EIGHTEENTH MEETING OF THE AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG/18)

DIX-HUITIÈME RÉUNION DU GROUPE RÉGIONAL AFI DE PLANIFICATION ET DE MISE EN OEUVRE (APIRG/18)

(KAMPALA, UGANDA, 27 – 30 MARCH 2012)

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APPENDIX 1.2A

Status of Implementation of select Conclusions/Decisions of APIRG/17 Meeting
— Action Plan —

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action Agreed by ANC on 8 March 2011 (ANC 186-6)	Reporting/ Completion date
C 17/3 **A**	**Next Generation of Aviation Professionals**	That, States in the AFI Region take necessary actions to ensure that an adequate number of qualified and competent aviation professionals to operate, manage and maintain the future international air transport systems is developed and retained.	States	Qualified and competent aviation professionals	Request Secretariat to explore means to support States in the AFI Region to improve this situation and attract and retain competent personnel to work in the aviation field.	2011
C 17/4 **D**	**Mechanism for Data Collection to support Regional Performance Metrics**	That States that have not done so, are requested to establish, when possible, a mechanism for data collection, processing and storage and provide the information to the corresponding Regional Office for the identified regional performance metrics.	States	Implementation of mechanism and information of regional performance metrics	Support the conclusion to establish a mechanism to collect data to support Regional performance metrics.	2011 2011

Conclusion No. **---** **Strategic Objective***	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/7 **A**	**Establishment of Regional Aviation Safety Teams**	That: a) ICAO Regional Offices should be the champions in the establishment of Regional Aviation Safety Teams (RAST); and b) The Terms of Reference of the RAST should be established so that in soliciting participants from States, appropriate individuals are identified for participation.		Regional Aviation Safety Teams (RAST)	Noted actions taken in the AFI Region to implement RASTs.	2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/10 **A**	**Aerodrome Certification**	That: States which have not done so should while developing their legislative frameworks ensure that Aerodrome Inspectors are adequately empowered to impose operating restrictions and sanctions at aerodromes in cases where non-conformances have been identified; and b) where aerodrome certification has not been implemented, the Aerodrome Operators should commit to certification of their aerodromes by 2011.	States	Certification of aerodromes	Support the conclusion and request States to address the lack of aerodrome certification activities and the implementation of runway and safety areas (RESA).	2011
C 17/15 **D**	**Development of an AFTN Database**	That: a) States provide AFTN centers with statistics software for the automation of AFTN data collection; and b) ICAO develops a secured data base to facilitate web-based electronic compilation of AFTN statistical data collection and monitoring.	States	Statistics software Web-based database	Noted.	2011 2011

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action Agreed by ANC on 8 March 2011 (ANC 186-6)	Reporting/ Completion date
C 17/25 **D**	**Implementation of CPDLC**	That, States implement CPDLC procedures for en-route operations in their managed oceanic and remote continental airspace.	States	CPDLC Procedures	Noted.	2011
C 17/26 **D**	**Implementation of RCP concept**	a) That States take the advantage of RCP concept stated in ICAO Doc 9869 to improve the provision of aeronautical mobile service (AMS) meeting service level agreements; and b) ICAO support the implementation of the RCP concept through Regional Seminars and Workshops.	States	Meeting service level agreements Seminars/ Workshops	Noted and support the implementation of the RCP concept through regional seminars and workshops.	2011 2011
C 17/28 **D**	**Need for a High Level Meeting on AFI GNSS Strategy**	That, in order to assist AFI States in making an informed decision on the regional strategy for the introduction of GNSS applications, AFCAC organize as a matter of urgency a high level meeting in coordination with ICAO, ASECNA, IATA, AFRAA and other relevant stakeholders.	AFCAC	Meeting as a matter of urgency	Noted.	Completed

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/34 **D**	**ICAO Position for the ITU WRC-2012**	That, States and Air Navigation Service Providers (ANSPS): a) continue their efforts on implementation of the relevant elements of ICAO Assembly Resolution A32-13 and in particular, participate in the preparatory work of the ITU and the ATU for WRC; and b) continue to assign high priority to the tasks relating to the protection and availability of Radio frequency spectrum allocated to aeronautical services and in particular, actively participate in the relevant activities of the ITU-R and ATU.	States/ANSPs	Protection of Radio frequency spectrum	Noted. The ANC acknowledges the efforts made by AFI States in supporting ICAO policies at ITU Conferences.	2011
C 17/38 **D**	**Non-application of charges for the utilization of aeronautical frequency spectrum**	That, AFI States refrain from subjecting Air Navigation Service Providers to charges for the utilization of Aeronautical Frequency Spectrum, including aeronautical communications supported by VSAT Stations.	States	Non-application of charges for the utilization of aeronautical frequency spectrum	Noted and applauds the implementation of VSAT services in the AFI Region.	2011

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action Agreed by ANC on 8 March 2011 (ANC 186-6)	Reporting/ Completion date
C 17/42 **D**	**Resolution of Missing Flight Plans Problem**	That, in order to effectively address the problem of missing flight plans between AFI ACCS, AFI states: take immediate measures to ensure that standard requirements for flight plan processing are adhered to; ensure that all FIRs collect/record information on missing flight plans and exchange such information/data with other FIRs; ensure that ACCs/FICs respond to queries from other ACCs/FICs regarding missing flight plans on a timely basis, providing details that might assist not just the affected firs but others in resolving the causes for missing flight plans; and bring the trend information/data on missing flight plans to the attention of the TAG for further action.	States	Solve missing flight plan problem	Noted and acknowledge that there are areas of no/poor flight plan coordination that need to be improved.	2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/43 **D**	**Implementation of Strategic Lateral Offsets (SLOP) in the AFI Region**	That, AFI States implement SLOP within their areas of responsibility, by AIRAC effective date 30th November 2010, in line with provisions in PANS-ATM Doc 4444 Chapter 16 and the following guidance: a) SLOP will be applied in those oceanic FIRs where fixed routes are established; b) SLOP will be applied in all areas of the continental AFI Region except in those areas where ATC separation is provided by surveillance, unless approved by the State; and c) SLOP will be applied in oceanic random routing areas (AORRA and IORRA) with effect from the target date of AIRAC date of 2 June 2011.	States	Implement SLOP	Noted . The Commission welcomed this positive development. The increased reliance on highly accurate navigation systems in African airspace increases the possibility of collision should a loss of vertical separation occur to aircraft in the same route. The ANC also noted that this is particularly good news in a region with challenging geography, vast remote regions, communications deficiencies and largely procedural air traffic control.	2010/2011

Conclusion No. **---** **Strategic Objective***	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/46 **D**	**AFI PBN Implementation Regional Plan**	That: the AFI Regional PBN implementation plan is updated and endorsed as at Appendix G 3.4D to this report, to more accurately reflect PBN implementation goals in Assembly Resolution A36-23, guidance in the PBN Manual (Doc 9613), and regional planning guidance provided by APIRG; and the Regional PBN Implementation Plan be included in AFI Doc 003.		Update AFI Regional PBN implementation plan	Noted .The Commission encourages the region to work towards the implementation of PBN.	2011
C 17/51 **D**	**Lowering of RNAV/RNP Routes UM214 and UM215**	That, the ICAO Regional Offices carry out further consultations with the States concerned about the lowering of RNAV/RNP routes UM214 and UM215 from FL330 down to FL320, taking into account operational considerations.			Noted.	2011

Appendix 1.2A

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/52 **D**	**Dissemination of a letter inviting proposals for establishment of the AFI Flight Procedures Programme (FPP)**	That, pursuant to the SP AFI/08 RAN Meeting, Recommendation 6/10, ICAO disseminate, as a matter of urgency, the letter inviting interested States and international organizations to submit proposals for establishment and hosting of the AFI FPP.			Noted . The Commission encourages the establishment of the AFI Flight Procedures Programme (FFP).	Completed

Conclusion No. **---** **Strategic Objective***	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
D 17/61 **D**	**Establishment of the AFI Flight Plan Transition Task Force (FPLT TF)**	That, in order to enable a harmonized regional implementation of Amendment 1 to the fifteenth edition of PANS-ATM (Doc 4444) in coordination with other ICAO Regions: the AFI Flight Plan Transition Task Force (FPLT TF) is established with the terms of reference (TOR) at Appendix 3.4J to this report; b) the Task Force should, if practical hold its first meeting as soon as possible but no later than September 2010; c) c) AFI States are urged to provide to the Task Force information requested with regard to its studies and assessments, with minimum delay; and d) APIRG noting that its next regular meeting could be in late 2011, directed the ATS/AIS/SAR SG to endorse the regional strategy and plan including changes thereto, on its behalf.	ICAO HQ	Task Force Support AFI Region to implement FPL 2012	Noted the decision and expressed concern over the progress for the implementation of the ICAO FPL 2012. The Secretariat is called upon to assist the AFI Region wherever possible.	2010/2011 2011

Conclusion No. --- Strategic Objective*	Title of Conclusion	Text of Conclusion	Responsibility	Deliverable	Action Agreed by ANC on 8 March 2011 (ANC 186-6)	Reporting/ Completion date
C 17/66 **D**	**Development and promulgation of contingency plans**	That: a) AFI States develop/update and promulgate contingency plans in accordance with Annex 11 and Annex 15 provisions;	States	Contingency plans	Noted.	2011
		b) AFI States use available ICAO guidance material for the development and promulgation of contingency plans including the template at Appendix 3.4K to this report;	States	Contingency plans		2011
		ICAO Regional Offices carry out a survey on the status of development of contingency plans in the AFI region in order to take remedial actions as necessary; and		Survey		2011
		d) ICAO Regional Offices expedite responses to States on matters related to development of contingency plans, as well processes for approval of contingency plans submitted by States.				2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/68 **D**	**Search and Rescue Services**	That, with the objective to foster the implementation of SAR services and improvement of SAR systems in the Region, AFI states are: urged to establish joint aviation/maritime rescue coordination centres (RCCs) in order to optimize usage of resources and coordination; b) encouraged to establish sub-regional task forces to progress the development SAR cooperative arrangements and integration of SAR services; c) urged to consider entering into agreements with States that have adequate facilities (within or outside the sub-region) to assist in SAR operations; and d) encouraged to include officials from other State organs who are part of the States SAR organization, in their delegations to relevant ICAO meetings and workshops.	States	SAR services	Noted . The Commission was informed by the Secretariat on several initiatives done in the AFI Region to improve SAR services. The Commission called upon States to make efforts to implement measures requested by this conclusion.	2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/82 **D**	**Measures to improve the issuance and dissemination of SIGMET**	That: the ICAO Regional Offices of Dakar and Nairobi evaluate the provision of SIGMET information in all AFI MWOs through the RODB and State missions; ICAO Regional Offices encourage States to establish arrangements between adjacent MWOs for the provision of SIGMET information in MWOs where telecommunications or organizational issues are still inadequate; c) WMO in coordination with ICAO, be invited to provide additional training in the issuance of VA and TC SIGMETs to some MWOs not able to issue the required SIGMETs; d) the ICAO Regional Offices of Dakar and Nairobi update the AFI SIGMET guide for additional details of VA and TC test procedures; and e) the MWOs provider States endeavor to address the identified deficiencies in the issuance and dissemination of SIGMET.	ICAO Headquarters/ WMO States	SIGMET information Arrangements between MWOs Training Update AFI SIGMENT guide Address SIGMET deficiencies	Noted the conclusion observing that similar issues associated with communications exist. The Secretary General is requested to coordinate with WMO for additional training related to issue of VA and TC SIGMETs.	2011 2011 2011 2011 2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/86 **D**	**Transition from AIS to AIM**	That, recognizing the limitations of the current AIS, which does not meet the new global ATM system requirements envisioned by the ATM operational concept, and taking into consideration the ICAO roadmap for the transition from AIS to AIM:			Noted. The transition in the AFI Region will benefit if a robust communication infrastructure exists. The Commission called upon the Secretariat to support/monitor the transition of AIS to AIM through regional mechanisms.	
		a) States that have not yet done so, are urged to develop national plans to implement the transition from AIS to AIM and send them to the ICAO ESAF and WACAF Regional Offices before 31 December 2010; and	States	Develop national plans		2010
		b) AFI AIM implementation task force monitor the progress of transition from AIS to AIM in the AFI Region and support regional and national planning efforts.		Monitor /Support transition AIS to AIM		2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/92 **D**	**Development and management of a National e-TOD Programme**	That, States, in accordance with sound management principles and procedures, should: develop a framework and a detailed planning including priorities and timelines, for the implementation of a national e-TOD programme; adopt/follow a collaborative approach, involving all concerned parties, in the implementation of e-TOD provisions; and make an inventory of and evaluate the quality of existing terrain and obstacle data sources, and in the case of data collection, consider carefully the required level of details of collected terrain and obstacle data with particular emphasis on obstacle data and associated cost.	States	National e-TOD programme	Noted.	2011

Conclusion No. --- Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**	**Responsibility**	**Deliverable**	**Action Agreed by ANC on 8 March 2011** (ANC 186-6)	**Reporting/ Completion date**
C 17/97 **D**	**Adoption of the AIS to AIM Transition Roadmap**	That, States adopt the roadmap as guidance material to plan, manage and facilitate the global transition from AIS to AIM within the AFI Region including planning of the scope and prioritizing projects and actions for the transition to AIM**.**	States	AIS to AIM Transition Roadmap	Noted.	2011
C 17/100 **A**	**Development of the AFI web-based Air Navigation Deficiency Database**	That, in order to enable States and international organizations to contribute directly to the deficiency database on a continuous basis, ICAO Regional Offices expedite the development of a web-based AFI Air Navigation Deficiencies Data Base (AANDD).	States/ international organizations	Web-based AFI Air Navigation Deficiencies Database (AANDD)	Noted .States/international organizations should contribute to update the deficiencies database.	2011
C 17/105 **A**	**Amendment of APIRG TOR and Procedural Handbook**	That: the Terms of Reference and tasks of the group be amended as at Appendix 7A to this report; and the amendments be reflected in the APIRG Procedural Handbook.		Updated Terms of Reference	Noted. The Commission expressed its support to the establishment of RASG in the AFI Region.	2011

*** Note:** ICAO established the following Strategic Objectives for the period 2005-2010:

A: Safety - *Enhance global civil aviation safety*;
B: Security - *Enhance global civil aviation security*;
C: Environmental Protection - *Minimize the adverse effect of global civil aviation on the environment*;

D: Efficiency - *Enhance the efficiency of aviation operations*;
E: Continuity - *Maintain the continuity of aviation operations;*
F: Rule of Law - *Strengthen law governing international civil aviation.*

— END —

Methodology for transition to a performance based Global ATM System

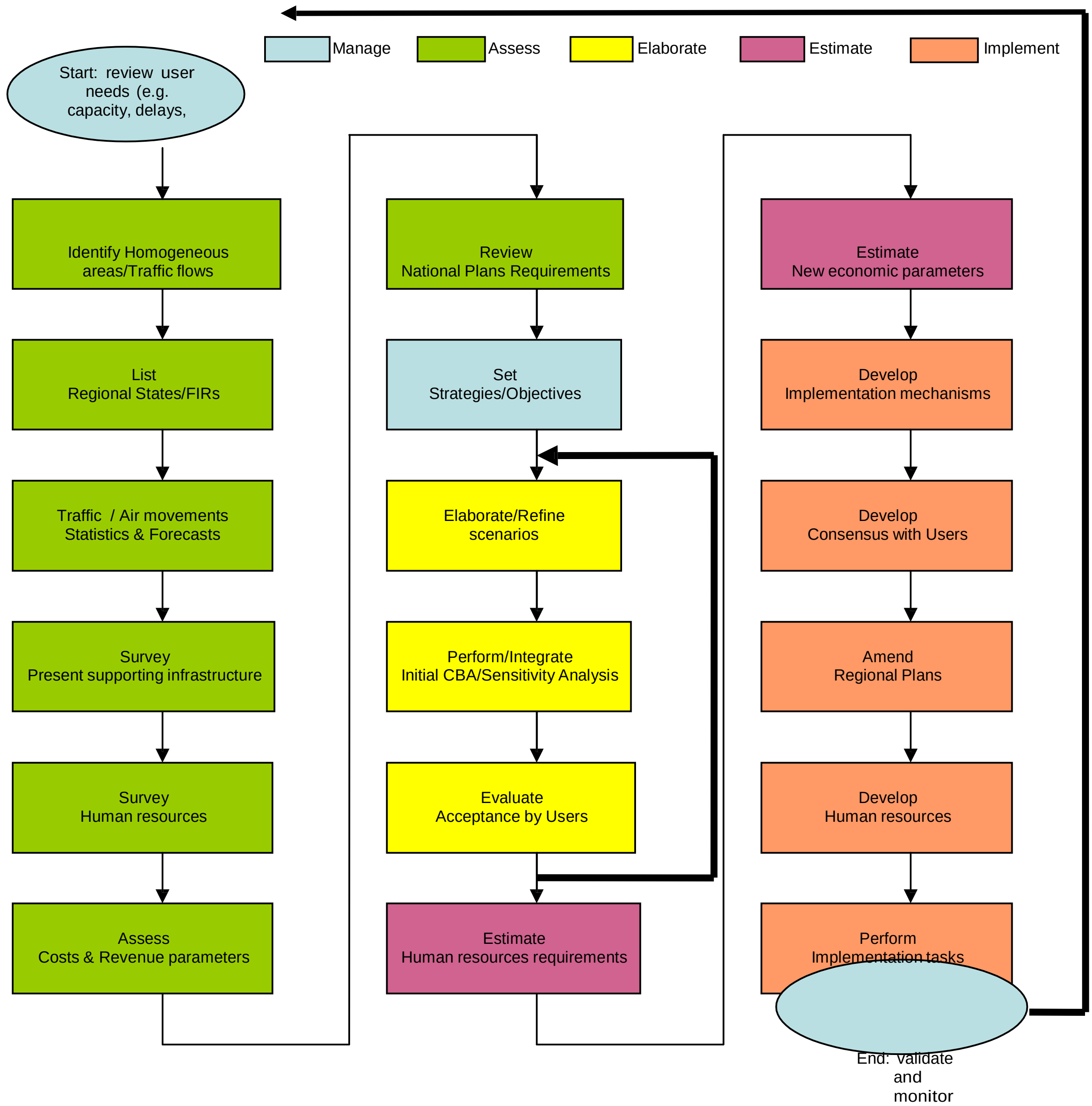

Figure 1.
Planning flow chart

Extracted from the Global Air Navigation Plan (Doc 9750), Chapter 1

Transition Approach of the global Performance Manual, Doc 9883

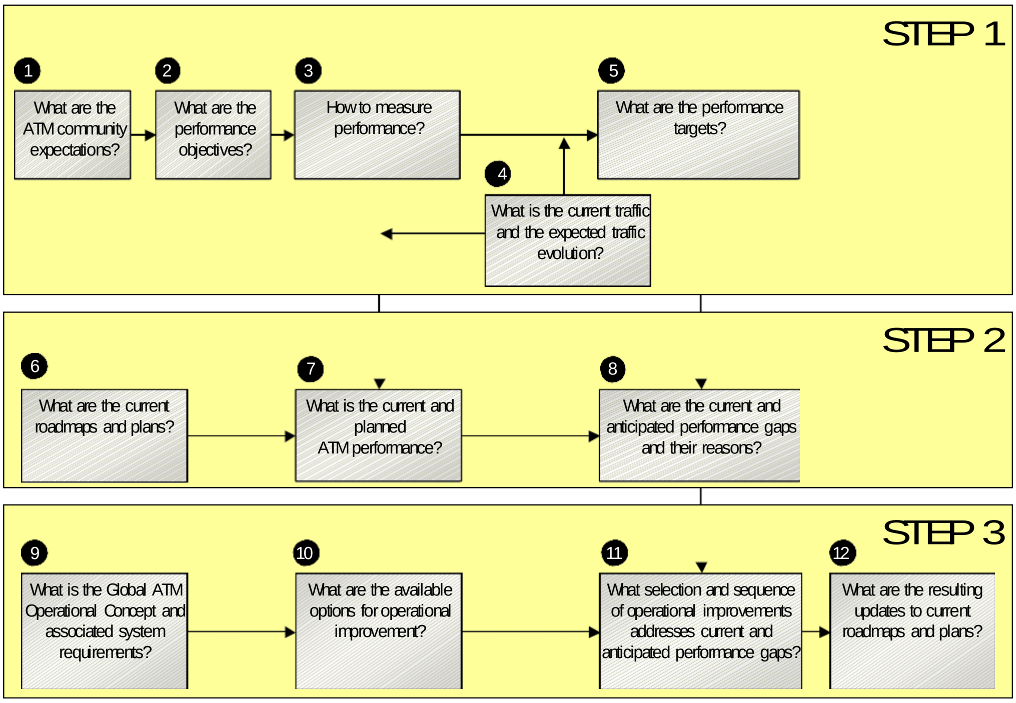

Figure 2 – Performance-based transition approach

Extracted from Part II of the
Manual on Global Performance of the Air Navigation System (Doc 9883)

PERFORMANCE FRAMEWORK FORM (Sample)

REGIONAL PERFORMANCE OBJECTIVES /NATIONAL PERFORMANCE OBJECTIVES — OPTIMIZE THE ATS ROUTE STRUCTURE IN EN-ROUTE AIRSPACE				
Benefits				
Environment Efficiency	• reductions in fuel consumption; • ability of aircraft to conduct flight more closely to preferred trajectories; • increase in airspace capacity; • facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency.			
Strategy Short term (2010) Medium term (2011 -2015)				
ATM OC COMPONENTS	TASKS	TIMEFRAME START-END	RESPONSIBILITY	STATUS
AOM	En-route airspace • analyze the en-route ATS route structure and implement all identifiable improvements; • implement all remaining regional requirements (e.g. RNP 10 routes); and • finalize implementation of WGS-84 • monitor implementation progress • develop a strategy and work programme to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN and, in particular, RNAV/5, taking into account interregional harmonization; • monitor implementation progress	2005-2008		
Linkage to GPIs	GPI/5: performance-based navigation, GPI/7: dynamic and flexible ATS route management, GPI/8: collaborative airspace design and management, GPI/11: RNP and RNAV SIDs and STARs and GPI/12: FMS-based arrival procedures.			

PERFORMANCE FRAMEWORK FORM — EXPLANATORY NOTES

1. Performance framework form: This form is an output and management form which is applicable to both regional and national planning and includes references to the Global Plan. Other formats may be appropriate but should contain as a minimum the elements described below.

2. Performance objective: Regional/national performance objectives should be developed using a performance-based approach that best reflects the necessary activities needed to support regional/national ATM systems. During their life cycle, performance objectives may change depending on the ATM system's evolution; therefore, throughout the implementation process, these should be coordinated with and be available to all interested parties within the ATM Community. The establishment of collaborative decision making processes ensures that all stakeholders are involved in and concur with the requirements, tasks and timelines.

3. Regional performance objective: Regional performance objectives are the improvements required to the air navigation system in support of the global performance objectives, and are related to the operating environments and priorities applicable at the regional level.

4. National performance objective: National performance objectives are the improvements required to the air navigation system in support of the regional performance objectives, and are related to the operating environments and priorities applicable at the State level.

5. Benefits: The regional/national performance objectives should meet the expectations of the ATM community as described in the operational concept and should lead to benefits for stakeholders and be achieved through operational and technical activities aligned with each performance objective.

6. Strategy: ATM evolution requires a clearly defined progressive strategy including tasks and activities which best represent the national and regional planning processes in accordance with the global planning framework. The goal is to achieve a harmonized implementation process evolving toward a seamless global ATM system. For this reason, it is necessary to develop short (1 to 5 years) and medium term (6 to 10 years) work programmes, focusing on improvements to the system indicating a clear work commitment for the parties involved.

7. ATM operational concept components: Each strategy or set of tasks should be linked with associated components of the ATM operational concept. The designators for ATM components are as follows:

- AOM – Airspace organization and management
- DCB – Demand and capacity management
- AO – Aerodrome operations
- TS – Traffic synchronization
- CM – Conflict management
- AUO – Airspace user operations
- ATM SDM – ATM service delivery management

8. Tasks: The regional/ national work programmes, using this PFF templates, should define tasks in order to achieve the said performance objective and at the same time maintain a direct relation with ATM system components. The following principles should be considered when developing work

programme:

- The work should be organized using project management techniques and performance-based objectives in alignment with the strategic objectives of ICAO.

- All tasks involved in meeting the performance objectives should be developed using strategies, concepts, action plans and roadmaps which can be shared among parties with the fundamental objective of achieving seamlessness through interoperability and harmonization.

