo.co.uk
MAROC	Abderrahim Mouhtadi Cadre à la Direction de la Météorologie Nationale – Chef du service de la Météorologie Aéronautique	Direction de la Meteorologie, B.P. 8106 Casa- Oasis Maroc Tel _ : + 212 5 22654910 GSM +212661472338 Fax : + 212 5 22 913698 E.mail abderrahim.mouhtadi@gmail.com
SOUTH AFRICA	G.E. Khambule South African Weather Service	P/Bag X097, Pretoria 0001 Tel _ : + 2711 390 9326 Fax : + 2711 390 9332 E.mail gaborekwe.khambule@weathersa.co.za
NIGERIA	Mrs Mary Ottu Iso Focal Point Nigerian Meteorological Agency(NIMET)	NIMET 33 Pope John Street Off Gana Street Maitama District Abuja, Nigeria E-mail: maryottuiso@yahoo.com

STATE/ ADMINISTRATION	NAME/DESIGNATION AND ADDRESS	TEL/FAX AND E-MAIL
--------------------------	------------------------------	--------------------

ASECNA

Dieudonné Ngouaka

_ BP : 3144, Dakar
 Tel : + 221-33 8695714/777288948
 Fax : + 221-33 8234654
 E.mail : ngouakadie@asecna.org

IATA

Prosper Zoo'Minto'o
 Directeur Régional Adjoint,
 IATA, (AFI) Sécurité,
 Operations et Infrastructure

Tel _ : + 2711523 2724
 Fax : + 2711 523 2709
 E.mail : ZooMintooP@iata.org