- The planning of tasks should include optimizing human resources as well as encouraging dynamic use of electronic communication between parties such as the Internet, videoconferences, teleconferences, e-mail, telephone and facsimile. Additionally, resources should be efficiently used, avoiding any duplication or unnecessary work.

- The work process and methods should ensure that performance objectives can be measured against timelines and the national and regional progress achieved can be easily reported to PIRGs and ICAO Headquarters respectively.

9. Timeframe: Indicates start and end time period of that particular task(s).

10. Responsibility: Indicates the organization/entity/person accountable for the execution or management of the related tasks.

11. Status: The status is mainly focused on monitoring the progress of the implementation of that task(s) as it progresses toward the completion date.

12. Linkage to global plan initiatives (GPIs): The 23 GPIs, as described in the Global Plan, provide a global strategic framework for planning for air navigation systems and are designed to contribute to achieving the regional/national performance objectives. Each performance objective should be mapped to the corresponding GPIs. The goal is to ensure that the evolutionary work process at the State and regional levels will be integrated into the global planning framework.

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR PBN

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN EN-ROUTE AIRSPACE				
Benefits				
Environment **Efficiency** **Safety**	• reduction in gas emissions • ability of aircraft to conduct flight more closely to preferred trajectories • increase in airspace capacity • facilitate utilization of advanced technologies (e.g., FMS-based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency			
Strategy ***Short term (2010)*** ***Medium term (2011-2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***En-route airspace***	2008		
	• develop regional implementation plan	2008-2009	AFI PBN TF	Completed
	• develop regional action plan	2009-2010	AFI PBN TF	Completed
	• establish collaborative decision making (CDM) process	2010	States	Continuous
	• develop airspace concept based on AFI PBN regional implementation plan, in order to design and implement a trunk route network, connecting major city pairs in the upper airspace and for transit to/from aerodromes, on the basis of PBN, e.g. RNAV 10 and RNAV 5, and taking into account interregional harmonization	2009-2012	AFI PBN TF/States	In progress
	• harmonize national and regional PBN implementation plans	2010-2016	AFI PBN TF/States	On-going
	• develop performance measurement plan	2010-2012	States	In progress
	• formulate safety plan	2010-2012	States	To be developed
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material	2010-2011	States	To be developed
	• identify training needs and develop corresponding guidelines	2010-2011	States	In progress
	• identify training programmes and develop corresponding guidelines	2010-2011	AFI PBN TF/States	in progress
	• formulate system performance monitoring plan	2010-2011	AFI PBN TF/States	To be developed
	• implementation of en-route ATS routes	2010-2012	AFI PBN TF/States	In progress
	• monitor implementation progress in accordance with AFI PBN implementation plan and State implementation plan	2010 and beyond	AFI PBN TF/States	On-going

AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES OPTIMIZATION OF THE ATS ROUTE STRUCTURE IN TERMINAL AIRSPACE				
Benefits				
Environment **Efficiency** **Safety**	• reduction in gas emissions • ability of aircraft to conduct flight more closely to preferred trajectories • increase in airspace capacity • improved availability of procedures • facilitate utilization of advanced technologies (e.g., FMS based arrivals) and ATC decision support tools (e.g., metering and sequencing), thereby increasing efficiency			
Strategy ***Short term (2010)*** ***Medium term (2011-2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AOM	***Terminal airspace***	2008		
	• develop regional implementation plan	2009	AFI PBN TF	Completed
	• develop regional action plan	2009-2010	AFI PBN TF	Completed
	• develop State PBN implementation plan	2009 (see note1)	States	In progress (X States have completed)
	• establish collaborative decision making (CDM) process	2010	States	In progress
	• develop airspace concept based on AFI PBN roadmap, in order to design and implement an optimized standard instrument departures (SIDs), standard instrument arrivals (STARs), holding and associated instrument flight procedures, on the basis of PBN and, in particular RNAV 1 and Basic-RNP 1	2009-2012	PBN TF/States	In progress
	• develop performance measurement plan	2010-2012	States	In progress
	• formulate safety plan	2010-2012	States	To be developed
	• publish national regulations for aircraft and operators approval using PBN manual as guidance material	2010-2011	States	To be developed
	• identify training needs and develop corresponding guidelines	2010-2011	States	In progress
	• identify training programmes and develop corresponding guidelines	2010-2011	AFI PBN TF	To be developed
	• formulate system performance monitoring plan	2010-2012	AFI PBN TF/States	In progress
	• develop a regional strategy and work programme implementation of SIDs and STARs	2009-2012	AFI PBN TF/States	In progress
	• monitor implementation progress in accordance with AFI PBN implementation roadmap and State implementation plan	2010 and beyond	AFI PBN TF/States	On going
Linkage to GPIs	GPI/5: performance-based navigation; GPI/7: dynamic and flexible ATS route management; GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: FMS-based arrival procedures.			

<table>
<tr><th colspan="5">OPTIMIZATION OF VERTICALLY GUIDED RNP APPROACHES</th></tr>
<tr><th colspan="5">Benefits</th></tr>
<tr><td>Environment
Efficiency
Safety</td><td colspan="4">• reduction in gas emissions
• increased accessibility to aerodromes, including continuity of access
• increased runway capacity
• reduced pilot workload
• availability of reliable lateral and vertical navigation capability</td></tr>
<tr><td colspan="5">Strategy</td></tr>
<tr><td>ATM OC COMPONENTS</td><td>TASKS</td><td>TIMEFRAME START-END</td><td>RESPONSIBILITY</td><td>STATUS</td></tr>
<tr><td rowspan="13">AOM</td><td>Terminal airspace</td><td>2008</td><td></td><td></td></tr>
<tr><td>• develop regional implementation plan</td><td>2008 – 2009</td><td>AFI PBN TF</td><td>Completed</td></tr>
<tr><td>• develop regional action plan</td><td>2009-2010</td><td>AFI PBN TF</td><td>Completed</td></tr>
<tr><td>• develop State PBN implementation plan</td><td>2009</td><td>States</td><td>In progress</td></tr>
<tr><td>• establish collaborative decision making (CDM) process</td><td>2010</td><td>States</td><td>In progress</td></tr>
<tr><td>• develop airspace concept based on AFI PBN implementation plan, in order to design and implement RNP APCH with Baro-VNAV or LNAV only (see note 1) in accordance with relevant Assembly resolutions , and RNP AR APCH where beneficial</td><td>2009 – 2012</td><td>AFI PBN TF/States</td><td>In progress</td></tr>
<tr><td>• develop performance measurement plan</td><td>2010-2012</td><td>States</td><td>In progress</td></tr>
<tr><td>• formulate safety plan</td><td>2010-2012</td><td>States</td><td>To be developed</td></tr>
<tr><td>• publish national regulations for aircraft and operators approval using PBN manual as guidance material</td><td>2010-2011</td><td>States</td><td>To be developed</td></tr>
<tr><td>• identify training needs and develop corresponding guidelines</td><td>2010-2011</td><td>States</td><td>In progress</td></tr>
<tr><td>• identify training programmes and develop corresponding guidelines</td><td>2010-2011</td><td>AFI PBN TF/States</td><td>To be developed</td></tr>
<tr><td>• implementation of APV procedures</td><td>2010 - 2016</td><td>AFI PBN TF/States</td><td>In progress</td></tr>
<tr><td>• Formulate system performance monitoring plan</td><td>2010-2012</td><td>AFI PBN TF/States</td><td>in progress</td></tr>
<tr><td>linkage to GPIs</td><td colspan="4">GPI/8: collaborative airspace design and management; GPI/10: terminal area design and management; GPI/11: RNP and RNAV SIDs and STARs; GPI/12: FMS-based arrival procedures</td></tr>
</table>

Note 1: States that have not already done so should complete preparation of their national PBN implementation plans as soon as possible.

Note 2: Where altimeter setting does not exist or aircraft are not suitably equipped for APV.

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AFI REGIONAL PERFORMANCE OBJECTIVES/NATIONAL PERFORMANCE OBJECTIVES FOR SEARCH AND RESCUE (SAR)

<table>
<tr><th colspan="5">ESTABLISHMENT OF SUB-REGIONAL SAR ARRANGEMENTS</th></tr>
<tr><th colspan="5">Benefits</th></tr>
<tr><td>Efficiency and Safety</td><td colspan="4">• cost-efficient use of accommodation and RCC equipment on a shared basis
• service provision more uniform across a geographic area defined by risk
• proficient services provided near and within States with limited resources.
• harmonization of aviation / maritime procedures
• inter-operability of life-saving equipment
• development of a pool of experienced SAR mission coordinators skilled across both aviation and maritime domains thus reducing coordination and fragmentation</td></tr>
<tr><th colspan="5">Strategy</th></tr>
<tr><th>ATM OC COMPONENTS</th><th>TASKS</th><th>TIMEFRAME START-END</th><th>RESPONSIBILITY</th><th>STATUS</th></tr>
<tr><td rowspan="6">N/A</td><td>• conduct AFI Regional SAR workshop</td><td>every year</td><td>ICAO</td><td></td></tr>
<tr><td>• establish collaborative decision making process
• Collaboration between states
• Networking process by setting up a website; nominate a focal point within ICAO to manage the website
• Nominate a focal point within each state/organization to coordinate SAR issues</td><td>2011 – 2012</td><td>ICAO
/States</td><td>Not started</td></tr>
<tr><td>• develop needs assessment and gap analysis
• conduct self audits</td><td>2011 – 2012</td><td>APIRG/STATES</td><td>Not started</td></tr>
<tr><td>• develop regional action plan to resolve the deficiencies</td><td>2011 – 2012</td><td>APIRG/STATES</td><td>Not started</td></tr>
<tr><td>• conduct regional SAR Administrators training and SAR Mission Coordinators training</td><td>2011 – 2012</td><td>ICAO</td><td>Not started</td></tr>
<tr><td>• determine regional and sub regional organisation, functions and responsibilities, accommodation and equipment needs.</td><td>2011 – 2012</td><td>APIRG/ STATES</td><td>Not started</td></tr>
<tr><td></td><td>• produce draft legislation, regulations, operational procedures, letters of agreement SAR plans and safety management policies for regional SAR provision using IAMSAR manual as guidance.</td><td>2010 – 2012</td><td>APIRG</td><td>Implementation on a continuous basis</td></tr>
</table>

	• determine future training needs and develop training plans and conduct training as required	2010 – permanent	APIRG/STATES	Implementation on a continuous basis
	• develop SAR plan ➢ alerting procedures ➢ resource databases ➢ interface procedures with aerodrome emergency procedures and generic disaster response providers ➢ RCC check lists ➢ staffing, proficiency and certification plans ➢ preventive SAR programmes ➢ quality programmes ➢ education and awareness programmes ➢ in-flight emergency response procedures	2011 – 2012	States	Not started
	•			
	• conduct SAR exercises required: -National -Multinational	2012 - Permanent	States	Not started
	• monitor implementation process	As appropriate	ICAO/States	Not started
linkage to GPIs	N/A			

Notes:

1. Enablers: Regional Organizations like SADC, ECOWAS, CEMAC, EAC etc.

2. The Task Force has identified the following groups of RCCs as potential base for regional/sub-regional SAR close co-operation e.g. SAR exercise, training, meetings etc..

- ➢ Casablanca, Canarias, Dakar, Roberts, Sal,
- ➢ Algiers, Asmara, Cairo, Tripoli, Tunis,
- ➢ Accra, Brazzaville, Kano, Kinshasa, Ndjamena, Niamey,
- ➢ Addis, Entebbé, Khartoum, Mogadishu, Nairobi,
- ➢ Southern African States,
- ➢ Antananarivo, Mauritius, Seychelles.

3. All work requires close cooperation with all States affected, ICAO, IMO, Cospas-Sarsat and other worldwide bodies as require.

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Performance Objectives

ATM PERFORMANCE OBJECTIVES

<table>
<tr><td colspan="5">REGIONAL PERFORMANCE OBJECTIVE - IMPLEMENTATION OF THE NEW ICAO FPL PROVISIONS BY 15 NOVEMBER 2012</td></tr>
<tr><td colspan="5">Benefits</td></tr>
<tr><td>Environment
Efficiency

Safety</td><td colspan="4">• reduction in fuel consumption and reduction of carbon emissions
• ability of air navigation service providers t make maximum use of aircraft capabilities
• ability of aircraft to conduct flights more closely to their preferred trajectories
• facilitate utilization of advanced technologies thereby increasing efficiency
• increase airspace capacity
• optimized demand and capacity balancing through the efficient exchange of information
• enhance safety by use of modern capabilities on board aircraft
• enhance the success of SAR operations
• generally enable PBN and other advanced navigation capabilities</td></tr>
<tr><td colspan="5">Strategy
Short term (2010-2012)</td></tr>
<tr><td>ATM OC COMPONENTS</td><td>TASKS</td><td>TIMEFRAME START-END</td><td>RESPONSIBILITY</td><td>STATUS</td></tr>
<tr><td rowspan="5">AUO
SDM</td><td>• plan the transition arrangements to ensure that the changes from the current to the new ICAO FPL form occur in a timely and seamless manner and with no loss of service</td><td>2009-June 2011</td><td>States</td><td>Completed</td></tr>
<tr><td>• ensure that the capabilities of local systems are fully adaptable to the changes envisaged in the new FPL form</td><td>2010 to June 2012</td><td>States</td><td>On-going Not completed</td></tr>
<tr><td>• ensure the ability of FDPS's to parse information correctly to guarantee that misinterpretation of data does not occur</td><td>2010 to June 2012</td><td>States</td><td>On-going Not completed</td></tr>
<tr><td>• analyze each individual data item within the various fields of the new flight plan form, comparing the current values and the new values to verify any issue regarding the provision of service by the flight planning facility itself or downstream units</td><td>2010 to June 2012</td><td>States</td><td>On-going Not completed</td></tr>
<tr><td>• ensure that there are no individual State peculiarities or deviations from the flight plan provisions</td><td>2012</td><td>States</td><td>Ongoing</td></tr>
</table>

	• ensure that the accepting ATS Reporting Office accepts and disseminates all aircraft capabilities and flight intent to all the downstream ACCs as prescribed by the PANS-ATM provisions	2012	States	Ongoing
	• in order to reduce the change of double indications it is important that any State having published a specific requirement(s) which are now addressed by the amendment should withdraw those requirements in sufficient time to ensure that aircraft operators and flight plan service providers, after 15 November 2012, use only the new flight plan indications	2010-2012	States	Ongoing
	• inform on the implementation status to the ICAO regional offices on an ongoing basis	2010-2012	States	Ongoing
	• keep the Flight Plan Implementation Tracking System (FITS) up to date based on the information provided by the States	2010-2012	ICAO Regional Offices	Ongoing
linkage to GPIs	GPI/5 RNAV and RNP (Performance-based navigation) GPI-12 Functional integration of ground systems with airborne system GPI/18 Aeronautical Information			

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APIRG 15, APIRG/16 and Other Outstanding Routes

Table 1A – Route segments still required, to be implemented by the time of APIRG/18

IATA to review the requirements and re-submit the list with supporting details

No	Route Designator	Meeting	Country	Comment
1.	UG402	APIRG15	Algeria, Niger, Burkina Faso, Benin	Accelerate Implementation
2.	UG404	APIRG15	Morocco, Algeria, Mali, Niger	Accelerate Implementation
3.	UG629	APIRG15	Morocco, Algeria, Mali, Niger, Nigeria	Accelerate Implementation
4.	UG981	APIRG15	Niger, Nigeria, Cameroun, Guinea, Gabon	Accelerate Implementation IATA to review & re-submit
5.	UM220	APIRG 16	Sudan	Review with South Sudan
6.	UM365	APIRG 16	Sudan	Review with South Sudan
7.	UM665	APIRG 16	Sudan	Accelerate Implementation

Table 1B – Routes/segments identified by ATM/AIM/SAR SG/12 as no longer required

1	UG403	APIRG15	Algeria, Niger	No longer Required
2	UG616	APIRG15	Niger, Nigeria	No Longer Required
3	UB525	APIRG 16	Ethiopia, Sudan, Egypt	No Longer Required; UT124
4	UL612	APIRG 16	DR Congo, Sudan, Egypt	No Longer Required; UG607

Table 2 - Unimplemented Routes/segments developed by PRND WG/1 (2010) to be implemented by time of APIRG/18

No	Temp. Route Designator	Route Segment	Country	Comment
1.	UT127	TIKAR-MRW	Sudan	Internal Route structure Review
2.	UT151	OXILO-DCT-LAG	Nigeria	VHF Coverage. To be reviewed in line with required comms/surveillance implementation.
3	UT152	MLK-DCT-LAG	Sudan	Implementation suspended; Suggest use of UB763
4	UT253	NV-KESOM-MOGDU-DCT-BKK	India	India to be approached to expedite implementation. ICAO interregional coordination support required
5	UT261	BRN-DCT-ATMUL	Egypt	Awaiting Military Clearance
6	UT263	LUKRO-KAN	Nigeria	Implementation suspended; Suggest UH206 via JOS To be reviewed by Nigeria in line with required comms/ surveillance implementation

7	UT271	TLE-MPK	Nigeria	Implementation suspended; Suggest UA609 via OPALA To be reviewed by Nigeria in line with required comms/ surveillance implementation
8	UG402	TMS-DCT-GAO-DCT-TYE	Algeria	On-going
9	UW900	OZT-GAO-LV (See UG981 APIRG 15)	Nigeria	VHF Coverage To be reviewed by Nigeria in line with required comms/ surveillance implementation

Table 3- <u>New User Preferred Routes</u>

To be implemented by time of APIRG/18

No	Route Designator	Route Segment	Country	Comment
1.	UB533	DAR-Nampula - DV-VNP	Tanzania, Mozambique	Extension of UB533 NV-VNP Has been coordinated. Both States to finalize implementation. Implementation January 2012 AIRAC date
2.	UTxxx	NBO-NDJ (BUN-FL)	DR Congo, Chad	Previously existed route
3.	UG650	NBO-JED (NV-GWZ-ASM-JDW)	Ethiopia, Eritrea	Eretria/Ethiopia co-ordination
4.	UTxxx	NBO-ALG	Sudan, Chad, Libya, Algeria	New
5.	UT384	DAROT- P4	Mogadishu, Seychelles	Re-align to connect T940. IATA to coordinate with both States
6.	RouteLab 3	ADD-BKK, NBO-BKK	NONE in AFI	ICAO Asia Region (8 Routes)
7.	UQ579	DWA-IMKAT-EKBUL-MUBAK-TAREM	Eretria, Ethiopia, Kenya, Uganda	iFLEX route
8.	UQxxx	NBO-BKO	Kenya, Uganda, DR Congo, Cameroun, Nigeria, Ghana and ASECNA.	iFLEX route
9.	UQxxx	IAD (Washington)-ADD	Several Countries	iFLEX route

Table 4 – Other ATS Routes developed after APIRG/17

No	Route Designator	Route Segment	Country	Comment
1.	UQ592	BIRNI-ODMAP	Nigeria	iFLEX 2
2.	UQ583	KITEK-KNA-KTM	Sudan	iFLEX 2
3.	UT419	ASKON-MLK-TIKAT-OHA(-GEREK-HDH)	Sudan Ethiopia Asmara	iFLEX 2
4.	UB535[1]	JUB-SAGBU	Sudan	Route Lab 1
5.	UT129	ALEMU-GWZ	Ethiopia	Route Lab 1
6.	UQ597	DANAD-METSA	Egypt	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
7.	UQ598	DITAR-PASAM	Egypt Libya	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
8.	UQ599	KFR-ALSEP-KHG	Egypt Libya	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
9.	UQ595	KHG-KIRET	Egypt	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
10.	UQ594	LIGAT-KARUK-ORMOL	Egypt Libya	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
11.	UQ596	IPOBA-TWARG-TUKAM-IMRAD	Algeria Libya Egypt	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
12.	UQ853	DJA-TWARG	Algeria	iFLEX 2: Pending resolve of “No-Fly” zone in Tripoli FIR
13.	UW325	SIPKI-GOVEL-MISRU-MENIT-FL	Chad CAR DRC	Requested in July 2011

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[1] Conventional route

AFI ATS ROUTES CATALOGUE (AARC) TEMPLATE

AFI/00X	**ATS Route Name:**	**Entry-Exit:**	**Inter-Regional Cross Reference if any**		**Users Priority**		**Originator of Proposal**	
							Date of Proposal	

Route Description		**States Concerned**	**Expected Implemen-tation date**	**Implementation Status**	**ANP Status**	**Action Taken / Required**	**Deadline for each Action**
Flight Level Band:							
Potential City Pairs:							

Conclusions/Remarks			**Last updated**	

AFI/00X	**ATS Route Name:**	**Entry-Exit:**	**Inter-Regional Cross Reference if any**		**Users Priority**		**Originator of Proposal**	
							Date of Proposal	

Route Description		**States Concerned**	**Expected Implemen-tation date**	**Implementation Status**	**ANP Status**	**Action Taken / Required**	**Deadline for each Action**
Flight Level Band:							
Potential City Pairs:							

Conclusions/Remarks			**Last updated**	

- END -

PBN ROUTE NETWORK DEVELOPMENT WORKING GROUP (PRND WG)

TERMS OF REFERENCE

A) TERMS OF REFERENCE

1. Review the AFI ATS route network in order to assess its capacity and constraints;

2. Based on the airspace user needs and in coordination with stakeholders (States, International Organizations, user representative organizations and other ICAO Regions), AFI Regional Performance Objectives, the Regional PBN Implementation Plan, as well as related ICAO provisions and guidance material, identify requirements and improvements for achieving and maintaining an efficient route network in the AFI Region;

3. Propose a strategy and prioritized plan for development of improvements to the route network, highlighting:

    - areas that require immediate attention
    - interface issues with adjacent ICAO Regions
    - the implementation of PBN

4. Develop a working depository for route proposals that will be used as a dynamic reference document for ongoing discussions on routes under development/modification. In this respect, the Working Group should explore the utility that can be realized from the route catalogue concept/ATS route database;

5. Engage the necessary parties regarding routes under consideration;

6. Recognizing that, prior to implementation of new ATS routes or changes to existing routes, States are to conduct safety assessments in accordance with provisions of Annex 11 to the Chicago Convention, continue to sensitize States on the importance of this obligation and need to coordinate with the ARMA;

7. After adoption by the ATM/AIM/SAR SG, or as delegated by the same, submit completed route proposals for amendment of the Basic ANP Table ATS-1, to the AFI Regional Offices for processing;

8. Assess the role that may be contributed by a special project for a comprehensive review of the AFI ATS route network as envisaged by APIRG 15 and make recommendations, with detailed project description if the role of a project is confirmed.

B) COMPOSITION

It is recognized that in order to facilitate the effectiveness of proceedings of the Working Group, the preferable core size of the Working Group should be about 15 members. However, that this does not preclude other AFI States from attending proceedings of the Working Group as necessary, the PRND Working Group will comprise:

a) experts nominated by AFI Provider States from both civil aviation entities and military authorities;

   Cape Verde, Ghana (*to confirm*), Kenya Mozambique, Namibia, Nigeria, Seychelles, Somalia, South Africa, Swaziland, Tanzania, Zimbabwe
   (Agreed at the PRND WG/2 Meeting);

b) ARMA, ASECNA, IATA, IFALPA and IFATCA;

c) representatives from adjacent States and concerned international organizations (on ad-hoc basis).

C) WORKING ARRANGEMENTS

The Working Group shall:

a) report to the ATM/AIM/SAR Sub Group through the PBN TF (or its successor);

b) meet as required and at least once a year; and

c) use electronic communication between members as much as feasible.

--- END ---

AFI RVSM SAFETY POLICY

JULY 2011

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AFI REDUCED VERTICAL SEPARATION MINIMUM (RVSM) SAFETY POLICY

1. INTRODUCTION

This document, the AFI RVSM Safety Policy Document, sets out the Safety Policy and the Safety Objectives in order to guide the safe maintenance of the AFI RVSM system in the AFI Region.

The AFI RVSM Safety Policy Document is intended to provide a framework to facilitate the safety regulation process for the maintenance of AFI RVSM.

The AFI RVSM Safety Policy Document provides guidance to States to ensure that safety is continuously met, the aircraft approval process is effective, the target levels of safety are being met, operational errors do not increase and ATC procedures and equipment introduced to manage RVSM remain effective.

2. RVSM OPERATIONAL APPLICATION

The application of AFI RVSM is maintaining the safe vertical separation minimum of, 1000 FT, between adjacent State CAA RVSM Approved aircraft between the Flight Levels FL290 and FL410 inclusive. This provides six additional cruising levels to air traffic, increases the capacity of the Air Traffic Management system and facilitates the task of Air Traffic Services in maintaining a safe, orderly and expeditious flow of traffic. The additional capacity and system benefits of AFI RVSM shall, by facilitating the Air Traffic Control function, also continue to enhance safety benefits.

AFI RVSM shall be applied between State CAA RVSM approved aircraft within the confines of the designated AFI RVSM airspace. Therefore, all operators proposing to operate across the lateral limits of the AFI RVSM airspace shall be required to indicate on Filed Flight Plans their RVSM status i.e. W. Non-RVSM approved aircraft, other than bone fide State aircraft, shall not be permitted to operate within RVSM airspace. Non-RVSM approved State aircraft shall indicate on their Flight Plans, STS: Non RVSM.

Uninterrupted climb through AFI RVSM airspace to FL430 or above by non RVSM approved aircraft will be permitted.

Uninterrupted descent through AFI RVSM airspace from FL430 or above by non RVSM approved aircraft will be permitted

There will be no RVSM Transition Airspace within the AFI Region.

AFI RVSM requires that specific training of aircrew and ATC staff shall be performed to ensure safe RVSM operations. ATC equipment and procedures shall be maintained in such a way that they ensure the maintenance of safe AFI RVSM.

3. AFI RVSM SAFETY MAINTENANCE

This Safety Policy has been established to meet the requirements of ICAO Standards, Recommended Practices, Global best practices and guidance material on managing collision risk consequent to safe AFI RVSM operations.

The following statements define the AFI RVSM Safety Policy:

(i) AFI RVSM applies an explicit, pro-active approach to safety management in maintaining continued safe RVSM operations.

(ii) The responsibility of management for the safe performance of AFI RVSM is recognised. Each States RVSM Program Manager is responsible for the overall management of RVSM within the State. The RVSM National Program Manager is responsible for liaison with the Regulatory Authority and ARMA.

(iii) AFI RVSM shall be conducted in accordance with ICAO provisions, Global best practices and guidelines as applicable.

(iv) 100% of aircraft operating within the designated AFI RVSM airspace shall be RVSM approved excluding bone fide non approved State aircraft;

(v) AFI RVSM shall minimise the contribution to RVSM related incidents by maintaining a safe RVSM system as far as is reasonably practicable.

4. RVSM MAINTENANCE SAFETY OBJECTIVES

AFI RVSM shall not contribute to an increase in incidents or accidents by ensuring that:

(i) In accordance with ICAO SARP's the management of vertical collision risk within RVSM airspace shall meet the Target Level of Safety of 5×10^{-9} fatal accidents per flight hour;

(ii) In accordance with ICAO SARP's, the risk of mid-air collision in the vertical dimension within RVSM airspace, due to technical height keeping performance, shall meet a Target Level of Safety of 2.5×10^{-9} fatal accidents per flight hour.

5. RVSM SAFETY DELIVERABLES

5.1 Collision Risk Assessment

A Collision Risk Assessment (CRA) shall be carried out annually in order to provide the evidence that the collision risk in RVSM airspace meets the Target Level of Safety required by ICAO.

5.2 Safety Management System Plans

Each State shall ensure that their SMS plan appropriately addresses all RVSM System elements. These elements shall be made available during routine safety audits for review.

6 STATE RVSM NATIONAL MANAGER

The State RVSM National Manager shall facilitate the overall application and maintenance of RVSM in accordance with the AFI RVSM safety policy within the States area of responsibility.

Each State shall ensure that the ARMA has the most current contact details for the nominated State RVSM Manager.

---END---

RVSM MINIMUM DEFICIENCIES REPORTING LIST

REDUCED VERTICAL SEPARATION MINIMA (RVSM)								
1.	AFI/RAN 8 Rec. 5/21	No safety data		No contribution to CRA	CAAs/ACCs to periodically submit data to ARMA	Target date: 1/8/2011		
2.	Annex 6	No records of Approvals/ Withdrawals	2006	RVSM safety reduction in separation	RVSM Approvals/Withdrawals to be submitted to ARMA (F2, F3)	Target date: 1/8/2011		
3.	Annex 6	No or limited Height Monitoring	2006	No monitoring of ASE	CAAs to comply with Height Monitoring Plan	Target date: 1/8/2011		

Note: ICAO Council definition of a Deficiency:

A deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council, or with related ICAO Standards and Recommended Practices, and which situation has a negative impact on the safety, regularity and/or efficiency of international civil aviation.

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STATUS OF DEVELOPMENT OF CONTINGENCY PLANS IN THE AFI REGION

Status of Development of Contingency Plans in the AFI Region (February 2012)						
	State	**CP Submitted**	**Date Submitted**	**CP on APIRG Template**		**Remarks**
				Yes	**No**	
1.	Algeria	??				
2.	Angola	??				
3.	Benin	Yes		-	No	By ASECNA
4.	Botswana	Yes	Oct 2010	Yes	-	Under revision
5.	Burkina Faso	Yes		-	No	By ASECNA
6.	Burundi	No				
7.	Cameroun	Yes		-	No	By ASECNA
8.	Canary Islands (Spain)	??				
9.	Cape Verde	No				
10.	Central African Republic	Yes		-	No	By ASECNA
11.	Chad	Yes		-	No	By ASECNA
12.	Comoros	Yes		-	No	By ASECNA
13.	Congo	Yes		-	No	By ASECNA
14.	Cote D’Ivoire	Yes		-	No	By ASECNA
15.	D.R. Congo	No				
16.	Djibouti	No				
17.	Egypt	??				
18.	Equatorial Guinea	Yes		-	No	By ASECNA
19.	Eritrea	Yes	May 2010	Yes	-	
20.	Ethiopia	Yes	Aug 2003	-	No	
21.	Gabon	Yes		-	No	By ASECNA
22.	Gambia	No				
23.	Ghana	No				
24.	Guinea	Yes	Apr 2011	-	No	Roberts FIR
25.	Guinea-Bissau	Yes		-	No	By ASECNA
26.	Kenya	No				
27.	Lesotho	No				
28.	Liberia	Yes	Apr 2011	-	No	Roberts FIR
29.	Libya	No				

Status of Development of Contingency Plans in the AFI Region (February 2012)						
	State	CP Submitted	Date Submitted	CP on APIRG Template		Remarks
				Yes	No	
30.	Madagascar	Yes	Feb 2012	Yes	-	By State and ASECNA
31.	Malawi					
32.	Mali	Yes		-	No	By ASECNA
33.	Mauritania	Yes		-	No	By ASECNA
34.	Mauritius	Yes	Apr 2009	-	No	
35.	Morocco	??				
36.	Mozambique	No				
37.	Namibia	No				
38.	Niger	Yes		-	No	By ASECNA
39.	Nigeria	No				
40.	Reunion (France)	??				
41.	Rwanda	No				
42.	Sao Tome and Principe	No				
43.	Senegal	Yes		-	No	By ASECNA
44.	Seychelles	Yes	Apr 2009	-	No	
45.	Sierra Leon	Yes	Apr 2011	-	No	Roberts FIR
46.	Somalia	No				
47.	South Africa	Yes	Apr 2011	Yes	-	
48.	South Sudan	Yes	Sep 2011	Yes	-	By Sudan
49.	Sudan	Yes	Sep 2011	Yes	-	
50.	Swaziland	No				
51.	Tanzania	No				
52.	Togo	Yes		-	No	By ASECNA
53.	Tunisia	??				
54.	Uganda	No				
55.	Zambia	No				
56.	Zimbabwe	No				

--- END ---

AFI AIR TRAFFIC MANAGEMENT/METEOROLOGY (AFI ATM/MET) TASK FORCE

TERMS OF REFERENCE

1. Terms of Reference

1.1 Under guidance from ICAO Secretariat:

a) Evaluate the current and future requirements for MET in support of ATM in the AFI Region and update Regional Air Navigation Plan accordingly and provide guidance material to assist States to develop MET services to meet these requirements;

b) Assess aviation meteorological services, systems and architecture in the region and how they can integrate weather information into decision support tools;

c) Review and update the AFI Volcanic Ash Contingency Plan (VACP) and monitor VACP exercises;

d) Investigate sub-regional exchange of MET information and associated agreements that facilitate ATM operations particularly over busy routes that overlap different FIRs;

e) Promote coordination between MET and ATM communities in the AFI Region to enhance the level of understanding of MET requirements and capabilities in support of ATM;

f) Monitor global policy associated with source data and delivery of MET products for ATM;

g) Coordinate with MET/SG and ATM/AIS/SAR/SG on framework for contingency plan for specific phenomenon including volcanic ash, radioactive cloud, tropical cyclone and Tsunami with reference to developments made WMO scientific steering committee;

h) Report to the MET/SG Sub-group of APIRG for further co-ordination through the ICAO Secretariat with other relevant bodies.

1.2 The objective being to improve efficiency of ATM and airlines by providing tailored regional MET products needed to optimize flight routes in all weather conditions.

1.3 The Benefits will be to increase efficiency – save time and fuel as well as reduce carbon emissions.

2. Work Programme

2.1 The work to be addressed by the AFI ATM/MET Task Force includes:

a) Develop regional MET requirements for ATM by:

- conducting MET/ATM meetings (TF meetings, Seminars) to contribute in developing MET requirements for ATM;
- analyzing existing ATM/MET surveys and develop new surveys, when necessary, to determine regional ATM requirements for MET;
- recommending regional MET requirements for ATM to MET/SG Meetings;
- Determining regional MET requirements for ATM.

b) Developing methods to use weather information in decision support tools;

c) Review and update the AFI Volcanic Ash Contingency Plan (VACP) by:
- Regularly updating the VACP through new requirements from the IAVWOPSG
- Conducting annual VACP exercises or AFI ATM/MET Volcanic Ash Exercises (VAEX/AFI);
- reporting on annual VAEX/AFI to MET/SG meetings.

d) Develop sub-regional exchange of MET information to facilitate ATM operations by:
- Encouraging States develop agreements on the exchange of MET information that provides benefits to ATM operations on sub-regional level;
- Encouraging States report developments to MET/ATM TF and MET/SG meetings;
- Developing sub-regional exchange of MET information to facilitate ATM operations in busy routes.

e) Develop regional implementation plan for Meteorological Service for Terminal Area (MSTA) by:
- Monitoring developments of MSTA (pending approval at conjoint ICAO/WMO Divisional meeting 2014);
- Monitoring ICAO Annex 3 developments (requirements for MSTA);
- Developing regional implementation plan for MSTA ;
- Monitoring regional implementation of MSTA;
- Reporting implementation progress to MET/SG.
- Developing regional implementation plan for Meteorological Services for the Terminal Area.

f) Monitor global policies associated with source data and delivery of MET products for ATM by:
- monitoring global policies associated with source data and delivery of MET products for ATM ;
- reporting results to MET/SG meetings;
- monitor global policies associated with source data and delivery of MET products for ATM.

3. Composition

3.1 The Task Force is composed of experts from:

a) South Africa, Senegal, France, Kenya, Gambia and Morocco.

b) Representatives of VAAC Toulouse, ASECNA, IATA, IFALPA and WMO are expected to participate in the work of the Task Force.

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INTERNATIONAL CIVIL AVIATION ORGANIZATION

DRAFT VOLCANIC ASH CONTINGENCY PLAN

AFI REGION

First Edition - April 2011

THIS DOCUMENT IS ISSUED BY THE WACAF AND NAIROBI OFFICES OF ICAO
UNDER THE AUTHORITY OF THE APIRG

TABLE OF CONTENTS

FOREWARD

Within and adjacent to the Africa and Indian Ocean (AFI) Region there are areas of volcanic activities which are likely to affect flight in the AFI Region. The major volcanoes in the region are located in the following States: Algeria, Cameroon, Cape Verde Islands, Chad, Comoros Island, Democratic Republic of Congo, Djibouti, Eritrea, Ethiopia, France (Reunion Island), Kenya, Madagascar, Mali, Niger, Nigeria, Rwanda, Sao Tome and Principe, Spain (Canary Islands, Madeira), Sudan, Tanzania and Uganda. The names of the concerned volcano are listed in **Attachment F** (source: Smithsonian Institution).

The AFI Volcanic Ash Contingency Plan sets out standardised guidelines for the alerting of aircraft when eruptions occur, and procedures to be followed.

Volcanic ash is a hazard for flight operations. Recent encounters with volcanic ash have resulted in one or more of the following and other problems:

- Engine failures and malfunctions;
- Subsequent failure of electrical, pneumatical and hydraulic systems;
- Blocking of sensors, resulting inter alia in erroneous airspeed indications;
- Smoke, dust and/or chemical pollution of cabin air; resulting in the need for aircrews to use oxygen masks;
- Communication problems;
- Loss of visibility through cockpit windows.

Regulatory authorities of States of the Operator[1], or State of Registry [2]as appropriate, should therefore prescribe appropriate operational procedures for flight crew to be followed in case of operation in or near airspaces that are contaminated by volcanic ash. Operators are required by ICAO Annex 6 to assess the risk of operation in volcanic ash and to implement appropriate mitigation measures in accordance with their Safety Management System as approved by the State of the Operator.

It should be noted that this document is an air traffic management (ATM) contingency plan including its interfaces with supporting services such as MET and AIS and that the Plan therefore primarily addresses the Provider States[3]. Where distinct actions by the Meteorological Watch Offices (MWOs) are described, these are additional procedures to be considered by MWOs. Where actions by Volcanic Ash Advisory Centre (VAAC) and Aircraft Operators are described, these are for clarification only.

Volcanic Ash can also affect the operation of aircraft on aerodromes. In extreme cases, aerodromes might no longer be available for operation at all, resulting in repercussions on the Air Traffic Management systems; e.g. diversions, revised traffic flow, etc.

These suggested procedures are not intended to establish or confirm a safe level of ash concentration. Operation through any area where volcanic ash is forecast is at the discretion of the operator.

NOTE: *All modeled ash concentrations are subject to a level of uncertainty relative to errors in the estimation of the eruption strength.*

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[1] The term “State of the Operator” refers to the role of a Contracting State as the regulatory authority with regard to aircraft operators having been issued an Aircraft Operator’s Certificate (AOC) by that` State.

[2] The term “State of Registry” refers to the State on whose register the aircraft is entered.

[3] The term “Provider State” refers to the role of a Contracting State as responsible for the provision of air navigation services within airspace over its territory and, as agreed by Regional Air Navigation Meeting, within defined airspace over the High Seas.

Considering that a commercial aircraft will travel about 150 km (80 NM) in 10 minutes and that volcanic ash can rise to flight levels commonly used by turbine-engine aeroplanes in half that time, timely response to reports of volcanic ash is essential.

It is imperative that information on the volcanic activity is disseminated as soon as possible. In order to assist the staff in expediting the process in originating and issuing relevant messages (SIGMET, NOTAM, ASHTAM), a series of templates should be available for different stages of the volcanic activity. Examples of SIGMET, NOTAM and ASHTAM announcing volcanic activities in the different stages and operational measures are contained in **Attachment E**. ASHTAM is promulgated by service providers in the AFI Region, APIRG/16 Conclusion 16/52 refers.

A list of ICAO registered volcanoes should be available at the international NOTAM office with volcano name, number and nominal position. The volcanoes in the AFI region are listed in **Attachment F.**

In order to ensure the smooth implementation of the contingency plan in case of an actual volcanic eruption, annual AFI ATM/MET Task Force Volcanic Ash Exercises (VAEX/AFI) should be conducted.

Terminology

Area of Low Contamination: An airspace of defined dimensions where volcanic ash may be encountered at concentrations equal to or less than $2x10^{-3}$ g/m^3.

Area of Medium Contamination: An airspace of defined dimensions where volcanic ash may be encountered at concentrations greater than $2x10^{-3}$ g/m^3, but less than $4x10^{-3}$ g/m^3.

Area of High Contamination: An airspace of defined dimensions where volcanic ash may be encountered at concentrations equal to or greater than $4x10^{-3}$ g/m^3, or areas of contaminated airspace where no ash concentration guidance is available.

> *Note 1: Concentration areas are defined by the MET office co-located with the AFI VAAC: Toulouse MET Office.*
>
> *Note 2: "defined dimensions" refers to horizontal and vertical limits.*

The response to a volcanic event ***that affects air traffic*** has been divided into three distinct phases described briefly below. Volcanic activity at many locations is continuously monitored by the scientific community. Furthermore, flight crew are required to report observations of significant volcanic activity by means of a Special Air Report (Special AIREP). Arrangements are in place to ensure that such information is transferred without undue delay to the appropriate aeronautical institutions responsible for subsequent action:

ALERTING PHASE

The initial response, "***raising the alert***", commences when a volcanic eruption is expected. Alerting information will be provided by SIGMET, NOTAM or ASHTAM as appropriate and disseminated to affected aircraft in flight by the most expeditious means. In addition to the normal distribution list, the NOTAM/ASHTAM will be addressed to meteorological and volcanological agencies.

If it is considered that the event could pose a hazard to aviation, a Danger Area[4] will be declared by NOTAM around the volcanic source. Normally, clearances will not be issued through the Danger Area.

[4] Wherever this document discusses the possible establishment of Danger Areas, States are not prevented from establishing Restricted or Prohibited Areas over the sovereign territory of the State if considered necessary by the State concerned.

REACTIVE PHASE The Reactive Phase commences at the outbreak of the volcanic eruption and entrance of volcanic ash into the atmosphere and mainly pertains to aircraft in flight. A "***Start of eruption SIGMET***" will be issued and a Danger Area will be declared by NOTAM. Clearances will not be issued through the Danger Area.

PROACTIVE PHASE The Proactive Phase commences with the issuance of the first Volcanic Ash Advisory (VAA) and Volcanic Ash Graphic (VAG) after completion of reactive responses. Supplementary modelled ash concentration charts may be available. The volcanic ash forecasts up to T+18 hours are to be used to prepare SIGMET. SIGMET shall be issued as soon as practicable but not more than 12 hours before the commencement of the period of validity, and shall be valid for up to 6 hours. The T+12 hours and T+18 hours (and further into the future, if available) volcanic ash forecasts are to be used to prepare NOTAM/ASHTAM. Significant changes may result in a reversion to a temporary Reactive Phase situation and unscheduled issuance of VAA, VAG and ash concentration charts by Toulouse VAAC MET Office, SIGMET and NOTAM/ASHTAM. As appropriate, Danger Areas will be notified via NOTAM.

Note that where SIGMET and NOTAM are mentioned in this document, volcanic ash SIGMET and volcanic ash NOTAM are being referred to.

This document pays due respect to Standards and Recommended Practices in ICAO Annexes, WMO procedures, and guidance material contained in ICAO documents, including, but not limited to, the following:

ICAO Annex 3 – *Meteorological Services for International Air Navigation*; ICAO Annex 11 – *Air Traffic Services*; ICAO Annex 15 - *Aeronautical Information Services*; ICAO Doc 4444 – *Procedures for Air Navigation Services – Air Traffic Management;* ICAO Doc 8126 – *Aeronautical Information Services Manual*; ICAO Doc 8896 – *Manual of Aeronautical Meteorological Practice*; ICAO Doc 9691 – *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds*; ICAO Doc 9766 – *Handbook on the International Airways Volcanic Watch*; ICAO Doc 9859 – *Safety Management Manual*; ICAO AFI *SIGMET Guide*; and WMO No.386 Volume I (*Manual of Global Telecommunications System*) Part II (*Operational Procedures for the Global Telecommunications System*).

1. ALERTING PHASE

1.1 This phase is characterised by a limited availability of information on the extent and severity of the volcanic event. The purpose of this phase is to ensure the safety of aircraft in flight and to promulgate information as a matter of urgency. Regardless of the extent of information available the alerting phase actions should be carried out for every event.

1.2 **ORIGINATING AREA CONTROL CENTRE (ACC) ACTIONS** (eruption in its own flight information region (FIR))

1.2.1 In the event of significant pre-eruption volcanic activity, a volcanic eruption occurring, or a volcanic ash cloud being reported which could pose a hazard to aviation, an ACC, on receiving information of such an occurrence, should carry out the following actions:

a) Define an initial Danger Area in accordance with established procedures, or if no such procedures have been established the danger area should be defined as a circle with a radius of 222 km (120 NM). If the eruption has not commenced or if no information on upper winds is available, the circle should be centred on the estimated location of the volcanic activity. If the eruption has started and predicted upper wind information is available, the circle should be centred 111 km (60 NM) downwind from while enclosing the volcano. The purpose of this initial Danger Area is to ensure safety of flight in the absence of any prediction from a competent authority of the extent of contamination.

b) Advise the associated Meteorological Watch Office (MWO) and the appropriate Volcanic Ash Centre (VAAC) (unless the initial notification originated from either of these entities). The VAAC will then inform the appropriate ACCs.

c) Alert flights already within the Danger Area and offer assistance to enable aircraft to exit the area in the most expeditious and appropriate manner. Aircraft that are close to the Danger Area should be offered assistance to keep clear of the area. Tactically re-clear flights which would penetrate the Danger Area onto routes that will keep them clear. The ACC should immediately notify other affected ACC's of the event and the location and dimensions of the Danger Area. It should also negotiate any re-routings necessary for flights already coordinated but still within adjacent flight information regions (FIRs). It is also expected that adjacent ACCs will be asked to reroute flights not yet coordinated to keep them clear of the Danger Area.

d) Ensure that a NOTAM/ASHTAM is originated. This must provide as precise information as is available regarding the activity of the volcano. The name (where applicable), reference number and position of the volcano should be included along with the date and time of the start of the eruption (if appropriate). It is imperative that this information is issued by the international NOTAM office and disseminated as soon as possible.

e) In order to assist the staff in expediting the process of composing the NOTAM/ASHTAM, a series of templates should be available for this stage of the volcanic activity. Example NOTAM and ASHTAM are provided in **Attachment E**.

1.2.2 In addition to sending the NOTAM/ASHTAM and any subsequent NOTAM/ASHTAM to the normal distribution list, it will be sent to the relevant meteorological agencies after adding the appropriate World Meteorological Organization (WMO) header. Example NOTAM and ASHTAM are provided in **Attachment E.**

1.3 ADJACENT ACC ACTIONS

1.3.1 During the Alerting Phase aircraft should be tactically rerouted to avoid the Danger Area. Any ash contamination should be contained within a limited area and disruption to traffic should not be excessive. Adjacent ACCs should take the following action to assist:

a) When advised, re-clear flights to which services are being provided and which will be affected by the Danger Area.

b) Unless otherwise instructed, continue normal operations except:

   i) if one or more routes are affected by the Danger Area, stop clearing aircraft on these routes and take steps to reroute onto routes clear of the Danger Area; and

   ii) initiate a running plot of the affected area.

2. REACTIVE PHASE

2.1 This phase commences at the outbreak of volcanic eruption. Major activities of the Reactive Phase are: Issuance of an eruption commenced SIGMET, eruption commenced NOTAM/ASHTAM and rerouting of airborne traffic. As appropriate, Danger Areas will be notified via NOTAM. This phase will last until such time as the Proactive Phase can be activated.

2.2 ORIGINATING ACC ACTIONS (eruption in its own FIR)

2.2.1 The ACC providing services in the FIR within which the volcanic eruption takes place should inform flights about the existence, extent and forecast movement of volcanic ash and provide information useful for the safe conduct of flights.

2.2.2 Rerouting of traffic commences immediately or may be in progress if the alerting time has been sufficient to facilitate activation of the Alerting Phase. The ACC should assist in rerouting aircraft around the Danger Area as expeditiously as possible. Adjacent ACCs should also take the Danger Area into account and give similar assistance to aircraft as early as possible.

2.2.3 During this phase the ACC should:

a) Maintain close liaison with its associated MWO. The MWO should issue a SIGMET message on the extent and forecast movement of the ash cloud based on appropriate sources of information.

b) Ensure a NOTAM is originated to define a Danger Area.

c) Ensure that reported differences between published information and observations (pilot reports, airborne measurements, etc.) are forwarded as soon as possible to the appropriate authorities.

d) Should significant reductions in intensity of volcanic activity take place during this phase and the airspace no longer is contaminated by volcanic ash, a NOTAMC cancelling the last active NOTAM shall be issued stating the cause for cancellation; new ASHTAM should be promulgated to update the situation. Otherwise, begin planning for the Proactive Phase in conjunction with the affected ACCs.

2.3 ADJACENT ACC ACTIONS

2.3.1 During the Reactive Phase the adjacent ACCs should take the following action:

a) Maintain close liaison with the originating ACC to design, implement and keep up to date measures which will enable aircraft to remain clear of Danger Areas.

b) In the event that tactical measures are required, the adjacent ACC should, in cooperation with the originating ACC, impose such measures. .

c) Maintain a running plot of the affected area.

d) Begin planning for the Proactive Phase in conjunction with the appropriate ACCs concerned.

3. PROACTIVE PHASE

3.1 The Proactive Phase commences with the issuance of the first VAA/VAG by Toulouse VAAC after completion of the reactive responses. The VAA/VAG will contain forecasts of the expected vertical and horizontal extent of the volcanic ash cloud, and its expected movement, at six-hourly time-steps for the period T+0 to T+18 hours. In addition, the meteorological office co-located with the VAAC will issue ash concentration forecasts to supplement the VAA/VAG information, at six-hourly intervals with a nominal validity time of 0000Z, 0600Z, 1200Z and 1800Z which will define Areas of Low, Medium and High Contamination.

3.2 Following the Reactive Phase, the VAA/VAG and (where available) ash concentration forecasts should be used to define airspace volumes encompassing the furthest extent of contamination predicted for that period. These volumes should be used to:

a) publish NOTAM indicating the extent of Danger Areas, indicating which areas of contamination are included therein;

b) issue SIGMET warning of potential hazard from areas of volcanic ash contamination;

c) publish NOTAM to separately indicate the extent of Areas of Medium Contamination if not included in a Danger Area.

3.3 Longer term forecasts (i.e. beyond T+6 hours) should be used to generate NOTAM in order to ensure that adequate information is available to support flight planning. These messages should differentiate between levels of contamination.

3.4 Operators should use the information published regarding Areas of Low, Medium and High Contamination to plan their flights in accordance with their regulatory requirements and the service that will be provided in the airspace concerned. Operators should be aware that, depending on the State concerned, Danger Areas may be established to contain an Area of High Contamination, Areas of Medium/High Contamination, or Areas of Low/Medium/High Contamination.

3.5 The volcanic ash may affect any combination of airspace; therefore, it is impossible to prescribe measures to be taken for any particular situation. Nor is it possible to detail the actions to be taken by any particular ACC. The following guidance may prove useful during the Proactive Phase but should not be considered mandatory:

a) ACCs affected by the movement of the ash should continue to originate NOTAM/ASHTAM at appropriate intervals. ACCs concerned should continue to publish details on measures taken.

b) Depending on the impact of the volcanic ash, the appropriate ACC may take the initiative to organise teleconferences to exchange latest information on the developments with Toulouse VAAC, ANSPs and MWO's and operators concerned.

c) During this phase the VAAC should endeavour to assess the vertical extent of the ash contamination and provide appropriate VAA/VAG to define the contaminated airspace as accurately as possible. For the purpose of flight planning, operators should treat the horizontal and vertical limits of the Danger Area to be over-flown as they would mountainous terrain. Operators are cautioned regarding the risk of cabin depressurisation or engine failure resulting in the inability to maintain level flight above the Danger Area, especially where Extended Twin Operations (ETOPS) aircraft are involved.

d) Any reported differences between published information and observations (pilot reports, airborne measurements, etc.) should be forwarded as soon as possible to the appropriate authorities; and

e) When the airspace is no longer contaminated by volcanic ash, a NOTAMC cancelling the active NOTAM shall be promulgated. New ASHTAM should be promulgated to update the situation.

4. AIR TRAFFIC CONTROL PROCEDURES[5]

4.1 If volcanic ash is reported or forecast in the FIR for which the ACC is responsible, the following procedures should be followed:

a) relay all available information immediately to pilots whose aircraft could be affected to ensure that they are aware of the horizontal and vertical extent of the ash contamination;

b) if requested, suggest appropriate rerouting to assist flights to avoid areas of known or forecast ash contamination;

c) When appropriate, remind pilots that volcanic ash may not be detected by ATC radar systems;

d) If modelled ash concentration charts are available showing Areas of Low, Medium and High Contamination, the Provider State may establish Danger Areas. Depending on the State concerned, the Danger Areas will be established to contain an Area of High Contamination, Areas of Medium/High Contamination, or Areas of Low/Medium/High Contamination;

[5] This information is adapted from the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691). Refer to this document for full details.

e) In the absence of ash concentration guidance, the entire area of forecast volcanic ash should be considered as an Area of High Contamination, for the purposes of applying ATC procedures, until ash concentration guidance is available;

f) Normally, ATC should not provide a clearance for an aircraft to enter or operate within a Danger Area. Assistance to enable an aircraft to exit a Danger Area in the most expeditious and appropriate manner should be provided;

g) If the ACC has been advised by an aircraft that it has entered an area of ash contamination and indicates that a distress situation exists:

   i) consider the aircraft to be in an emergency situation;

   ii) do not initiate any climb clearances to turbine-powered aircraft until the aircraft has exited the area of ash contamination; and

   iii) do not attempt to provide vectors without pilot concurrence.

4.2 Experience has shown that the recommended escape manoeuvre for an aircraft which has encountered volcanic ash is to reverse its course and begin a descent (if terrain permits). However, the final responsibility for this decision rests with the pilot.

5. GENERAL GUIDANCE FOR THE DEVELOPMENT OF ATS CONTINGENCY PLANS FOR VOLCANIC ASH[6]

5.1 In a contingency plan relating to volcanic ash certain steps need to be taken to provide a coordinated and controlled response for dealing with an event of this nature. Responsibilities should be clearly defined for the manager in charge, supervisors and Air Traffic Controllers (ATCOs). The plan should also identify the officials who need to be contacted, the type of messages that are to be created, the proper distribution of the messages and how to conduct business.

5.2 ATCOs need to be trained and be made aware of the potential effects if aircraft encounter unsafe levels of volcanic ash.

5.3 Some particular points of guidance are as follows:

a) Volcanic ash clouds may extend for hundreds of miles horizontally and reach the stratosphere vertically;

b) Volcanic ash may block the pitot-static system of an aircraft, resulting in unreliable airspeed indications;

c) Braking conditions at airports where volcanic ash has recently been deposited on the runway will affect the braking ability of the aircraft. This is more pronounced on runways contaminated with wet ash. Pilots and ATCOs should be aware of the consequences of volcanic ash being ingested into the engines during landing and taxiing. For departure it is recommended that pilots avoid operating in visible airborne ash; instead they should allow sufficient time for the particles to settle before initiating a take-off roll, in order to avoid ingestion of ash particles into the engine. In addition, the movement area to be used should be carefully swept before any engine is started;

d) Volcanic ash may result in the failure or power loss of one or all engines of an aeroplane; and

[6] This information is adapted from the *Manual on Volcanic Ash, Radioactive Material and Toxic Chemical Clouds* (Doc 9691). Refer to this document for full details.

e) Airports might have to be declared unsafe for flight operations. This might have consequences for the ATM system.

5.4 The ACC serves as the critical communication link between the pilot, dispatcher and meteorologists during a volcanic eruption. During episodes of volcanic ash contamination within the FIR, the ACC has two major communication roles. First and of greatest importance is its ability to communicate directly with aircraft en route which may encounter the ash. Based on the information provided in the volcanic ash SIGMET and VAAs and working with MWO, the ATCOs should be able to advise the pilot of which flight levels are affected by the ash and the projected trajectory and drift of the contamination. Through the use of radio communication, ACCs have the capability to coordinate with the pilot alternative routes which would keep the aircraft away from the volcanic ash.

5.5 Similarly, through the origination of a NOTAM/ASHTAM for volcanic activity the ACC can disseminate information on the status and activity of a volcano even for pre-eruption increases in volcanic activity. NOTAM/ASHTAM and SIGMET together with special AIREPs are critical to dispatchers for flight planning purposes. Operators need as much advance notification as possible on the status of a volcano for strategic planning of flights and the safety of the flying public. Dispatchers need to be in communication with pilots en route so that a coordinated decision can be made between the pilot, the dispatcher and ATC regarding alternative routes that are available. It cannot be presumed, however, that an aircraft which is projected to encounter ash will be provided with the most desirable route to avoid the contamination. Other considerations have to be taken into account such as existing traffic levels on other routes and the amount of fuel reserve available for flights which may have to be diverted to other routes to allow for the affected aircraft to divert.

5.6 The NOTAM/ASHTAM for volcanic activity provide information on the status of activity of a volcano when a change in its activity is, or is expected to be, of operational significance. They are originated by the ACC and issued through the respective international NOTAM office based on the information received from any one of the observing sources and/or advisory information provided by the Toulouse VAAC. In addition to providing the status of activity of a volcano, the NOTAM/ASHTAM also provides information on the location, extent and movement of the ash contamination and the air routes and flight levels affected. NOTAM can also be used to limit access to the airspace affected by the volcanic ash. Complete guidance on the issuance of NOTAM and ASHTAM is provided in Annex 15 — *Aeronautical Information Services*. Included in Annex 15 is a volcano level of activity colour code chart. The colour code chart alert may be used to provide information on the status of the volcano, with "red" being the most severe, i.e. volcanic eruption in progress with an ash column/cloud reported above flight level 250, and "green" at the other extreme being volcanic activity considered to have ceased and volcano reverted to its normal pre-eruption state. It is very important that NOTAM for volcanic ash be cancelled and ASHTAM be updated as soon as the volcano has reverted to its normal pre-eruption status, no further eruptions are expected by volcanologists and no ash is detectable or reported from the FIR concerned.

5.7 It is essential that the procedures which the ACC personnel, including supporting services such as MET and AIS should follow during a volcanic eruption/ash cloud event described in the foregoing paragraphs are translated into the local staff instructions (adjusted as necessary to take account of local circumstances). It is also essential that these procedures/instructions form part of the basic training for all MET, ATS and AIS personnel whose jobs would require them to take action in accordance with the procedures. Background information to assist the ACC or Flight Information Centre (FIC) in maintaining an awareness of the status of activity of volcanoes in their FIR(s) is provided in the ICAO monthly International Airways Volcano Watch (IAVW) website at: http://www2.icao.int/en/anb/met-aim/met/iavwopsg/Pages/default.aspx under Worldwide Weekly Volcanic Activity Reports webpage. The major AFI volcanoes are listed in **Attachment F**.

ATTACHMENT A - ANTICIPATED PILOT ISSUES WHEN ENCOUNTERING VOLCANIC ASH

1. Air Traffic Controllers (ATCOs) should be aware that flight crews will be immediately dealing with some or all of the following issues when they encounter volcanic ash:

a) smoke or dust appearing in the cockpit which may prompt the flight crew to don oxygen masks (could interfere with the clarity of voice communications);

b) acrid odour similar to electrical smoke;

c) multiple engine malfunctions, such as stalls, increasing Exhaust Gas Temperature (EGT), torching, flameout, and thrust loss causing an immediate departure from assigned altitude;

d) on engine restart attempts, engines may accelerate to idle very slowly, especially at high altitudes (could result in inability to maintain altitude or Mach number);

e) at night, St. Elmo's fire/static discharges may be observed around the windshield, accompanied by a bright orange glow in the engine inlet(s);

f) possible loss of visibility due to cockpit windows becoming cracked or discoloured, due to the sandblast effect of the ash;

g) cockpit windows could be rendered completely opaque; and/or

h) sharp distinct shadows cast by landing lights as compared to the diffused shadows observed in clouds (this affects visual perception of objects outside the aircraft).

2. Simultaneously, ATC can expect pilots to be executing contingency procedures. This may include a possible course reversal and/or an emergency descent.

ATTACHMENT B - ACTION TAKEN BY METEOROLOGICAL WATCH OFFICES (MWO) IN THE EVENT OF A VOLCANIC ERUPTION[7]

[7] This information is adapted from the *Handbook on the International Airways Volcano Watch (IAVW)* (Doc 9766). Refer to this document for full details.

1. On receipt of information of a volcanic eruption and/or the existence of volcanic ash, the MWO will:

a) Notify, if necessary, the AFI VAAC (Toulouse) designated to provide VAA/VAG for the FIR for which the MWO is responsible that a volcanic eruption and/or ash has been reported. In the event that the MWO becomes aware, from a source other than an ACC, of the occurrence of pre-eruption activity, a volcanic eruption or ash from any other source , the information will be passed with all available relevant details on the extent, forecast movement and concentration of volcanic ash immediately to the ACC and to the designated VAAC;

b) Reported differences between ash encounters by aircraft and the information published in VAA/VAG, SIGMET or NOTAM/ASHTAM received by an ACC shall be made available as soon as possible to the respective MWO, preferably in the form of an AIREP. The MWO will relay the information to the respective originators of the published information;

c) Notify adjacent MWOs designated to provide SIGMET that a volcanic eruption and/or ash cloud has been reported, provide available relevant details on the extent, forecast movement and (if known) concentration of volcanic ash. In the event that any other MWO becomes aware of the occurrence of volcanic ash cloud from any source other than the VAAC, the information should be passed immediately to the VAAC and any adjacent MWO(s) downstream of the moving ash cloud;

d) As soon as practicable, advise the ACC and the VAAC whether or not the volcanic ash is identifiable from satellite images/data, ground based or airborne measurements or other relevant sources;

e) Issue SIGMET relating to the horizontal and vertical extent of volcanic ash cloud and its expected movement (provided in the VA from Toulouse VAAC) for a validity period of up to 6 hours. The SIGMET shall include an observed (or forecast) position of the ash cloud at the *start* of the period of validity, and a forecast position at the *end* of the period of validity. The SIGMET should be based on the advisory information provided by the VAAC. Include in the SIGMET distribution list the two Regional OPMET Databanks (RODBs) in Dakar and Johannesburg (Pretoria RODB). As well as inter-regional distribution, the RODBs will ensure dissemination of the SIGMET to ~~all~~ the VAAC, the London World Area Forecast Centre (WAFC) and the AFI Bulletin Compiling Centres (BCC);

f) provide information to assist with the origination of NOTAM by ACCs and maintain continuous coordination with ACCs, adjacent MWOs and the VAAC concerned to ensure consistency in the issuance and content of SIGMET and NOTAM/ASHTAM; and

g) provide, if possible, regular volcanic briefings, based on the latest available ash observations and forecasts, to ACCs, Airport Operators and aircraft operators concerned, giving an outlook for beyond T+12 hours.

ATTACHMENT C - ACTION TO BE TAKEN BY THE AFI VAAC IN THE EVENT OF A VOLCANIC ERUPTION[8]

1. On receipt of information from a MWO or any other source, of significant pre-eruptive/eruption activity and/or a volcanic ash cloud observed, the VAAC should:

a) Initiate the volcanic ash computer trajectory/dispersal model in order to provide advisory information on volcanic ash trajectory to MWOs, ACCs and operators concerned;

b) Review satellite images/data and any available pilot reports of the area for the time of the event to ascertain whether a volcanic ash cloud is identifiable and, if so, its extent and movement;

c) Prepare and issue advisories on the extent, and forecast trajectory, of the volcanic ash contamination in message format for transmission to the MWOs, ACCs and operators concerned in the VAAC area of responsibility, and to the two Regional OPMET Data Banks (RODB) in Dakar and Pretoria. As well as inter-regional distribution, the RODBs will ensure dissemination of the advisory to all VAACs, the London World Area Forecast Centre (WAFC);

d) Monitor subsequent satellite information or other available observations to assist in tracking the movement of the volcanic ash;

e) Continue to issue advisory information (i.e. VAA/VAG), for validity periods T+0, T+6, T+12 and T+18 hours after data time, to MWOs, ACCs and operators concerned at least at 6 hour intervals, and preferably more frequently, until such time as it is considered that the volcanic ash is no longer identifiable from satellite data, no further reports of volcanic ash are received from the area and no further eruptions of the volcano are reported; and

f) Maintain regular contact with other VAACs and meteorological offices concerned, and, as necessary, the Smithsonian Institute Global Volcanism Network, in order to keep up to date on the activity status of volcanoes in the VAAC area of responsibility.

[8] This information is adapted from the *Handbook on the International Airways Volcano Watch (IAVW)* (Doc 9766). Refer to this document for full details.

ATTACHMENT D - PROCEDURES FOR THE PRODUCTION OF MODELLED ASH CONCENTRATION CHARTS

1. The following procedures are to be applied by the meteorological office of a Provider State, having accepted, by regional air navigation agreement, the responsibility for providing a VAAC within the framework of the International Airways Volcano Watch (IAVW).

2. All VAA and VAG information issued by a meteorological office under designation as a VAAC within the framework of the IAVW shall be prepared in accordance with ICAO provisions.

3. Additionally, where feasible, the meteorological office may issue modelled ash concentration charts and corresponding coordinate data files at 6-hourly intervals showing the different ash concentrations for the validity periods T+0, T+6, T+12 and T+18 hours after data time. These charts will show forecast ash distribution in terms of Areas of Low, Medium and High Contamination and be published at the same time, and with the same validity periods, as the VAA/VAG described above. Updated charts and data files should be distributed prior to the end of the validity time of those previously distributed.

4. These data may be used by Provider States to prepare SIGMET, NOTAM/ASHTAM and to establish Danger Areas as appropriate.

ATTACHMENT E - EXAMPLE SIGMET, NOTAM, ASHTAM

Guidance on WMO headers referred to in Alerting Phase, paragraph 1.2.2 refers can be found in WMO No.386 Volume I (*Manual of Global Telecommunications System)* Part II *(Operational Procedures for the Global Telecommunications System)*

NOTAM Offices are reminded that ASHTAM (or NOTAM for volcanic ash) should be distributed via AFTN to their associated MWO, the SADIS Gateway and all the VAAC, in accordance with guidelines contained in ICAO Doc 9766 Chapter 4 paragraph 4.3.

1. SIGMET

```
WVUK02 EGRR 180105
EGGX SIGMET 2 VALID 180105/180705 EGRR-
EGGX SHANWICK OCEANIC FIR VA ERUPTION MT KATLA PSN N6337
W01901 VA CLD OBS AT 0100Z N6100 W02730 - N6100 W02230 - N5800
W01730 - N5630 W02000 FL200/350 MOV SE 35KT FCST 0705Z VA CLD
APRX N5800 W02000 - N5730 W01200 - N5500 W00910 - N5430 W01530
- N5800 W02000=
```

Note: PSN replaces LOC as per Amendment 75 to Annex 3 (applicable 18 November 2010)

2. NOTAM alerting pre-eruptive activity

```
(A0777/10NOTAMN
Q) BIRD/QWWXX/IV/NBO/W/000/999/6337N01901WXXX
A) BIRD B) 1002260830 C) 1002261100  E) INCREASED VOLCANIC
ACTIVITY, POSSIBLY INDICATING IMMINENT ERUPTION, REPORTED FOR
VOLCANO KATLA 1702-03 6337.5N01901.5W ICELAND-S. VOLCANIC
ASHCLOUD IS EXPECTED TO REACH 50,000 FEET FEW MINUTES FROM
START OF ERUPTION.AIRCRAFT ARE REQUIRED TO FLIGHT PLAN TO
REMAIN AT LEAST XXXNM CLEAR OF VOLCANO AND MAINTAIN WATCH FOR
NOTAM/SIGMET FOR AREA.
F) GND G) UNL)
```

Note: XXX is a distance established by the Provider State in accordance with paragraph 1.2.1 a)

3. NOTAM establishing Danger Area after initial eruption

```
(A0778/10 NOTAMR A0777/10
Q) BIRD/QWWXX/IV/NBO/W/000/999/6337N01901WXXX
A) BIRD
B) 1002260900 C) 1002261200
E) VOLCANIC ERUPTION REPORTED IN VOLCANO KATLA 1702-03
6337.5N01901.5W ICELAND-S. VOLCANIC ASHCLOUD REPORTED REACHING
FL500. AIRCRAFT ARE REQUIRED TO REMAIN AT LEAST XXXNM CLEAR OF
VOLCANO AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR BIRD AREA.
F) GND G) UNL)
```

Note: XXX is a distance established by the Provider State in accordance with paragraph 1.2.1 a)

4. NOTAM establishing Danger Area to include Area of High [or High/Medium or High/Medium/Low] Contamination

```
(A0503/10 NOTAMN
Q)EGGN/QWWXX/IV/NBO/AE/000/350
A) EGPX B) 1005182300 C) 1005190500
E) TEMPORARY DANGER AREA HAS BEEN ESTABLISHED FOR VOLCANIC ASH
AREA OF HIGH CONTAMINATION IN AREA 5812N00611W 5718N00216W
5552N00426W 5629N00652W
F) SFC
G) FL350)
```

5. NOTAM to define Area of Medium Contamination for which a Danger Area has not been established

```
(A0207/10 NOTAMN
Q) EUEC/QWWXX/IV/AE/000/200
A) EIAA B) 1005190700 C) 1005191300
E) VOLCANIC ASH AREA OF MEDIUM CONTAMINATION FORECAST IN AREA
5243N00853W 5330N00618W 5150N00829W
F) SFC
G) FL200)
```

6. ASHTAM alerting pre-eruptive activity

```
VALI0021 LIRR  01091410
ASHTAM 005/10
A) ROMA FIR B) 01091350 C) ETNA 101-06 D) 3744N01500E
E) YELLOW ALERT
J) VULCANOLOGICAL AGENCY
```

7. ASHTAM alerting eruptive activity

```
VALI0024 LIRR  01151800
ASHTAM 015/10
A) ROMA FIR B) 01151650 C) ETNA 101-06 D) 3744N01500E
E) RED ALERT F) AREA AFFECTED 3700N01500E 3900N01600E
3800N001700W SFC/35000FT  G) NE H) ROUTES AFFECTED WILL BE
NOTIFIED BY ATC  J) VULCANOLOGICAL AGENCY
```

8. ASHTAM alerting reduction in eruptive activity

```
VALI0035 LIRR  01300450
ASHTAM 025/10
A) ROMA FIR B) 01300350 C) ETNA 101-06 D) 3744N01500E
E) YELLOW ALERT FOLLOWING ORANGE J) VULCANOLOGICAL AGENCY
```

ATTACHMENT F – MAJOR VOLCANOES IN THE AFI REGION

	MAJOR VOLCANOES IN THE AFI REGION			
	Volcano Name	**Volcano Type**	**Volcano Status**	**Location**
1	TAHALRA VOLCANIC FIELD	Pyroclastic cones	Holocene	Algeria
2	ATAKOR VOLCANIC FIELD	Scoria cones	Holocene	Algeria
3	MANZAZ VOLCANIC FIELD	Scoria cones	Holocene	Algeria
4	IN EZZANE VOLCANIC FIELD	Volcanic field	*Holocene*	Algeria-Niger border
5	CAMEROON	Stratovolcano	Historical	Cameroon
6	TOMBEL GRABEN	Cinder cones	Holocene	Cameroon
7	MANENGOUBA	Stratovolcano	*Holocene*	Cameroon
8	OKU VOLCANIC FIELD	Stratovolcano	*Holocene*	Cameroon
9	NGAOUNDERE PLATEAU	Volcanic field	*Holocene*	Cameroon
10	LA PALMA	Stratovolcanoes	Historical	Canary Islands
11	HIERRO	Shield volcano	Radiocarbon	Canary Islands
12	TENERIFE	Stratovolcano	Historical	Canary Islands
13	GRAN CANARIA	Fissure vents	Radiocarbon	Canary Islands
14	FUERTEVENTURA	Fissure vents	Holocene	Canary Islands
15	LANZAROTE	Fissure vents	Historical	Canary Islands
16	FOGO	Stratovolcano	Historical	Cape Verde Islands
17	BRAVA	Stratovolcano	Holocene	Cape Verde Islands
18	SAO VICENTE	Stratovolcano	Holocene	Cape Verde Islands
19	TARSO TOH	Volcanic field	Holocene	Chad
20	TARSO TOUSSIDE	Stratovolcano	Holocene	Chad
21	TARSO VOON	Stratovolcano	Fumarolic	Chad
22	EMI KOUSSI	Pyroclastic shield	Holocene	Chad
23	LA GRILLE	Shield volcano	Holocene	Comore Island
24	KARTHALA	Shield volcano	Historical	Comore Island
25	KARISIMBI	Stratovolcano	Potassium-Argon	Democratic Republic Congo-Rwanda border
26	VISOKE	Stratovolcano	Historical	Democratic Republic Congo-Rwanda border
27	MAY-YA-MOTO	Fumarole field	Fumarolic	Democratic Republic of Congo
28	NYAMURAGIRA	Shield volcano	Historical	Democratic Republic of Congo
29	NYIRAGONGO	Stratovolcano	Historical	Democratic Republic of Congo
30	TSHIBINDA	Cinder cones	Holocene	Democratic Republic of Congo
31	ARDOUKOBA	Fissure vents	Historical	Djibouti
32	GARBES	Fumarole field	*Pleistocene-*	Djibouti
33	BOINA	Fumarole field	*Pleistocene-*	Djibouti-Ethiopia border
34	JALUA	Stratovolcano	Holocene	Eritrea
35	ALID	Stratovolcano	Holocene	Eritrea
36	DUBBI	Stratovolcano	Historical	Eritrea
37	NABRO	Stratovolcano	*Holocene?*	Eritrea
38	ASSAB VOLCANIC FIELD	Volcanic field	Holocene	Eritrea
39	GUFA	Volcanic field	Holocene	Eritrea-Djibouti border
40	DALLOL	Explosion craters	Historical	Ethiopia
41	GADA ALE	Stratovolcano	Holocene	Ethiopia
42	ALU	Fissure vents	Holocene	Ethiopia
43	DALAFFILLA	Stratovolcano	Historical	Ethiopia
44	BORALE ALE	Stratovolcano	Holocene	Ethiopia
45	ERTA ALE	Shield volcano	Historical	Ethiopia
46	ALE BAGU	Stratovolcano	Holocene	Ethiopia
47	HAYLI GUBBI	Shield volcano	Holocene	Ethiopia
48	ASAVYO	Shield volcano	Holocene	Ethiopia
49	MAT ALA	Shield volcano	Holocene	Ethiopia
50	TAT ALI	Shield volcano	Holocene	Ethiopia
51	BORAWLI	Stratovolcano	Holocene	Ethiopia
52	AFDERA	Stratovolcano	*Holocene?*	Ethiopia
53	MA ALALTA	Stratovolcano	Holocene	Ethiopia
54	ALAYTA	Shield volcano	Historical	Ethiopia
55	DABBAHU	Stratovolcano	Historical	Ethiopia

MAJOR VOLCANOES IN THE AFI REGION				
	Volcano Name	**Volcano Type**	**Volcano Status**	**Location**
56	DABBAYRA	Shield volcano	Holocene	Ethiopia
57	MANDA HARARO	Shield volcanoes	Historical	Ethiopia
58	GROPPO	Stratovolcano	Holocene	Ethiopia
59	KURUB	Shield volcano	Holocene	Ethiopia
60	MANDA GARGORI	Fissure vents	Anthropology	Ethiopia
61	BORAWLI	Lava domes	Holocene	Ethiopia
62	DAMA ALI	Shield volcano	Historical	Ethiopia
63	GABILLEMA	Stratovolcano	Holocene	Ethiopia
64	YANGUDI	Complex volcano	Holocene	Ethiopia
65	AYELU	Stratovolcano	Holocene	Ethiopia
66	ADWA	Stratovolcano	Holocene	Ethiopia
67	HERTALI	Fissure vent	Holocene	Ethiopia
68	LIADO HAYK	Maars	*Holocene?*	Ethiopia
69	DOFEN	Stratovolcano	Holocene	Ethiopia
70	FENTALE	Stratovolcano	Historical	Ethiopia
71	BERU	Volcanic field	Holocene	Ethiopia
72	KONE	Calderas	Historical	Ethiopia
73	UNNAMED	Pyroclastic cones	Holocene	Ethiopia
74	BOSET-BERICHA	Stratovolcanoes	Holocene	Ethiopia
75	BISHOFTU VOLCANIC FIELD	Fissure vents	Holocene	Ethiopia
76	UNNAMED	Fissure vents	Holocene	Ethiopia
77	SODORE	Pyroclastic cones	Holocene	Ethiopia
78	GEDAMSA	Caldera	Holocene	Ethiopia
79	BORA-BERICCIO	Pumice cones	Holocene	Ethiopia
80	TULLU MOJE	Pumice cone	Anthropology	Ethiopia
81	UNNAMED	Fissure vents	Holocene	Ethiopia
82	EAST ZWAY	Fissure vents	Holocene	Ethiopia
83	BUTAJIRI-SILTI FIELD	Fissure vents	Holocene	Ethiopia
84	ALUTU	Stratovolcano	Radiocarbon	Ethiopia
85	O'A CALDERA	Caldera	Holocene	Ethiopia
86	CORBETTI CALDERA	Caldera	Holocene	Ethiopia
87	BILATE RIVER FIELD	Maars	Holocene	Ethiopia
88	TEPI	Shield volcano	Holocene	Ethiopia
89	HOBICHA CALDERA	Caldera	*Holocene?*	Ethiopia
90	CHIRACHA	Stratovolcano	*Holocene?*	Ethiopia
91	TOSA SUCHA	Cinder cones	Holocene	Ethiopia
92	UNNAMED	Cinder cones	Holocene	Ethiopia
93	KORATH RANGE	Tuff cones	*Holocene?*	Ethiopia
94	MALLAHLE	Stratovolcano	*Holocene?*	Ethiopia/Eritrea
95	SORK ALE	Stratovolcano	*Holocene?*	Ethiopia/Eritrea
96	MANDA-INAKIR	Fissure vents	Historical	Ethiopia-Djibouti border
97	MOUSA ALLI	Stratovolcano	Holocene	Ethiopia-Eritrea-Djibouti border
98	MEGA BASALT FIELD	Pyroclastic cones	Holocene	Ethiopia-Kenya border
99	NORTH ISLAND	Tuff cones	Holocene	Kenya
100	CENTRAL ISLAND	Tuff cones	Holocene	Kenya
101	SOUTH ISLAND	Stratovolcano	Historical	Kenya
102	MARSABIT	Shield volcano	*Holocene?*	Kenya
103	THE BARRIER	Shield volcano	Historical	Kenya
104	NAMARUNU	Shield volcano	Tephrochronology	Kenya
105	SEGERERUA PLATEAU	Pyroclastic cones	Holocene	Kenya
106	EMURUANGOGOLAK	Shield volcano	Radiocarbon	Kenya
107	SILALI	Shield volcano	Ar/Ar	Kenya
108	PAKA	Shield volcano	Ar/Ar	Kenya
109	BOGORIA	Shield volcano	*Pleistocene-Geysers*	Kenya

MAJOR VOLCANOES IN THE AFI REGION

	Volcano Name	Volcano Type	Volcano Status	Location
110	KOROSI	Shield volcano	Holocene	Kenya
111	OL KOKWE	Shield volcano	Holocene	Kenya
112	NYAMBENI HILLS	Shield volcano	Holocene	Kenya
113	MENENGAI	Shield volcano	Tephrochronology	Kenya
114	HOMA MOUNTAIN	Complex volcano	Holocene	Kenya
115	ELMENTEITA BADLANDS	Pyroclastic cones	Holocene	Kenya
116	OL DOINYO EBURRU	Complex volcano	Holocene	Kenya
117	OLKARIA	Pumice cones	Radiocarbon	Kenya
118	LONGONOT	Stratovolcano	Anthropology	Kenya
119	SUSWA	Shield volcano	Holocene	Kenya
120	CHYULU HILLS	Volcanic field	Anthropology	Kenya
121	HARUJ	Volcanic field	Holocene	Libya
122	WAU-EN-NAMUS	Caldera	*Holocene?*	Libya
123	AMBRE-BOBAOMBY	Volcanic field	Holocene	Madagascar
124	NOSY-BE	Cinder cones	Holocene	Madagascar
125	ANKAIZINA FIELD	Cinder cones	Holocene	Madagascar
126	ITASY VOLCANIC FIELD	Scoria cones	Radiocarbon	Madagascar
127	ANKARATRA FIELD	Cinder cones	Holocene	Madagascar
128	MADEIRA	Shield volcano	Radiocarbon	Madeira
129	TIN ZAOUATENE VOLCANIC FIELD	Volcanic field	Holocene	Mali
131	TODRA VOLCANIC FIELD	Cinder cones	Holocene	Niger
132	BIU PLATEAU	Volcanic field	*Holocene?*	Nigeria
133	PITON DE LA FOURNAISE	Shield volcano	Historical	Reunion Island
134	SAO TOME	Shield volcano	*Holocene?*	Sao Tome and Principe
135	JEBEL MARRA	Volcanic field	Radiocarbon	Sudan
136	KUTUM VOLCANIC FIELD	Scoria cones	*Holocene?*	Sudan
137	MEIDOB VOLCANIC FIELD	Scoria cones	Holocene	Sudan
138	BAYUDA VOLCANIC FIELD	Cinder cones	Radiocarbon	Sudan
139	JEBEL UMM ARAFIEB	Shield volcano	*Holocene?*	Sudan
140	OL DOINYO LENGAI	Stratovolcano	Historical	Tanzania
141	KILIMANJARO	Stratovolcano	Holocene	Tanzania
142	MERU	Stratovolcano	Historical	Tanzania
143	IGWISI HILLS	Tuff cones	Holocene	Tanzania
144	UNNAMED	Pyroclastic cone	Holocene	Tanzania
145	SW USANGU BASIN	Lava domes	Holocene	Tanzania
146	NGOZI	Caldera	Radiocarbon	Tanzania
147	IZUMBWE-MPOLI	Pyroclastic cones	Holocene	Tanzania
148	RUNGWE	Stratovolcano	Radiocarbon	Tanzania
149	KYEJO	Stratovolcano	Historical	Tanzania
150	FORT PORTAL	Tuff cones	Radiocarbon	Uganda
151	KYATWA	Tuff cones	*Holocene?*	Uganda
152	KATWE-KIKORONGO	Tuff cones	Holocene	Uganda
153	BUNYARUGURU	Maars	Holocene	Uganda
154	KATUNGA	Tuff cone	Holocene	Uganda
155	BUFUMBIRA	Cinder cones	*Holocene?*	Uganda
156	MUHAVURA	Stratovolcano	Holocene	Uganda-Rwanda border

--- END ---

AFI STRATEGY FOR THE IMPLEMENTATION OF NEW ICAO FLIGHT PLAN FORMAT AND SUPPORTING ATS MESSAGES

Recognizing that:

The Global Air Traffic Management Operational Concept (Doc 9854) requires information management arrangements that provide accredited, quality-assured and timely information to be used to support ATM operations;

ATM Requirement 87 in the Manual of Air Traffic Management System Requirements (Doc 9882) provides that 4-D trajectories be used for traffic synchronization applications to meet ATM system performance targets, explaining that automation in the air and on the ground will be used fully in order to create an efficient and safe flow of traffic for all phases of flight;

The amended ICAO Flight Plan and associated ATS Message formats contained in Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, applicable 15 November 2012) have been formulated to meet the needs of aircraft with advanced capabilities and the evolving requirements of automated air traffic management systems;

The complexities inherent in automated computer systems preclude the adoption of a single regional implementation date and transitions to the new flight plan format will therefore occur in accordance with the declared transition period described in this document.

All States shall implement all provisions of Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, applicable 15 November 2012).

APIRG/17 established the AFI FPLT TF under Decision 17/61 to facilitate and guide the transition and implementation.

The AFI implementation of Amendment 1 to the PANS-ATM shall:

a) Ensure that all States and airspace users implement all the provisions of Amendment 1 from 15 November 2012, not just selected aspects of the Amendment;

b) Acknowledge that States, having taken all practical efforts to fully implement all the Amendment 1 provisions in accordance with guidelines, are obliged, in event of any non-implemented provisions, to inform ICAO about the “significant difference” in accordance with established ICAO procedures by 30 June 2011 and publish such difference in their State AIPs. However, that such action may not be taken before interested stakeholders including international organizations have been given an opportunity to intervene in pre-empting the “significant difference.”

Note: *The “significant difference” in this context does not relate to Standards and the obligation imposed by Article 38 of the Convention. It however, relates to provisions of Annex 15 to the Convention, inter alia, under section 4.1 thereof, regarding publication of significant differences between State practices and SARPs and procedures.*

c) Ensure that, from 15 November 2012, all States and airspace users accept and disseminate the 'NEW' flight plan and associated ATS message formats only, and transmission of 'PRESENT' flight plan is forthwith discontinued.

Note: *In the context of the implementation, 'PRESENT' refers to the existing flight planning and ATS message formats as defined in the current version of the PANS-ATM and 'NEW' refers to the amended provisions as contained in Amendment 1 to the PANS-ATM.*

The AFI transition to the PANS-ATM Amendment 1 provisions shall:

a) Comply with the regional guidance provided by APIRG's FPLT TF;

b) Preserve global consistency in implementation by basing implementation activities, to the extent possible, on Guidelines 1 to 6 as described in the ICAO guidance material circulated under cover of State Letter AN 13/2.1-09/9, dated 6 February 2009;

c) Ensure that the FPLT TF undertakes coordination to facilitate harmonization with implementation in neighbouring regions;

d) Ensure that State specific constraints are reduced, if not eliminated;

e) Declare a transition period from 1 January 2012 until 14 November 2012, comprising;

- 1 January to 31 March 2012 - ANSPs software delivery and internal testing,
- 1 April to 30 June 2012 – ANSPs implementation, and
- 1 July to 14 November 2012 at 23:59 – airspace users testing and implementation.

f) Encourage States:

- To commence with implementation process as soon as practical, and not await the transition period;
- Not to implement 'NEW' capability before the commencement of the ANSPs external testing and implementation period;
- Insofar as possible, to complete ANSP implementation of 'NEW' capability by the end of the ANSP's external testing and implementation period.

g) Recognizing the risk to automated systems of having all airspace users simultaneously commencing 'NEW' on the common implementation date (15 November 2012), encourage users to take full advantage of the airspace users testing and implementation period to ensure operational readiness of flight planning systems;

h) Encourage States (ANSPs) and airspace users to coordinate appropriate implementation methodologies in order to ensure a staggered migration of airspace users to 'NEW' during the airspace users testing and implementation period (i.e. 1 July – 14 November 2012);

i) Encourage States (ANSPs) and airspace users to immediately commence preparations to implement Amendment 1 provisions in accordance with the declared transition period and report progress to the Regional Offices quarterly (i.e., January, April, July and September);

j) Require States to keep the Regional Offices updated on ~~of~~ scheduled transition dates;

k) Require States to make necessary preparations in order to accommodate up to 120 hours prior to Estimated Off Blocks Time (EOBT) as of 15 November 2012; and

l) Require that States retain capability to simultaneously support 'PRESENT' and 'NEW' provisions (flight plan and ATS message format) from the activation of their 'NEW' capabilities until the end of the transition period (i.e. until and inclusive of 14 November 2012), at which point transmission of 'PRESENT' shall be discontinued.

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AFI FLIGHT PLAN TRANSITION TASK FORCE (FPLT TF)

TERMS OF REFERENCE

Terms of reference:

1) Conduct a comprehensive review of Amendment 1 to the Fifteenth Edition of the PANS ATM (Doc 4444, effective 15 November 2012) in order to identify, study and address implementation complexities arising from the adoption of amended PANS ATM Chapter 4, Chapter 11, Appendix 2 and Appendix 3 provisions relating to the ICAO Flight Plan and associated ATS Message formats;

2) Collect and analyze information on the status of AFI ANSP flight plan processing systems including ongoing upgrades to such systems;

3) On the basis of the above, and in accordance with relevant additional ICAO provisions and the SP AFI/8 RAN Recommendation 6/5, develop a coordinated AFI transition strategy and plan with associated timelines to enable the streamlined coordinated implementation of the amended Flight Plan and ATS Message provisions contained in Amendment 1 to the Fifteenth Edition of the PANS ATM; and

4) Periodically review the status of preparedness and propose solutions.

Considerations:

In addressing these terms of reference, the Task Force should consider, inter alia, the following aspects:

a) Likelihood that changes within the systems in the AFI Region could differ from systems in other ICAO Regions and accordingly provide recommendable Regional action with global goals;
b) Inter and intra regional issues;
c) Impact on inter-system co-ordination messaging;
d) Impact on non-automated flight plan processing systems;
e) Systems that transition early will need to be capable of handling both "NEW" and "PRESENT" instruction sets;
f) Inter-system exchanges need to take account of differing automation capabilities in order to avoid excessive message rejection;
g) Establishment of an Information Management system to track implementation timelines for various States/systems;
h) Management of Repetitive Flight Plans;
i) Implications for presentation formats, including paper & electronic flight progress strips;
j) Impacts to users (flight planning systems etc);

k) Appropriately timed withdrawal of existing State or Regional specific requirements to ensure consistency with new (global) instruction set; and

l) Existing ICAO guidance material.

Membership

Core members:

- ATM specialist and systems engineering experts (CNS) from AFI States and ANSPs with existing and planned automated flight plan processing systems
- ASECNA, IATA, IFALPA, IFATCA,

Note:
Algeria, Kenya, Senegal, Seychelles, South Africa, Sudan and Tanzania have offered their expertise as core members.

Other members

AFI States and ANSPs other than the above
Expertise from States, ANSPs outside the AFI Region that may be invited by the Task Force based on beneficial inputs they may contribute

Note:
Industry participation including systems providers, if required, is to be included under responsibility of State delegations. The Task Force may however, invite specific expertise from international organizations and relevant aviation industry entities (including vendor organizations) in order to enhance information available for the Task Force to progress its work. Such invitations shall be managed to exclude promotion of commercial interests.

Reporting

The Task Force shall report progress to the AFI ATM/AIM/SAR Sub-Group in coordination with CNS Sub-Group. However, owing to the limited time available for planning and in some cases acquisition of systems, valuable planning information emanating from the Task Force may, after coordination with Secretary of APIRG be provided to States without waiting for forthcoming meetings of the AFI ATM/AIM/SAR Sub-Group.

--- END ---

APPENDIX 3.4A

STRATEGY FOR IMPLEMENTATION OF THE ATS MESSAGE HANDLING SYSTEM (AMHS) IN THE AFI REGION

TABLE OF CONTENT

1. INTRODUCTION

The ATS Message Handling System (AMHS), which has been defined in the ICAO Aeronautical Telecommunication Network (ATN) standards, is intended to be a replacement for the current legacy Aeronautical Fixed Telecommunications Network (AFTN).
In order to assist States /Organizations on the matters relating to the implementation of ATS Messages Handling System (AMHS) in the AFI region and to ensure a uniform, smooth and harmonious implementation and regional interoperability, the AMHS/I/TF was requested to develop a Draft AFI AMHS Implementation Strategy.

2. OBJECT OF THE DOCUMENT

This document presents the draft AFI strategy to guide States and/or Organizations in implementation of AMHS within the AFI Region as required by the terms of reference of the AFI AMHS/I/TF meeting, Nairobi, Kenya, 20-21 May 2011. The document contains:

- A background about the states of AMHS implementation in AFI and other Regions
- an AFI implementation strategy

3. BACKGROUND

The exchange of ATS messages, as part of the Aeronautical Fixed Service (AFS) defined in ICAO Annex 10 Volume II is an essential function to the safety of air navigation and to the regular, efficient and economical operation of ATS provision. The Aeronautical Fixed Telecommunications Network (AFTN/CIDIN) has so far provided an effective store-and-forward messaging service for the conveyance of text messages, using character-oriented procedures. However, with regard to the future requirements in the exchange of ATS messages and the technological evolution, AFTN/CIDIN technology is now becoming obsolete, and is not sufficiently flexible to support messaging functions found in modern messaging systems (such as transfer of binary information and data folders).

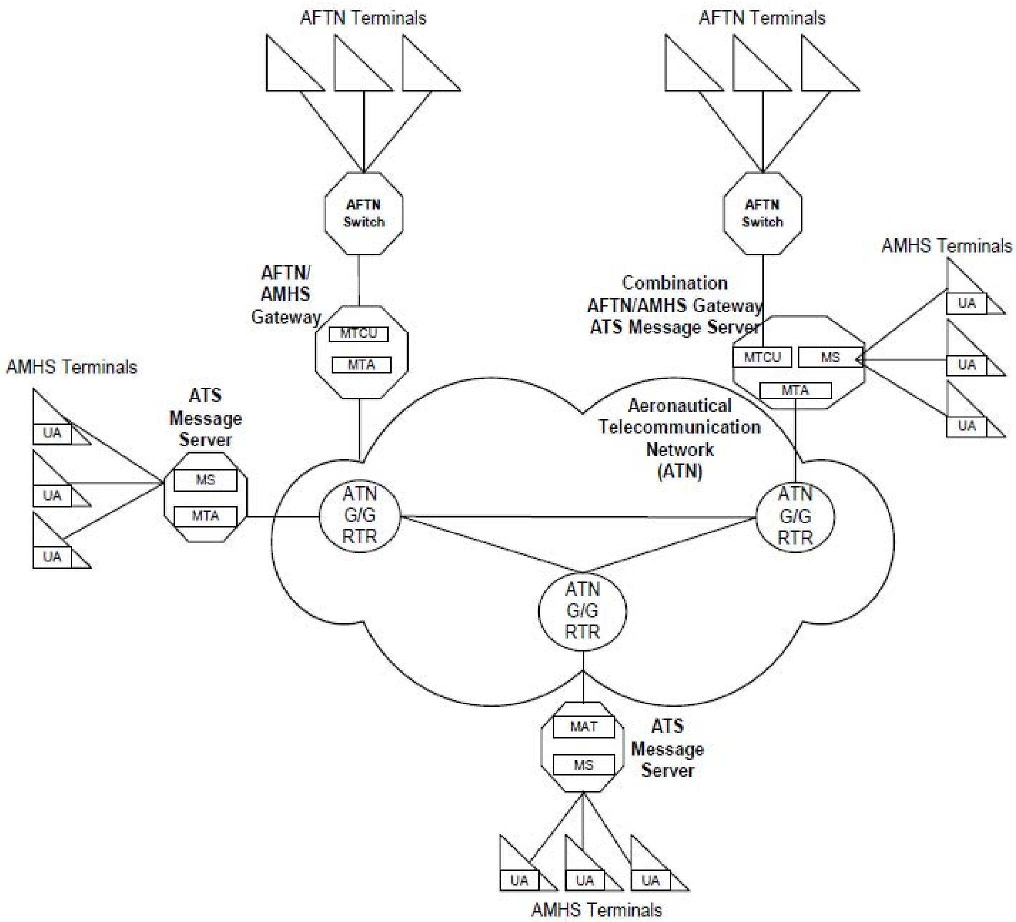
With a view to meet the critical requirements of the aviation community for enhancing its ground data communications by means of up to date technology, ICAO has specified that the Aeronautical Telecommunications Network (ATN) may replace the existing networks based on AFTN. The Aeronautical Telecommunication Network (ATN) will enable seamless communications between ground users (e.g. ANSPs, Airlines) and aircraft.

The most recent development with regard to messaging in the ATS environment is the ATS Message Handling System (AMHS). The AMHS is a natural evolution from AFTN/CIDIN and replaces the telegraphic style of working with a modern Message Handling System based on international Standards. The AMHS, being an ATN application utilizes the infrastructure of the ATN network, however this is not a prerequisite for the initial deployment of AMHS.

The AMHS is designed according to the International Telecommunication Union's (ITU) X.400 messaging standard which provides the core messaging framework similar to modern day email messages for the use of exchanging messages between Air Traffic Service users over the ATN. As an X.400-based system, the AMHS is specified in such a way that messages can be transferred from the sender to the recipient by passing reliably through intermediate AMHS systems. The AMHS system at the originating station, when it first receives a newly submitted message, must determine the AMHS system that will receive the AMHS message. This may be:

- the destination AMHS,
- a relay AMHS, or
- the AFTN.

3.1 OVERVIEW OF AMHS



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In terms of functionality, the AMHS comprises the following components:

- the Message Transfer Agent (MTA) which performs the function of the message switch,
- the User Agent (UA) which performs the user access to the MTA and provides an appropriate user interface,
- the Message Store (MS) which provides the intermediary storage between MTA and UA and is usually co-located with the MTA, and
- the Access Unit (AU) which provides for intercommunication with other Messaging.

Three categories of AMHS end systems are defined for the support of the ATS Message Handling Service:

- the ATS message server (MTA)
- the ATS message user agent (UA)

- the AFTN/AMHS gateway.

3.2 TECHNICAL PROVISION

The provisions pertaining to AMHS, such as SARPs, technical manuals and /or specifications and general guidance material are now available and the Industry has so far developed systems to provide AMHS along these guidelines. The following ICAO documents constitute the main references:

- Annex 10, Volume II, Chapter 4
- Annex 10, Volume III, Part I, Chapter 3
- Doc 9880 Part IIB
- Manual for the ATN using IPS Standards and Protocols (Doc 9896)
- Doc 9705

3.3 REQUIREMENTS FOR THE NETWORK

The performance network to support the AMHS is very important to ensure a reliable AMHS service. From the ICAO SARPS, AMHS could be implemented using ISO or IPS protocols. There are already national AMHS implementations in place, based on the TCP/IP protocol suite. In addition, ANSPs have the necessary TCP/IP expertise on hand from various national applications. The broad market of TCP/IP products would facilitate rapid implementation with reasonable costs.

In the AFI Region, the States adopted to implement the AMHS under ATN/IPS as the ground-ground network in line with several ICAO Regions. Today, the majority of the links of current AFTN circuits are configured at 9600 kbps.

The implementation of the AMHS requires more bandwidth because of the overhead of the protocol. The network speed in areas of high traffic density is 64 kbps with at least 32 kbps in general. The AFI strategy will thus have to take into account the necessity of increasing the network capacity through the implementation of a successful ATN network.

This increased capacity will necessarily have an associated cost and may require the upgrade of the network infrastructures.

3.4 STATUS OF AMHS IMPLEMENTATION ACTIVITIES

At present, there are many initiatives and activities aiming at a rapid implementation and operation of the ATS Message Handling System (AMHS). At the level of ICAO, Regional working groups are tasked with the development of guidelines and the coordination of implementation. Regional AMHS workshops are conducted to facilitate coordination between States and exchange of information with manufacturers. In addition, trials and operational implementations are underway.

The 17th APIRG meeting, Ouagadougou, Burkina Faso, 2-6 August 2010 per conclusion 17/17 set up a Task Force to coordinate and plan for the implementation of AMHS in the AFI Region; and the SAT/16 meeting Recife, 02-06 May 2011 per conclusion 16/13 calls States to participate in the forthcoming regional Seminars and workshops organized by ICAO to support the implementation of AMHS regional Plans requirements.

Today, some AFI States have already installed AMHS systems, conducted trials and demonstrations for implementation of AMHS and have taken actions for the introduction of AMHS operationally on a national basis. It is therefore necessary to develop a regional strategy, in order to conduct a standardized and harmonized implementation process within the AFI Region.

4. AFI AMHS IMPLEMENTATION TIMEFRAME

The implementation of the AMHS will follow several stages. Currently, only a very few states within the AFI region have AMHS infrastructures and the necessary network capacities. The AFI strategy should therefore take into account the experience gained from the equipped countries and progress studies conducted.

2011 –2013 Experimentation

During this period, pioneer and new States will continue to install AMHS systems. The experimentations and testing of interoperability will be expedited. This phase will allow the constraints related to the implementation and especially to the interconnections to be determined.

2011 - 2015 Validation of the architecture ATN – Upgrade of the network capacities

The harmonization and the increase of the network capabilities are necessary for the implementation of the AMHS. Several projects related to satellite VSAT networks of the AFI region are currently on going and in particular the audit of the AFISNET network which will involve some modifications to the network.

During the current phase, the ATN architecture will be validated and the increase of the capabilities of the various connections will be completed. These modifications can involve the modifications of the network infrastructure;

Due to the financial resources which it could require, the priority will be given to the main links establishing the ATN Backbone, which will allow to conduct effectively the experiments and to validate the ATN backbone.

During this period, the priority will be given to the systems of extremity AMHS in case of replacement of AFTN switches.

This deadline takes into account the necessary time for the validation of the ATN and AMHS architectures as well as the planning and the mobilization of the necessary financing.

From 2015 - Deployment in the main centers

In 2015, it can be considered that the ATN backbone and the network capabilities are quite completed.

The systems of extremity ATN / AMHS will then be deployed in the main centers with an AMHS/AFTN Gateway if required

From 2017 General Deployment

From 2017 onwards, all the End Systems of the network will have to be AMHS compatible. Various end-system such as the automated systems for the management of ATS data will be updated and the exchange l of ATS messages through the AMHS.

5. STRATEGY FOR IMPLEMENTATION OF THE AMHS IN THE AFI REGION

Considering the initiatives related to the AMHS implementation in the AFI region and the AMHS implementation activities progress in the other ICAO regions and in Industry, the AFI States/Organizations should take into consideration the following strategy to implement AMHS in the AFI region.

Considering:

1) The requirements for a reliable, secured and homogenous ground-to-ground Aeronautical Telecommunication Network to support the ATS Message Handling System (AMHS);

2) The availability of ICAO SARPs and technical manuals for the ATN/AMHS, the availability of equipment and readiness of vendors to support the AMHS ground-to-ground communications;

3) The availability of AMHS Transition and Implementation guidance materials required to assist States to ensure harmonization of procedures and protocols and thereby assure interoperability within the region;

4) The need for States using the currently AFTN systems for communication with other States and Regions to migrate gradually and harmoniously to the AMHS system by replacing the aging AFTN switches with ATS Message Transfer Agents (MTA);

5) The efforts of AFI States to take over and implement ATN/ AMHS; and

6) the need to support States to ensure a uniform, smooth and harmonious implementation;

THE GENERAL STRATEGY FOR THE IMPLEMENTATION OF AMHS INFRASTRUCTURE IN THE AFI REGION IS AS FOLLOWS:

a) Deploy a backbone network of ATN/IPS to provide a reliable infrastructure to initially support ground-to-ground applications (AMHS, AIDC…);

b) Use the TCP/IP communication protocol for the initial implementation of ATS Message Handling Systems, as a transition mechanism to enable AMHS operations to commence ahead of eventual full SARPs compliance;

c) The backbone States to implement in the short term a interoperable AMHS infrastructure and to conduct trials and studies on bilateral and multilateral basis in AFI region and on inter-regional basis to validate the operational implementation of AMHS and AMHS/AFTN Gateway;

d) The BBIS states with interface to other regions that adopt TCP/IP or, should establish connection based on bilateral agreement;

e) The none backbone States, to implement gradually AMHS when replacing their aging current AFTN systems and to connect to backbone States using the ATN/ IPS protocols and the appropriate security provision ;

IN ORDER TO ACHIEVE THE ABOVE STRATEGY THE FOLLOWING IS REQUIRED OF STATES AND ORGANIZATION IN THE AFI REGION:

a) States shall provide implementation in compliance with Annex 10 SARPS and ICAO Manuals, and with the Plans, Policies and AMHS Transition and Implementation guidance Materials adopted by APIRG;

b) Backbone States shall upgrade their network capability and later migrate to an IP sub-network capability for interconnection with other Backbone States and Non-backbone States.

c) States shall work co-operatively to assist each other on a multinational basis to implement the ATN and AMHS in an expeditious and coordinated manner and to ensure system inter-operability; and

d) States shall organize training of personnel to provide necessary capability to maintain and operate the ground-to-ground ATN/AMHS infrastructure and applications;

STRATEGY IMPLEMENTATION PLAN

	Short term 2011-2013	Mid-term 2014-2017	Long term2018-2023
APIRG technical provision	Elaboration of AFI technical provision	Implementation based on the AFI technical provision	
Telecommunications Infrastructure	Upgrade of ANSP VSAT networks and validation of the AMHS topology	Integration of AFI VSAT network and implementation of the AMHS topology	Full operational implementation of AMHS backbone and applications
Implementation of AMHS	Operation of (the existing AFTN system and progressive implementation of AMHS systems on national or regional basis	Implementation of AMHS systems at all Main AFTN centers and experimentation of inter-regional links	Completed transition of all the AFTN centers and full operational implementation
Operational deployment	AMHS trials on national basis and regional	Pursue of Trials on regional basis and operational implementation	Full AMHS operational implementation

Conclusion

The implementation of the ATN / AMHS requires the commitment of all the actors as was reaffirmed during the first meeting of the AMHS TASKFORCE. It will require the implementation of new systems of extremity ATN as well as the availability of an ATN network combining capabilities and adequate performances.

APPENDIX 3.4B

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE AFI ATS MESSAGE HANDLING SYSTEM IMPLEMENTATION TASK FORCE (AFI AMHS/I/TF)

1-TERMS OF REFERENCE

1) Conduct a comprehensive review of ICAO Standards and Recommended Practices (SARPs) pertaining to the Air Traffic Services Message Handling Service (ATSMHS) application as specified in Annex 10 – *Aeronautical Telecommunications* - Volume II and Volume III, and guidance material contained in ICAO *Manual on detailed specifications for the Aeronautical Telecommunication Network (ATN) using ISO/OSI standards and protocols* (Doc.9880), *Global Air Navigation Plan* (Doc 9750) and other relevant provisions;

2) Collect and analyze information on the status of AFI ANSPs ATS Message Handling Systems plans, including ongoing upgrades to existing systems and;

3) On the basis of the above, develop a coordinated AFI transition strategy and plan with associated timelines to enable the streamlined coordinated implementation of AMHS.

Considerations

In addressing its terms of reference, the Task Force should consider, *inter alia*, the following aspects:

1) AFI AMHS systems should be:

    a. implemented in accordance with ICAO SARPs and technical specifications, and
    b. interoperable with systems implemented by other ICAO Regions.
    c.

2) Personnel training for operational migration from AFTN to AMHS;

3) AFS network backbone capabilities;

4) Systems that transition early will need to be capable of handling both AMHS and AFTN messages;

5) Establishment of an Information Management system to track implementation timelines; and

6) Impacts to users (compliance to new flight plan format, availability of qualified personnel, etc).

2-WORK PROGRAMME

Task No.	Global Plan Initiative	Subject	Target date
1	GPI-22	**Conduct of a Regional Survey on:** 1. AFS circuits specifications (circuit type, modulation rate, protocol, ITU code, VSAT network) 2. AMHS implementation status (implementations, plans, levels of service, protocols, implementation challenges, level of knowledge on AMHS and ATN, etc.) *Team Leader: Secretariat* *Team members: All Task Force Core members* *References:* • *APIRG/15 Report* • *ICAO Annex 10 (Vol. 2 and Vol.3)* • *ICAO Doc 9880*	CNS/SG/5 2013
2	GPI-22	**Draft AFI AMHS Implementation Plan** 1. Draft AFI ATN Architecture 2. Draft AFI ATN Network Service Access Point Addressing Plan 3. Draft AFI AMHS Implementation Plan a. AFI FASID CNS1B Table b. AFI FASID CNS1C Table *Team Leader: Rwanda* *Team members: Angola, Ethiopia, Kenya, Mozambique, Rwanda, Sudan, Zimbabwe and ASECNA* *References:* • *Report of the Second Meeting of AFI ATN Planning Task Force* • *AFI Air Navigation Plan, FASID (CNS)* • *ICAO Annex 10 (Vol. 2 and Vol.3)*	CNS/SG/5 2013
3	GPI-22	**Draft AFI AMHS Manual** 1. Introduction 2. AFI AMHS Requirements 3. AFI ATS Messaging Service Profile 4. System implementation - Guidelines for system requirements 5. AMHS management 6. Tests and validation of systems 7. Operational procedures and recommendations 8. Miscellaneous	CNS/SG/5 2013

Task No.	Global Plan Initiative	Subject	Target date
		9. Appendices *Team Leader: South Africa (ATNS)* *Team members: Somalia (CACAS), South Africa, Tanzania, Uganda and ASECNA* *References:* • *ICAO EUR AMHS Manual (Doc 020)* • *ICAO Annex 10 (Vol. 2 and Vol.3)* • *ICAO Doc 9880*	

3-COMPOSITION

Core members: *Algeria, Angola, Botswana, Egypt, Ethiopia, Ghana, Kenya, Malawi, Niger, Nigeria, Rwanda, Senegal, South Africa (ATNS), Sudan, Tanzania, Tunisia, Uganda, Zimbabwe, ASECNA, IFATSEA and Roberts FIR.*

Other members: *All AFI States and Air Navigation Service Providers (ANSPs) with implemented and planned AMHS systems.*

Note: *Members should nominate suitable experts involved in aeronautical telecommunications operations and systems engineering.*

-END-

APPENDIX 3.4C

AFI

ATN ROUTING ARCHITECTURE PLAN

EXECUTIVE SUMMARY

This document provides technical guidance on the Planning and Implementing the transition to the Aeronautical Telecommunication Network (ATN) for ground communication within the ICAO AFI Region.

The routing architecture is based upon the need for a ground-ground infrastructure to eventually replace the existing AFTN infrastructure. For this reason, the routing architecture uses the existing AFTN infrastructure as a guideline for the positioning of ATN equipment.

The routing architecture is designed primarily for the ground-ground environment. It is intended that this architecture will be suitable as the routing architecture for the introduction of the air-ground communication requirements.

INTRODUCTION

This document presents an initial plan for the routing architecture within the AFI Region.

Terms used

Aeronautical Fixed Telecommunication Network (AFTN): a low-speed network providing the majority of ground-ground data communication services within the ICAO realm. This term is defined in ICAO Annex 10.

Boundary Intermediate Systems (BIS): a router that supports IDRP and routes PDUs to more than one routing domain. This term is defined in ICAO Doc. 9705.

Backbone Boundary Intermediate Systems (BBIS): a router that primarily routes PDUs between routing domains and does not support End Systems.

Note: This definition is similar to that found in ICAO Doc. 9705 and is meant to be consistent with that definition. This definition is made on the assumption that this version of the routing architecture is limited to the ground-ground infrastructure.

End Boundary Intermediate Systems (EBIS): a router that primarily routes PDUs between routing domains and connected End Systems.

End Systems (ES): an ATN system that supports one or more applications and that is a source and/or destination for PDUs.

Inter-Regional Boundary Intermediate Systems (IRBIS): a router that routes PDUs between systems (both End Systems and Boundary Intermediate Systems) within the Region with routers outside of the Region. These routers are the entry points into the Region and exit points from the Region for PDUs.

Network Service Access Point (NSAP) (address): a 20-octet value that uniquely identifies an interface between the Transport Layer and the Network Layer. In the ATN it provides the address of transport entity providing ATN Internet services.

Acronyms used

AFTN	-	Aeronautical Fixed Telecommunication Network
BIS	-	Boundary Intermediate Systems
BBIS	-	Backbone Boundary Intermediate Systems
CLNP	-	Connectionless Network Protocol
EBIS	-	End Boundary Intermediate Systems
ES	-	End System
IDRP	-	Inter-Domain Routing Protocol
IS	-	Intermediate System
PDU	-	Protocol Data Unit

ROUTING DOMAIN FUNDAMENTALS

The ATN consists of a set of End-Systems (ESs) and a set of Intermediate Systems (ISs). ESs are the source and destination of all data and are where the applications reside. ISs are better known as routers and relay PDUs from one system to another.

The ISs and ESs are organized into *Routing Domains*. Routing Domains are used to define sets of ystems (that typically operate together) into clusters. These clusters have two major properties:

- they are controlled by a single administration/organization, and
- a significant amount of the traffic is internal to the cluster.

The single most important characteristic is that they are controlled by a single administration or organization. This characteristic is manifested in technical terms by mutual trust between all routers in a routing domain. Routing protocols are based on the fact that the information exchanged between *intra*-domain routers can be trusted. No special reliability or trust is required to accept information about advertised routes.

The second characteristic, most traffic is internal to a routing domain, is more an artifact of proper network engineering.

Routing domains are established through the NSAP addressing conventions established for the ATN in Doc. 9705, Sub-Volume 5. All systems with NSAP addresses defined with the same address prefix are by definition in the same routing domain.

Intra-Domain Routing

Intra-domain routing is the routing of PDUs from the source to destination where both are in the same domain. Intra-domain routing implies one or more ISs capable of routing PDUs across the domain. Examples of intra-domain routing would be CLNP-capable routers exchanging PDUs between two Local Area Networks.

Since the ATN is specified across State boundaries, there are no SARPs requirements for intra-domain routing. The choice and configuration of internal routers is a local matter.

Inter-Domain Routing

The central definition of routing in the ATN is concerned with inter-domain routing. This is a particularly difficult problem since by the very nature of inter-domain routing, the information received cannot be fully trusted.

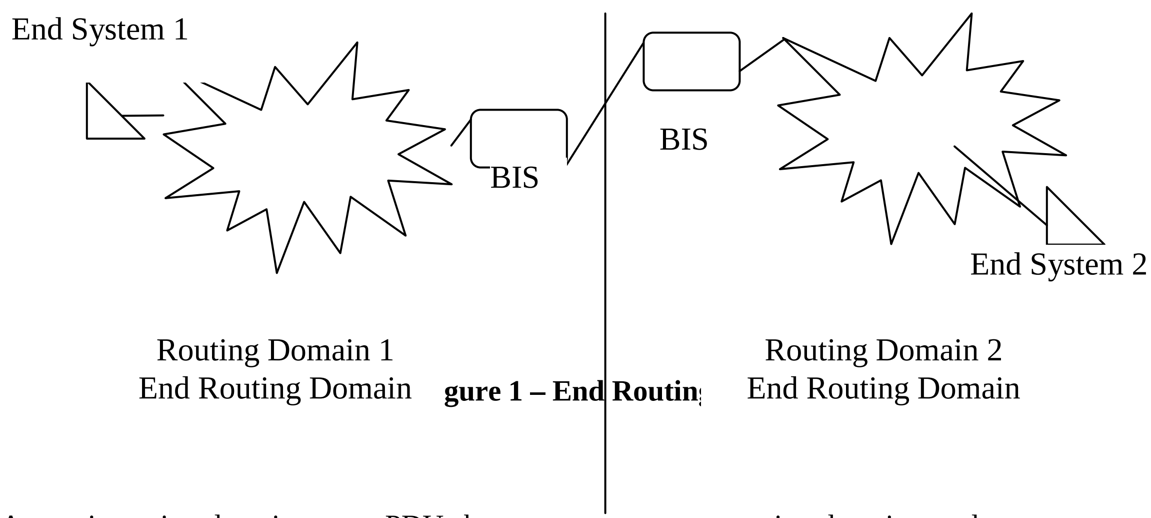
Inter-domain routing is based upon the mutual distrust of the received routing information. First, reliability mechanisms must be built-in to ensure the reliable transfer of the information. Second, the received information must be filtered to ensure that it meets the suitability constraints of the received system (in other words, can it be believed.)

After receiving the routing information, the inter-domain router must build routing tables based upon its internal policy about routing its data.

Types of Routing Domains

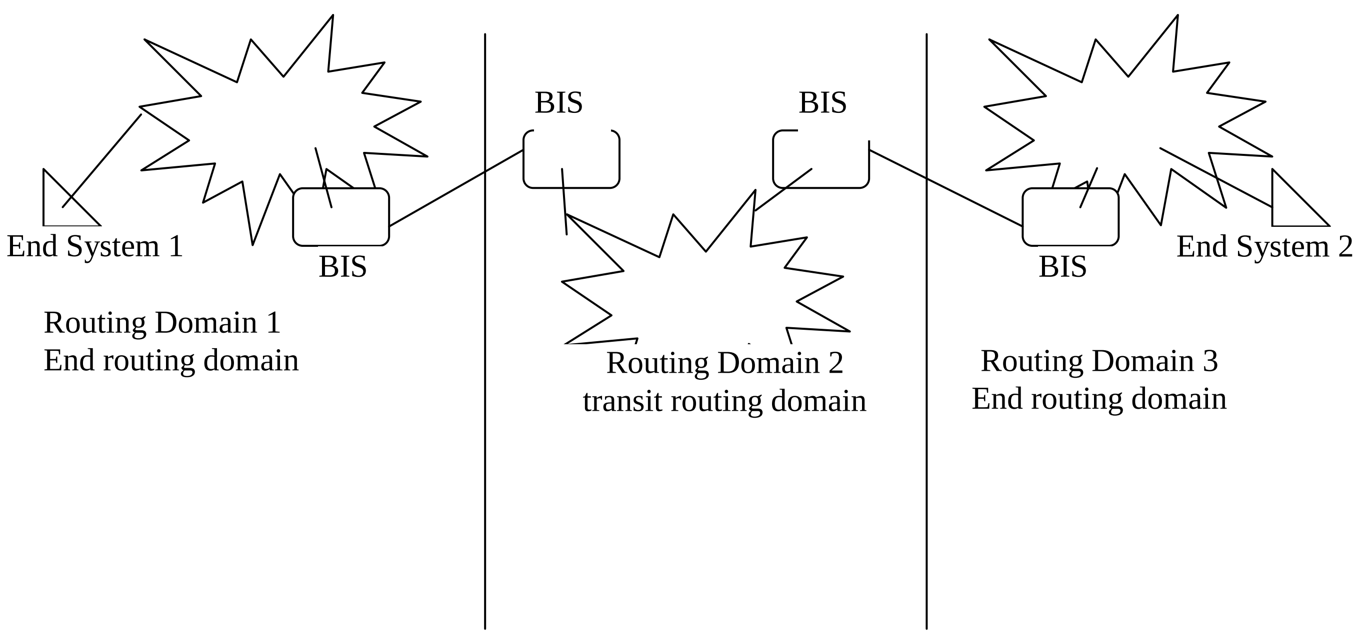
There are two basic types of routing domains: end routing domains, and transit routing domains.

An end routing domain routes PDUs to and from end-systems within its routing domain. Figure 1 shows an end routing domain.



gure 1 – End Routin

A transit routing domain routes PDUs between two or more routing domains, and may as an option also act as an end routing domain. An example of a transit domain is where a set of backbone routers is configured in their own routing domain with all of the end systems in end routing domains attached to the backbone.



Note: A transit routing domain may or may not be part of the backbone. That is, a routing domain may consist of BISs none of which are backbone routers.

Figure 2 – Transit Routing Domains

Routing Domain Construction

Based on the above, a routing domain consists of at least one inter-domain router.
Note: There must be at least one BIS. There is no requirement for any other equipment.
Routing domains are elements of the physical structure of the ATN.

ROUTER FUNDAMENTALS

All routers discussed within this document are ICAO Doc. 9880 compliant Boundary Intermediate Systems (BISs).
Note: Individual States may elect to use other routers that do not comply with the ATN IDRP requirements as found in ICAO Doc. 9880 within the limits of their own States. These router are internal State issues and outside the scope of this document.

Boundary Intermediate System Overview

Boundary Intermediate Systems comprise the interfaces between networks, and in particular, between different routing domains. The term "Boundary Intermediate System" can often be replaced with the more common term "router".
An important consideration in developing the routing architecture is the different roles that routers take within the ATN environment.

Router Types

There will be two primary types of BISs employed within the Region:

- Backbone BISs (BBISs), and
- End BISs (EBISs).

Backbone BISs

A BBIS is a router that primarily routes PDUs between routing domains. These routers are typically higher performance routers that aid in the efficient flow of data between domains. BBISs may have End-Systems connected to them, but often are limited to only router-to-router connections.
BBISs can be further subdivided into Inter-regional BBISs and Regional BBISs. Inter-regional Backbone BBISs are those backbone routers that connect to BBISs in other regions.
Regional BBISs are backbone routers that only connect to routers within the Region.
Note 1: A single high performance router may act as both a Regional BBIS and an Inter-regional BBIS based upon meeting the requirements for performance and reliability.
Note 2: For completeness of the routing architecture, it must be mentioned that the routers out-side of the Region to which Inter-regional Backbone BISs attach are, in fact, Inter-regional Backbone BISs in the other Region.

Note 3: The interconnection of backbone BISs typically require higher capacity communication lines based on the consolidation of traffic through those backbone routers. Even though the architecture takes into account existing AFTN infrastructure facilities, the need to upgrade the communication facilities as traffic through the backbone increases may be necessary.

Note 4: It is possible for some States to provide transit routing from their routing domains to the routing domains of other States using BISs that are not backbone routers.

End BISs

End BISs are connected to one or more BBISs and provide routing services to a single routing domain. Further, End BISs do not act as a transit router for passing PDUs between other routing domains.

AFI REGIONAL ROUTING ARCHITECTURE

The AFI Regional routing architecture is based upon several concepts:

1. from a routing domain point of view, the Region can be considered an "autonomous" area, that is, there is a difference between routers located within the Region and outside the Region.
2. routing domains and confederations of routing domains may be applied to areas within the Region.
3. States will make their own implementation and transition decisions.

The routing architecture can be divided into several distinct parts:

- the definition of the backbone routing structure for passing information between routing domains within the Region;
- the definition of the routing structure for passing information from this Region to other Regions;
- the definition of the routing structure between routing domains not on the backbone; and
- the definition of the routing structure for use in end-routing domains.

The first component is the definition of the backbone routing structure that supports the exchange of data within the Region. This part defines the interconnection of the major communication facilities in the Region and how they cooperate to link all of the systems in the Region.

The second part is needed to define how data will be routed between the systems within the Region with those systems outside the Region. More importantly, the structure describes how all global ATN systems are accessible from systems in the Region.

The third component is the definition of the structure that allows end routing domains to exchange data across the backbone to another end routing domain. This part defines how the end routing domains connect through the backbone.

The fourth component defines the routing structure that is used within an end routing domain. This part defines how the individual routing domains may be used to pass data.

Regional Backbone

The definition of a Regional Backbone is based upon the efficiencies that may be realized by concentrating the ATN traffic at major communication centres and using the economy of scale in passing this information between major communication centres.

The rationale for defining Regional backbone sites is based upon existing VSAT networks in the AFI Region and the flow of both AFTN traffic and possible future air-ground ATN traffic.
Within the Region there exist four VSAT networks (AFISNET, CAFSAT, NAFISAT and SADC) that can be used to simplify the definition of the backbone architecture.

However, it must be understood that the expected growth in communication traffic over the ATN could quickly exceed the capabilities of the existing communication infrastructure. Planning for the increased traffic loads will be needed as soon as ATN traffic begins to flow.

The architecture and communication requirements define a routing plan that incorporates alternate routing and communication paths so that no single router or communication failure can isolate major parts of the Region.
The initial AFI BBISs sites are defined in the following table by identifying those communication centres that are participating in more than one VSAT network as shown at **Attachment A**. Additional backbone sites will need to be identified in the future for increased reliability of the interconnections between the networks. This is done in subsequent paragraphs.

Item	ATN backbone router site	State
1	Antananarivo	Madagascar
2	Dakar	Senegal
3	Dar es Salaam	Tanzania
4	Johannesburg	South Africa
5	Kinshasa	Dem. Rep. of Congo
6	Luanda	Angola
7	Mauritius	Mauritius
8	N'djamena	Chad

Table 4.1 - Definition of initial AFI ATN Backbone router sites

At each ATN Backbone site, there should be at least one BBIS. States that are to be invited to committing to operate backbone routers are identified in the table above.

AFI Backbone router requirements

The definition of BBIS and the location of these routers may be affected by the requirements for backbone routers. A backbone router must meet several performance and reliability requirements:

- Availability
- Reliability
- Capacity; and
- Alternate routing.

Availability

A backbone router must provide a high-level of availability (24 hours a day, 7 days a week).

Reliability

A backbone router must be very reliable system that may require redundant hardware or more than one router per site.

Capacity

As a communication concentrator site, a backbone router must be capable of supporting significantly more traffic than other ATN routers.

Alternate routing

Based upon the need for continuity of service, backbone routers will require multiple communication links with a minimum of two and preferably three or more backbone routers to guarantee alternate routing paths in case of link or router failure.

Routing policies

States providing Regional BBISs must be capable of supporting routing policies that allow for Regional transit traffic and for dynamic re-routing of traffic based upon loading or link/router failures.

Inter-Regional Backbone

The second component of the AFI Regional Routing Architecture is the definition and potential location of Inter-Regional Backbone Routers. The manner in which this architecture was developed was to ensure that the use of the existing communication infrastructure is possible to the greatest degree. The use of the existing communication infrastructure should reduce the overall cost of transitioning to the ATN.

To re-state from the previous section, the Inter-Regional BBISs provide communication from routers within the AFI Region to routers in other regions. These Inter-Regional BBISs provide vital communications across regions and therefore need to have redundant communication paths and high availability. (Note: This can be accomplished through multiple routers at different locations.)

Within the current AFTN network environment, the following locations have been identified to initially serve centres outside the AFI Region:

Entry/Exit Centre	Region served
Addis Ababa	Middle East
Algiers	Europe
Casablanca	Europe
Cairo	Europe, Middle East
Dakar	South America
Johannesburg	Asia/Pacific, South America
Nairobi	Asia
Tunis	Europe

Table 4.2 - Centres with circuits to other Inter- Regional Backbones

For the transition to the ATN, connectivity to the other Regions should be a priority. This is especially important as other Regions begin the transition to the ATN and begin deploying ATN BISs.

Long Term Implementation

The transition to a fully implemented ATN requires that connectivity amongst the ICAO regions be robust. That is, there is the need to ensure alternate paths and reliable communication. Table 4.2 presents a minimal Inter-Regional Backbone that provides a minimum of 2 circuits to other ICAO regions that communicate directly with the AFI Region. For longer term implementation of the ATN, it would be advisable to have 3 circuits to each Region.

Initial Implementation

Note: Information is needed on the plans of States in implementing ATN.

The initial implementation of the ATN, outside of the AFI Region, will most likely be in North America, Europe and Asia/Pacific. Therefore, initial transition planning in AFI may focus on Europe and Asia/Pacific.

For connecting to Europe, there should be four (4) Inter-Regional BBISs. For example, the following locations would be candidates for such routers: Algiers, Cairo, Casablanca and Tunis.

Note: The locations presented above are examples of possible router sites. The selection of actual locations will be based on implementation schedules and circuit availabilities.

For connecting to the Middle East, Inter-Regional BBISs may be located at the locations of the existing AFTN centres, Cairo and Addis Ababa. However, these routers would not be needed until such time as ATN traffic is destined for that Region and the location of the routers would be determined at that time.

For connecting to the ASIA/PAC, Inter-Regional BBISs may be located at the locations of the existing AFTN centres, Johannesburg and Nairobi. However, these routers would not be needed until such time as ATN traffic is destined for that Region and the location of the routers would be determined at that time.

For connecting to the SAM Region, Inter-Regional BBISs may be located at the locations of the existing AFTN centres, Dakar and Johannesburg. However, these routers would not be needed until such time as ATN traffic is destined for that Region and the location of the routers would be determined at that time. In the future, Luanda could be added for interface with the SAM Region.

Routing between Backbone Routers and Routing Domains

The third component of the AFI ATN routing architecture is the definition of the routing structure between end routing domains within the AFI Region through the regional ATN backbone. This is done by linking routing domains within the coverage area of each VSAT network to the ATN backbone sites on the same network. In this process additional backbones are identified.

Based upon the exiting VSAT network coverage areas, sub-regions are defined for routing efficiencies. These sub-regions are used to concentrate traffic. The goal of this architecture is to use the existing communication infrastructure and the facilities available at existing AFTN centres to the maximum degree possible.

Within the AFISNET area, six major routing domains can be identified:

- ASECNA member States, which could form a routing confederation
- Ghana
- Nigeria
- Roberts FIR
- Sal FIR; and
- Sao Tome and Principe.

Within the ASECNA ensemble, two additional backbones could be located at Brazzaville and Niamey to concentrate traffic as in the current AFTN.

In the Ghana domain, Accra is being linked to Sao Tome by VSAT for VHF extension. This facility could be used in the future to link the Sao Tome domain to the ATN. Thus Accra BIS will be a transit router for Sao Tome. For added reliability, Lagos BIS should transit through Accra, while Kano BIS is linked to N'djamena and Niamey.

In the SADC VSAT coverage area, each State constitutes a routing domain that will be linked to the Johannesburg BBIS.

In the NAFISAT coverage area, each State also constitutes a routing domain. The additional BBIS identified is at Khartoum. Each routing domain has at least two links to the ATN. The BB locations are defined in Table 4.3. The table is organized with one site identified as a potential backbone router site identified above. This site is listed first and in bold text. The remainder of the sites in each sub-region follows.

Note: The identified backbone router sites are only examples. Actual backbone router sites will be determined by implementation schedules and States' willingness to implement backbone routers.

Location (State) of BB (including amendments by AFI Aeronautical VSAT Networks Managers)
Addis Ababa (Ethiopia) Sub-Regional sites: None Other BBIS sites: Khartoum, Nairobi, Jeddah Other Regions: MID
Accra (Ghana) Sub-Regional sites: None Other BBIS sites: Dakar, Niamey Other Regions: None
Algiers (Algeria) Sub-Regional sites: None Other BBIS sites: Casablanca, Tunis, Niamey Other Regions: EUR
Antananarivo (Madagascar) Sub-Regional sites: SADC:Johannesburg Other BBIS sites: Mauritius Other Regions: None
Brazzaville (Congo) Sub-Regional Sites: NAFISAT:Nairobi, SADC:Kinshasa, Luanda Other BBIS sites: Dakar, Niamey, N'djamena Other Regions: None
Cairo (Egypt) Sub-Regional Sites: Tunis Other BBIS sites: Khartoum Other Regions: EUR, MID
Casablanca (Morocco) Sub-Regional Sites: EUR:Lisbon Other BBIS sites: Algiers, Dakar Other Regions: EUR
Dakar (Senegal) Sub-Regional Sites: CAFSAT: Recife,Las Palmas, SADC:Johannesburg Other BBIS sites: Casablanca, Niamey, Accra, Brazzaville, Conakry Other Regions: SAM
Dar es Salaam (Tanzania) Sub-Regional Sites: NAFISAT:Nairobi

Location (State) of BB (including amendments by AFI Aeronautical VSAT Networks Managers)
Other BBIS sites: Kinshasa, Johannesburg Other Regions: None
Ezeiza (Argentina) Sub-Regional sites: SADC:Johannesburg Other BBIS sites: None Other Regions: AFI
Jeddah (Saudi Arabia) Sub-Regional Sites: NAFISAT:Addis Ababa,Khartoum Other BBIS sites: None Other Regions: AFI
Johannesburg (South Africa) Sub-Regional Sites: AFISNET:Dakar,Antatanarivo, CAFSAT:Ezeiza Other BBIS sites: Luanda, Kinshasa, Dar es Salaam, Plaisance Other Regions: SAM, ASIA/PAC
Kano (Nigeria) Sub-Regional Sites: None Other BBIS sites: Niamey, N'djamena Other Regions: None
Khartoum (Sudan) Sub-Regional sites: NAFISAT:N'djamena, SADC:Kinshasa Other BBIS sites: Cairo, Jeddah, Addis Ababa, Nairobi Other Regions: MID
Kinshasa (Democratic Republic of Congo) Sub-Regional sites: AFISNET:Brazzaville,N'djamena, NAFISAT:Khartoum Other BBIS sites: Dar es Salaam, Johannesburg Other Regions: None
Las Palmas (Gran Canaria) Sub-Regional sites: AFISNET:Dakar Other BBIS sites: Lisbon, Recife Other Regions: SAM, EUR
Lisbon (Portugal) Sub-Regional sites: CAFSAT:Casablanca Other BBIS sites: Las Palmas Other Regions: AFI
Luanda (Luanda) Sub-Regional sites: CAFSAT:Recife, AFISNET:Brazzaville Other BBIS sites: Johannesburg Other Regions: SAM
Nairobi (Kenya) Sub-Regional Sites: AFISNET:Brazzaville, SADC:Plaisance,Dar es Salaam Other BBIS sites: Khartoum, Addis Ababa Other Regions: ASIA/PAC
N'djamena (Chad) Sub-regional sites: NAFISAT:Khartoum, SADC:Kinshasa Other BBIS sites: Niamey, Brazzaville, Kano Other Regions: None
Niamey (Niger)

Location (State) of BB (including amendments by AFI Aeronautical VSAT Networks Managers)
Sub-Regional Sites: None Other BBI sites: Dakar, Algiers, N'djamena, Kano, Brazzaville, Accra, Conakry Other Regions: None
Plaisance (Mauritius) Sub-Regional sites: NAFISAT:Nairobi Other BBIS sites: Antananarivo, Johannesburg Other Regions: None
Recife (Brazil) Sub-Regional sites: AFISNET:Dakar, SADC:Luanda Other BBIS sites: Las Palmas Other Regions: AFI
Roberts (Guinea) Sub-Regional sites: None Other BBIS sites: Dakar, Niamey Other Regions: None
Tunis (Tunisia) Sub-regional sites: NAFISAT:Cairo Other BBIS sites: Algiers Other Regions: EUR

Table 4.3 – Definition of Geographic Location of BB Sites

Routing within end domains

The fourth component of the AFI routing architecture is the definition of routing within end domains.

Routing Domains

Each State is expected to have one or more routing domains. Where a State chooses not to implement an ATN BIS, it may choose to incorporate its systems into a routing domain of another State.

The AFI ATN Backbone will consist of routers from the selected States. Each of these routers will be part of its State's routing domain.

Note: This means that the backbone will not be configured with its own routing domain.

Routing to the backbone and between backbone routers will be controlled through IDRP policies.
Each State will be responsible for the designation of routing policies for its End Systems and End BISs. Individual States will also be responsible for establishing routing policies for routing to its designated BBIS.

The use of routing confederations is for further study. It should be noted that the establishment of routing confederations within the AFI Region could simplify considerably the routing architecture since a routing confederation can be viewed externally as a single routing domain.

End BISs

It is assumed that naming and addressing (and routing domain definition) will be done on a Regional basis. Further, for areas within the Region that may utilize an End BIS serving more than one State, the naming structure will be based on the Regional NSAP format defined in Doc. 9880. Further, States may choose to either implement the Regional (or Sub-Regional) NSAP format or the State NSAP format based on whether it installs a BIS.

AFI Regional Routing Architecture

Summarizing the information presented above, the AFI Regional Backbone network will consist of at least one BBIS router in each of the sub-regions identified above. The actual location of the routers will be based upon implementation schedules and the choices of States.

The Inter-Regional BBISs may be configured to provide both Regional routing services and Extra-Regional routing services. However, these routers must be engineered with sufficient performance capabilities to provide such services.

The chart at **Attachment B** shows the configuration of the AFI routing architecture.

Transition Issues

This area needs further work. Information about plans of the States is required.

ATN Transition

Based upon the previous sections, the implementation of the ATN within the AFI Region may require considerable planning for the transition of the AFTN.

Initial Regional Implementation

The very beginning of ATN implementation will be bilateral testing between States. For this scenario, each State will need at a minimum:

- an ATN-compliant router,
- a means for managing the router,
- an ATN application, and
- a circuit connecting the States.

States involved in bilateral ATN trials should consider the use of the trial infrastructure in expanding the ATN throughout the Region.

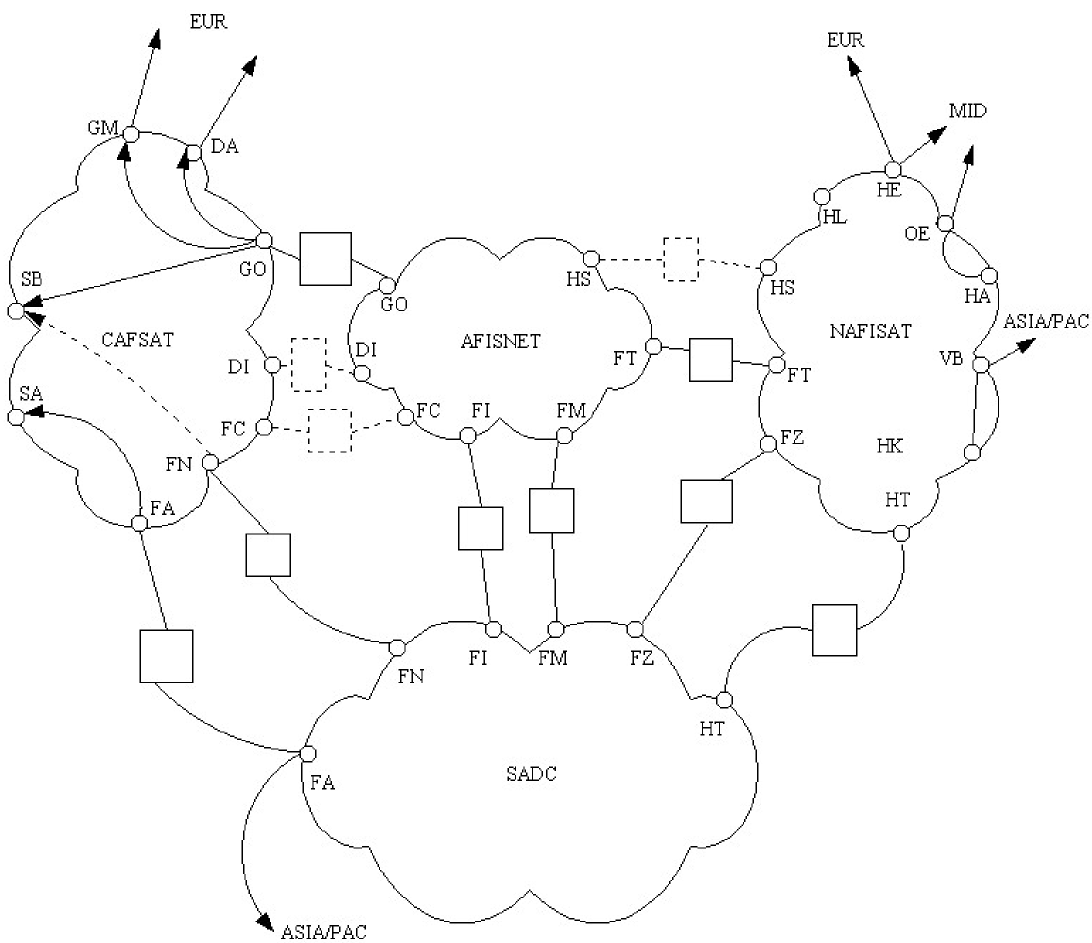
Regional ATN Implementation

At a certain time, sufficient bilateral trials will be underway to permit a region-wide ATN network based upon the plan presented above. As each State implements the ATN applications and network infrastructure, it will be added to the Regional infrastructure according to this plan.

-END-

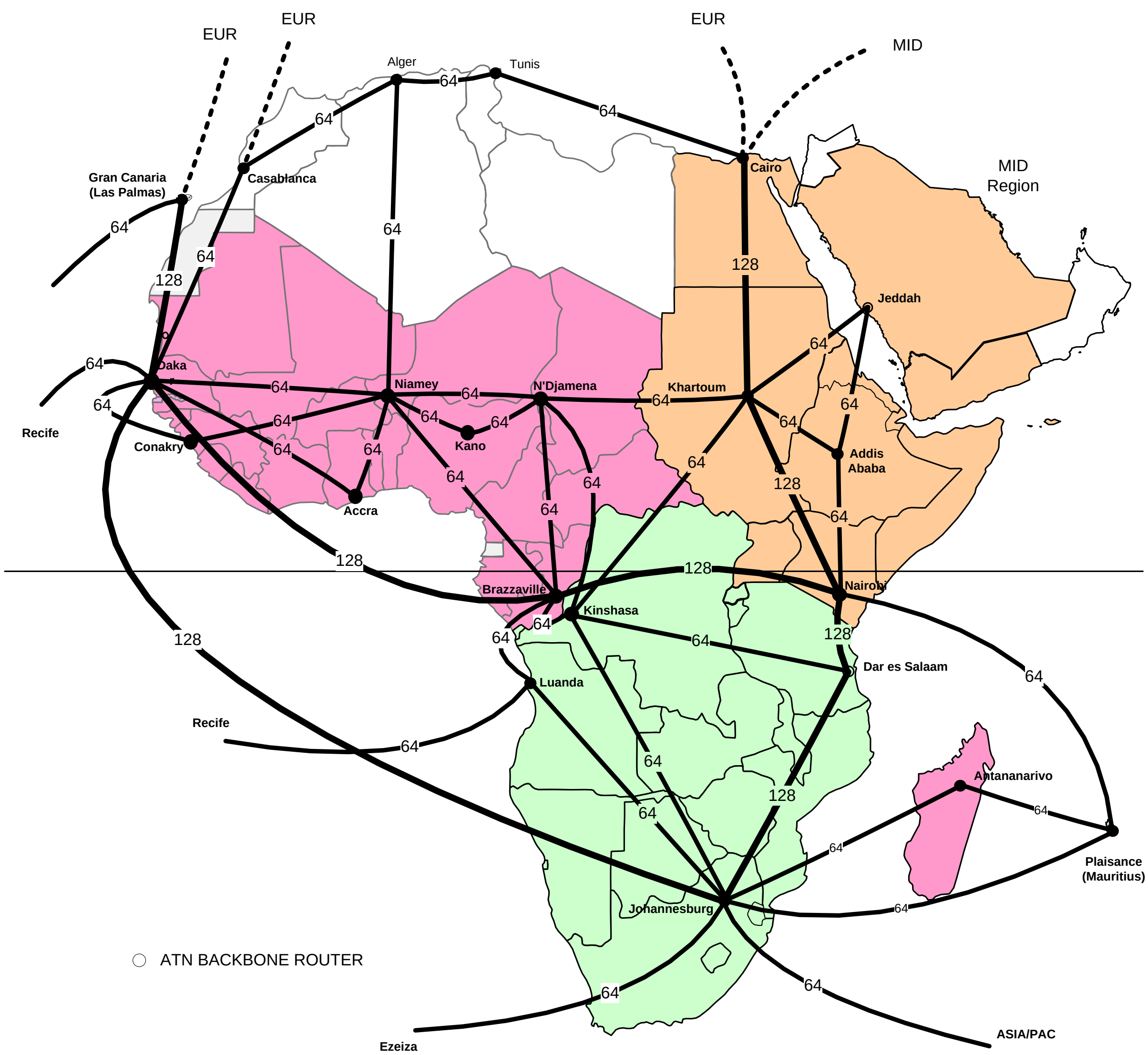
Attachment A

INDENTIFICATION OF BACKBONE ROUTER SITES



Attachment B

ATN BACKBONE



AFI ATN BACKBONE INTERCONNECTIVITY

APPENDIX 3.4D

AFI Frequency Management Group (FMG) Action Plan

Action	By	deadline	Status of implementation
Development of the Terms of Reference for the Rapporteur of the AFI Frequency Management Group	Secretariat	30/06/2011	Completed
Allocation of necessary resources to ensure that the designated Officer is available to participate in all activities of relevance to his/her mandate	ASECNA	Continuous	Completed in 2011 and 2012 through hosting of AFI FMG/2 and WRC-12 preparatory workshop, as well as attendance at WRC-12.
Establishment of national regulatory provisions to protect the use of Fixed Satellite Service (FSS) for the provision of aeronautical telecommunications services	States/ICAO	31/12/2012	Follow up action to be taken on implementation of Recommendation 724 (WRC-07)
Development of a model of a national coordination framework to facilitate efficient dialogue between appropriate authorities and resolution of issues related to the provision, the optimum operation and protection of aeronautical telecommunications spectrum,	States/ICAO	31/12/2013	
Survey on AFI States policies and regulations pertaining to aeronautical telecommunications, and determination of areas of required assistance by AFI /FMG	ICAO	31/12/2011	Survey conducted. Data awaited from States
Coordination of trials on HF Propagation forecast with all States within the same frequencies allotment areas defined in AFI FASID Chart CNS 2.	States/ANSPs	31/12/2012	AMS Survey conducted in 2012, in coordination with IATA
Organization of regional workshops/seminars on the RCP concept (Doc 9869) as called for by APIRG Conclusion 17/26 to facilitate its implementation by AFI	ICAO	31/12/2013	
Review and update AFI database COM Lists	States/ICAO	31/12/2012	AFI COM Lists No.1, 2 and 3 are being updated in coordination with States
Finalization and maintenance of the Frequency Assignment Planning Software	States/ICAO	31/12/2012	Software under evaluation by

Action	By	deadline	Status of implementation
			ICAO Regional Offices
Coordination between States and stakeholders for the development of regional strategies,	States/ICAO	31/12/2013	
Specifications and criteria for software integrity validation	Rapporteur Cameroon, Ghana, Morocco, Rwanda and South Africa	31/12/2013	

---END---

APPENDIX 3.4E

Draft Terms of Reference for the Rapporteur of the AFI Frequency Management Group (AFI FMG)

A. Terms of Reference

The Rapporteur of the AFI Frequency Management Group (AFI/FMG) nominated among the members of the Group is tasked to coordinate the activities of the Group. He develops his activities in the frame of the Action Plan driven from the outcomes of the meetings of the Group in particular through:

1. The follow up of the implementation of AFI/FMG Conclusion and Decisions that need coordinated activities on frequency spectrum management within AFI region;
2. The promotion of AFI Civil Aviation position to the AFI institutions involved in frequency spectrum management (African Telecommunication Union (ATU); African Broadcasting Union-ABU, Regional Direction of International Telecommunication Union (ITU)…)
3. The Report to the ICAO Aeronautical Communication Panel bodies (AC Panel and AC Working Group F) on the current developing activities on frequency spectrum management in AFI Region;
4. The coordination with the similar Rapporteur on frequency management Group nominated in the neighboring ICAO regions
5. The provision to the report to APIRG/CNSG of the status of implementation of APIRGB Conclusions and Decisions pertaining to AFI/FMG activities.
6. Any other activities that could enhance the development of the optimum usage and ensure the protection of Aeronautical Frequency Spectrum.

B. General List of actions

In the short and near term the main activities of the Rapporteur of AFI Frequency management Group can be listed as follow:

1. Ensure the complete collection of COM List
2. Ensure the follow up of the usage of the frequency planning software with feedback from AFI FMG Members
3. Participate to the analysis of the results of the surveys by users (ANSPs forecast on HF, IATA survey on VHF Coverage, Interferences mitigation issues…);

C. Participation to meetings dealing with Aeronautical Frequency Spectrum

To develop efficiently his assigned tasks, the Rapporteur of AFI Frequency Management Group should be provided with the adequate resources aiming to ensuring his participation to the mayor events that could be of interest of the Group mandate. In the other hand the Rapporteur should endeavor to ensure a relevant yearly planning of his activities allowing him to attend these meetings:;

The following meetings are activities with great relevance to AFI/FMG:

a) African Telecommunication Union Meeting for the preparation of WRCs;
b) ACP Working Group F meetings
c) CPM meetings
d) WRC meeting
e) Regional Seminar/Workshops on frequency spectrum mangement

Appendix 3.4F

Description of strategies for the implementation of the ICAO Global Plan initiatives pertaining to Communications, Navigation and Surveillance (CNS)

(Global Air Navigation Plan, Doc 9750)

1. COMMUNICATION INFRASTRUCTURE (GPI-22)

Description of strategy

1.1. ATM depends extensively and increasingly on the availability of real-time or near real-time, relevant, accurate, accredited and quality-assured information to make informed decisions. The timely availability of appropriate aeronautical mobile and fixed communication capabilities (voice and data) to accommodate ATM requirements and to provide the adequate capacity and quality of service requirements is essential. The aeronautical communication network infrastructure should accommodate the growing need for information collection and exchange within a transparent network in which all stakeholders can participate.

1.2. The gradual introduction of performance-based SARPs and system-level and functional requirements will allow the increased use of commercially available voice and data telecommunication technologies and services. In the framework of this strategy, States should, to the maximum extent possible, take advantage of appropriate technologies, services and products offered by the telecommunication industry.

1.3. Considering the fundamental role of communications in enabling aviation, the common objective is to seek the most efficient communication network service providing the desired services with the required performance and interoperability required for aviation safety levels at minimum cost.

2. DATA LINK APPLICATIONS (GPI-17)

Description of strategy

2.1. The implementation of less complex data link services (e.g. pre-departure clearance, oceanic clearance, D-ATIS, automatic position reporting) can bring immediate efficiency benefits to the provision of ATS. Transition to the use of data link communications for more complex safety-related uses that take advantage of a wide variety of CPDLC messages, including ATC clearances, is already being successfully implemented.

2.2. Use of CPDLC and implementation of other data link applications can bring significant advantages over voice communication for both pilots and controllers in terms of workload and safety. In particular, they can provide efficient linkages between ground and airborne systems, improved handling and transfer of data, reduced channel congestion, reduced communication errors, interoperable communication media and reduced workload. The reduction of workload per flight translates into capacity increases and enhanced safety.

2.3. Communication data link and data link surveillance technologies and applications should be selected and harmonized for seamless and interoperable global operations. ADS-C, ADS-B and CPDLC are in service in various regions of the world but lack global harmonization. Current regional initiatives, including utilizing unique message subsets and CPDLC procedures, hinder efficient development and acceptance for global aircraft operations. Existing and emerging technologies should be implemented in a harmonized global manner in the near term to support long-term goals. Harmonization will define global equipage requirements and therefore minimize user investment.

2.4. FANS-1/A and aeronautical telecommunication network (ATN) applications support similar functionality, but with different avionics requirements. Many internationally-operated aircraft are equipped with FANS-1/A avionics initially to take advantage of data link services offered in certain oceanic and remote regions. FANS-1/A equipage on international business aviation aircraft is underway and is expected to increase.

3. NAVIGATION SYSTEMS (GPI-21)

Description of strategy

3.1. Airspace users need a globally interoperable navigational infrastructure that delivers benefits in safety, efficiency and capacity. Aircraft navigation should be straightforward and conducted to the highest level of accuracy supported by the infrastructure.

3.2. To meet those needs, the progressive introduction of performance-based navigation must be supported by an appropriate navigation infrastructure consisting of an appropriate combination of global navigation satellite systems (GNSS), self-contained navigation systems (inertial navigation system) and conventional ground-based navigation aids.

3.3. GNSS provides standardized positioning information to the aircraft systems to support precise navigation globally. One global navigation system will help support a standardization of procedures and cockpit displays coupled with a minimum set of avionics, maintenance and training requirements. Thus, the ultimate goal is a transition to GNSS that would eliminate the requirement for ground-based aids, although the vulnerability of GNSS to interference may require the retention of some ground aids in specific areas.

3.4. GNSS-centered performance-based navigation enables a seamless, harmonized and cost-effective navigational service from departure to final approach that will provide benefits in safety, efficiency and capacity.

3.5. GNSS implementation will be carried out in an evolutionary manner, allowing gradual system improvements to be introduced. Near-term applications of GNSS are intended to enable the early introduction of satellite-based area navigation without any infrastructure investment, using the core satellite constellations and integrated multisensory airborne systems. The use of these systems already allows for increased reliability of non-precision approach operations at some airports.

3.6. Medium/longer-term applications will make use of existing and future satellite navigation systems with some type of augmentation or combination of augmentations required for operation in a particular phase of flight.

4. WORLD GEODETIC SYSTEM – 1984 (GPI-20)

Description of strategy

4.1. The geographical coordinates used across various States in the world to determine the position of runways, obstacles, aerodromes, navigation aids and ATS routes are based on a wide variety of local geodetic reference systems. With the introduction of RNAV, the problem of having geographical coordinates referenced to local geodetic datums is more evident and has clearly shown the need for a universal geodetic reference system. ICAO, to address this issue, adopted in 1994 the World Geodetic System — 1984 (WGS-84) as a common horizontal geodetic reference system for air navigation with an applicability date of 1 January 1998.

4.2. Fundamental to the implementation of GNSS is the use of a common geographical reference system. ICAO adopted the WGS-84 Geodetic Reference System as that datum, and many States have implemented or are implementing the system. Failure to implement, or a decision to use an alternative reference system, will create a seam in ATM service and will delay the full realization of GNSS benefits. Completion of the implementation of the WGS-84 Geodetic Reference System is a prerequisite for a number of ATM enhancements, including GNSS.

5. SITUTIONAL AWARENESS (GPI-9)

Description of strategy

5.1. The further implementation of enhanced surveillance techniques (ADS-C or ADS-B) will allow reductions in separation minima and an enhancement of safety, increase in capacity, and improved flight efficiency, all on a cost-effective basis. These benefits may be achieved by bringing surveillance to areas where there is no primary or secondary radar, when cost-benefit models warrant it. In airspaces where radar is used, enhanced surveillance can bring further reductions in aircraft separation minima and improve, in high traffic density areas, the quality of surveillance information both on the ground and in the air, thereby increasing safety levels. The implementation of sets of quality-assured electronic terrain and obstacle data necessary to support the ground proximity warning systems with forward-looking terrain avoidance function as well as a minimum safe altitude warning (MSAW) system will benefit safety substantially.

5.2. Implementation of surveillance systems for surface movement at aerodromes where weather conditions and capacity warrant will also enhance safety and efficiency while implementation of cockpit display of traffic information and associated procedures will enable pilot participation in the ATM system and improve safety through greater situational awareness.

5.3. In remote and oceanic airspace where ADS-C is used, FANS capabilities exist on many air transport aircraft and could be added to business aircraft. ADS-B can be used to enhance traffic surveillance in domestic airspace. In this respect, it should be noted that the 1090 extended squitter is available and should be accepted as the global choice for the ADS-B data link.

5.4. At terminal areas and at aerodromes surrounded by significant terrain and obstacles, the availability of quality-assured terrain and obstacle databases containing digital sets of data representing terrain surface in the form of continuous elevation values and digital sets of obstacle data of features, having vertical significance in relation to adjacent and surrounding features considered hazardous to air navigation, will improve situational awareness and contribute to the overall reduction of the number of controlled flight into terrain related accidents.

6. AERONAUTICAL RADIO SPECTRUM (GPI-23)

Description of strategy

6.5. States need to address all regulatory aspects on aeronautical matters on the agendas for International Telecommunication Network (ITU) World Radiocommunication Conferences (WRC). Particular attention is drawn to the need to maintain the current spectrum allocations to aeronautical services.

6.6. The radio spectrum is a scarce natural resource with finite capacity for which demand from all users (aeronautical and non-aeronautical) is constantly increasing. Thus the ICAO strategy on aeronautical radio spectrum aims at long-term protection of adequate aeronautical spectrum for all radio communication, surveillance and radio navigation systems. The process of international coordination taking place in the ITU obliges all spectrum users (i.e. aeronautical and non aeronautical) to continually defend and justify spectrum requirements. Civil aviation operations are expanding globally creating pressure on the already stressed and limited available aeronautical spectrum.

6.7. The framework of this initiative involves the support and dissemination by States of the ICAO quantified and qualified policy statements of requirements for aeronautical radio frequency spectrum agendas for ITU World Radiocommunication Conferences (WRC). This is necessary to maintain the current spectrum allocations to aeronautical services and ensure the continuing availability of adequate aeronautical radio spectrum and ultimately the viability of existing and new air navigation services globally.

-END-

APPENDIX 3.4G

VSAT NETWORKS BEST PRACTICES

		Best practices	Guidance material	Network compliance status			
				AFISNET	CAFSAT	NAFISAT	SADC
1.	**Year of completion**			1995	TBC	2008	2007
2.	**Period of Inception**			TBC	TBC	TBC	TBC
3.	**Membership**	N/A					
4.	**Satellite used**	Contingency planning required to ensure continuity of service in case of disruption or failure of operated satellite States shall provide the degree of facility reliability and availability consistent with their operational requirement.	ICAO, Annex 11 – Air Traffic Services, Section 2.30 ICAO, Annex 10, Volume I, Section 2.5 and Attachment F ICAO, Doc 9859 - Safety Management Manual.	No	No	No	No
5.	**Transponder (Up/Down)**	Contingency planning required to ensure continuity of service in case of disruption or failure of operated satellite States shall provide the degree of facility reliability and availability consistent with their operational requirement.	ICAO, Annex 11 – Air Traffic Services ICAO, Annex 10, Volume I, Section 2.5 and Attachment F ICAO, Doc 9859 - Safety Management Manual.	No	No	No	No
6.	**Frequency band**	In accordance with ITU Radio Regulations	ITU, Radio gulations	Yes	Yes	Yes	Yes
7.	**Topology**	Meshed network		Yes	Yes	Yes	Yes
8.	**Satellite access method**	Multiple Frequency – Time Division Multiple Access (MF-TDMA)	ICAO, Annex 10, Aeronautical Telecommunications, Volume III	Yes	No	Yes	Yes

		Best practices	Guidance material	Network compliance status			
				AFISNET	CAFSAT	NAFISAT	SADC
			ICAO, Doc 9776, Manual on VHF Digital Link Mode 2 ICAO, Doc 9805, Manual on VHF Digital Link Mode 3				
9.	**Lease Bandwidth**	Available bandwidth should accommodate current and future services	ICAO, Annex 10, Aeronautical Telecommunications, Volume II ICAO, Annex 11, Air Traffic Services ICAO, Doc 4444 – PANS/ATM ICAO, Doc 9880-Detailed Technical Specifications on ATN ICAO, Doc 7474 (ANP/FASID)	Yes	Yes	Yes	Yes
10.	**Administrative arrangements**	States commitment should be formalized and documented, including delegation of operational, technical and financial authority (as applicable).	ICAO, Doc 7474 (ANP/FASID) – Guidelines for multinational facility/service	No	No	Yes	Yes
11.	**Technical arrangements (Maintenance Management)**	Network control centre (NCC) should be implemented for all networks.	ICAO, ALLPIRG/5, Conclusion 5/16	No	No	Yes	Yes
12.	**Network control centre (NCC)**	Network control centre (NCC) should be implemented for all networks. Dedicated Engineering Service Channels recommended	ICAO, ALLPIRG/5, Conclusion 5/16	No	No	Yes	Yes
13.	**Dedicated engineering service channel**	A dedicated service channel is recommended to facilitate coordination of maintenance	ICAO Annex 10, Volume I, Attachment F	Yes	Yes	No	No

		Best practices	Guidance material	Network compliance status			
				AFISNET	CAFSAT	NAFISAT	SADC
		between networks' stations					
14.	**Services supported**	Aeronautical fixed services (AFTN, ATS/DS) Aeronautical mobile service (AMS) – Extended VHF radio coverage Aeronautical Telecommunication Network (ATN) applications (AMHS, AIDC)	ICAO, Annex 10, Aeronautical Telecommunications, Volume II ICAO, Annex 11, Air Traffic Services ICAO, Doc 4444 – PANS/ATM ICAO, Doc 9880-Detailed Technical Specifications on ATN ICAO, Doc 7474 (ANP/FASID)	Yes	Yes	Yes	Yes
15.	**New Services to be supported**	To be defined.		N/A	N/A	N/A	N/A
16.	**Funding mechanism for the networks**	Sustainable funding mechanism required for all networks.	ICAO, Doc 9082 – Policies on user charges	Yes	Yes	No	No
17.	**Connectivity (internal connectivity and interconnections with other networks)**	Full connectivity required within and between all the networks ICAO to address all the identified non-technical issues.	ICAO, Doc 7474 – Air Navigation Plan (FASID) Connectivity Matrices for ATS/DS and AFTN AFI AFTN Routing Directory	No	No	No	No
18.	**Management of interconnections**	Formal agreements recommended to address interconnection issues	ICAO Annex 10, Aeronautical Telecommunications, Vol.II, Paras. 2.4.1 and 2.4.4	No	No	No	No
19.	**Base band transmission protocols**	Use of standardised bit-oriented protocols Internet Protocol Suite (IPS) recommended X25 to be discontinued	ICAO, Annex 10, Aeronautical Telecommunications, Volume III ICAO, Doc 9896 – Manual on ATN using IPS Standards and Protocols AFI/7 - Recommendation 9/6 APIRG Conclusion 13/10 APIRG Conclusion 16/13 APIRG				

		Best practices	Guidance material	Network compliance status			
				AFISNET	CAFSAT	NAFISAT	SADC
			Conclusion 16/14				
20.	**Transmis-sion speed**	AFTN main circuits: 1200 bauds ATN circuits: 9.6 Kbps ATN backbone circuits: 64 Kbps	APIRG Conclusion 12/13 APIRG ATN/TF/2 Report	Yes	Yes	Yes	Yes
21.	**AFTN circuit availability**	Circuit availability should be monitored and provided to ICAO Regional Office on monthly basis. Minimum requirement is: 97%	ICAO, Doc 7474, ANP (AFI/7 Recommendations 9/3 and 9/4)	Yes	Yes	Yes	Yes
22.	**Message transit times**	Message transit times should be monitored and provided quarterly to ensure that operational requirements are met.	ICAO, Annex 11, Air Traffic Services, Chapter 6 ICAO, Doc 8259, Manual on the Planning and Engineering of AFTN APIRG Conclusion 12/13	No	No	No	No
23.	**AFTN circuit loading**	Performance evaluation of AFTN circuits is required on the basis of statistics collected for a period of minimum three days at the interval of six months from 23 to 25 April and October. These include traffic volume, traffic statistics and circuit occupancy, which are needed to assess the suitability of the modulation rate of AFTN circuits.	ICAO, Doc 8259, Manual on the Planning and Engineering of AFTN	No	No	No	No

---END---

APPENDIX 3.4H

TASK FORCE ON THE DEVELOPMENT OF REGIONAL PROJECT ON AN AFI INTEGRATED AERONAUTICAL TELECOMMUNICATION INFRASTRUCTURE TERMS OF REFERENCE

1. Vision

a) Continue to improve safety within the AFI region.
b) Enhance AFI Aeronautical Infrastructure safety.
c) Improve the contribution of infrastructure in AFI safety endeavours.
d) To enhance contribution of aeronautical communications infrastructure in the AFI region.
e) Enhancement of safety through elimination of deficiencies associated with AFI aeronautical infrastructure.

2. Objectives

a) Develop a sustainable and integrated/interoperable VSAT networks to provide aeronautical telecommunications services in AFI region;
b) Upgrade technical capabilities of the networks to comply with the ICAO SARPs and guidance material, user requirements and global best practices;
c) Ensure financial sustainability of the networks through equitable and fair allocation of costs to states and users;
d) Create harmonious and seamless administrative oversights for the networks;
e) Enlist states' commitment to this initiative;
f) Achieve the ATN concept for AFI; and
g) Apply appropriate costs-effective technologies.

3. Deliverables

The deliverables expected from the Task Force include:

3.1. Technical:

TECHNICAL	P**urpose of the multinational air navigation facility/service and its operational and technical justifications.** This should include the overall plan and targets for the development and the establishment of the facility/service. The likely implications if any, on regulations, working routines, equipment, premises and maintenance should be included. Information on the expected consequences on the overall AFI air navigation system or any part thereof should also be included. ***Deliverables*** *a) Detailed gap analysis based on ICAO SARPs and guidance material,*

	user requirements and global best practices; *b) Architectural requirements; Recommendations for a road-map, to be implemented by States; and* **c)** *Maintenance.*
	Need for an amendment to the AFI Regional Air Navigation Plan. Assess the need if the establishment of a multinational facility/service will necessitate an amendment to the AFI Regional Air Navigation Plan, to be carried out in accordance with established procedures. ***Deliverable*** *Amendment proposal to the Air Navigation Plan as appropriate*.

Composition of the Technical Team:

- Egypt, ATNS (South Africa, **Team Leader**), Tanzania, ASECNA, Roberts FIR, Botswana, Mozambique, Nigeria, IATA, Rwanda, France/Reunion, Swaziland, Uganda, SITA, CACAS

3.2. Financial:

FINANCIAL	F**inancial implications and cost-effectiveness.** Related information should include estimates of the total costs of the multinational facility/service covering, as required, research and development, implementation, operation and maintenance, administration, and capital costs. how all costs incurred prior to the operational phase will be financed; assessing savings which may accrue from the implementation of the facility/service and comparing these savings to the total cost estimates; proposals as to how cost shares of States participating in the provision of the project are to be determined. Also, assessment needs to be provided on impact on users from charges for the facility/service concerned. **Financial aspects** The participation of States in the provision of a multinational facility/service is based on the assumption that any State having supported and agreed to the implementation of such a facility/service and making use of it should also shoulder its respective share of the costs involved. ***Deliverables*** *a) Cost estimates;* *b) Funding (project teams and integrated network model);* *c) Cost recovery methods (cost sharing amongst states, billing); and Maintenance.*

Composition of the Financial Team:

- ATNS (South Africa), ASECNA (**Team Leader**), IATA, France, Kenya, Uganda

Administrative:

ADMINISTRATIVE	**Managerial implications and other contractual aspects** The participating States would need to formalize in an agreement the terms under which the multinational facility/service is to be provided. A primary aim of the agreement should be to ensure that the costs involved are shared among the participating States in a fair and equitable manner. ***Deliverables*** *a) Oversight model;* *b) States' commitment;* *c) Legal issues; Governance; and* *d) Maintenance.*

Composition of the Administrative Team:

- ATNS (South Africa), ASECNA, Egypt, IATA, Namibia, Kenya (**Team Leader**), Tanzania

3.4 Administrative:

LEGAL	**Agreement.** The various basic provisions that would normally have to be covered are addressed below in the sequence they would usually appear: a) *Objective of the agreement*. b) *Obligations of States party to the agreement*. c) *Definition and description of the facility/service*. d) *Establishment and operation of the facility/service*. e) *Legal responsibility*. f) *Liability aspects*. g) *Managerial aspects:* 1) *Governing bodies and decision-making arrangements*. 2) *Organization and staffing.* 3) *Consultation*. h) *Financial aspects:* 1) *Pre-implementation considerations*. 2) *Cost determination*. 3) *Cost sharing*. 4) *Recovery of costs from users*. 5) *Budgeting*. 6) *Authority to approve the budget*. 7) *Financial auditing*.

	8) *Taxation and other government levies*. i) *Procedures for settlement of disputes*. j) *Accessions, withdrawals, amendments to and termination of agreement.* ***Deliverables*** *Draft agreement*

APPENDIX 3.4I

VSAT NETWORK
PERFORMANCE DATA COLLECTION FORMS(PDCF)

(Template for CAFSAT Node)

Centre:

Date:

Parameters	Values	Remarks
Fixed Parameters		
Intelsat link Name	IS 901 @°E	
Transponder Number	36/36	
Satellite Earth Station Coordinates	LONG = ddd, mm O/E LAT = dd, mm N/S	Under WGS 84 Format
	AZ = ddd, mm O/E EL = dd, mm N/S	
Antenna Type and Size	….m	
Antenna Gain	Tx : …dBi Rx : …dBi	
SSPA type	X W	
Up Converter Frequency	MHz	
Down Converter Frequency	MHz	
Global Dynamic parameters		
EIRP		
G/T		
C/N0		
BER		
MTBF		
MTTR		
Parameter for Carrier Performance		
Carrier failure rate		
C/N0		
BER		

Appendix 3.4I

1: Performance of Aeronautical Fixed Service supported by CAFSAT

Performance of AFTN

Centre : Atlántico
Date /

Country	Terminal I	Terminal II	Support	COM Protocol	Speed	Transit Time	Routing	Monthly Availability 2011												½ Annual Average Availa-bility	
								01		02		03		04		05		06		1	
Brazil	Atlántico	Dakar	CAFSAT					TX	RX	TX	RX	TX	RX	TX	RX	TX	RX	TX	RX	TX	RX

2: Qualitative performance of ATS/DS

Centre :
Date /

Country	Terminal I	Terminal II	Support	Connexion Time	Nb of Attempts	One Way Latence Time	Call set up time	Voice Quality (1 to 5)	Monthly Availability 2011						½ Annual Average Availability
Brazil	Atlán-tico	Dakar	CAFSAT						01	02	03	04	05	06	

3: Qualitative performance of Future CNS Services

Country	Terminal 1	Terminal II	Support	Provided Service	COM Protocol	Speed	Transit Time	Routing	Availability 2005-2010						Remarks
									05	06	07	08	09	10	
Brazil	**Atlántico**	**Dakar**	**CAFSAT**	AIDC											
Spain	**Las Palmas**	**Sal**	**CAFSAT**	AMHS											

APPENDIX 3.4J

RESOLUTION COM6/24 (WRC-12)

Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3400-4200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1

The World Radiocommunication Conference (Geneva, 2012),

considering

a) that remote and rural areas often still lack a terrestrial communication infrastructure that meets the evolving requirements of modern civil aviation;

b) that the cost of providing and maintaining such an infrastructure could be expensive, particularly in remote regions;

c) where an adequate terrestrial communication infrastructure is not available, fixed-satellite service (FSS) earth stations are the only viable option to augment the communication infrastructure in order to satisfy the overall communications infrastructure requirements of the International Civil Aviation Organization (ICAO) and to ensure distribution of meteorological information under the auspices of the World Meteorological Organization (WMO);

d) that the use of FSS earth stations deployed in some countries in Region 1 for aeronautical communications has the potential to significantly enhance communications between air traffic control centres as well as with remote aeronautical stations,

noting

a) that the FSS is not a safety service;

b) that, by its Resolution 20 (Rev.WRC-03), WRC resolved to instruct the Secretary-General "to encourage ICAO to continue its assistance to developing countries which are endeavouring to improve their aeronautical telecommunications ...";

c) Recommendation ITU-R SF.1486 on sharing methodology between fixed wireless access systems in the fixed service (FS) and very small aperture terminals (VSATs) in the FSS in the 3 400-3 700 MHz band;

d) Report ITU-R S.2199 on studies on compatibility of broadband wireless access systems and FSS networks in the 3 400-4 200 MHz band;

e) Report ITU-R M.2109 on sharing studies between International Mobile Telecommunications-Advanced (IMT-Advanced) systems and geostationary-satellite networks in the fixed-satellite service in the 3 400-4 200 MHz and 4 500-4 800 MHz frequency bands, *resolves to invite ITU-R*

to study possible technical and regulatory measures in some countries in Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information referred to in *considering c)*,

invites

all members of the Radiocommunication Sector, ICAO and WMO to contribute to these studies,

instructs the Director of the Radiocommunication Bureau

to include the results of these studies in his Report to WRC-15 for the purposes of considering adequate actions in response to *resolves to invite ITU-R* above,

instructs the Secretary-General

to bring this Resolution to the attention of ICAO and WMO.

-END-

APPENDIX 3.4K

DRAFT GNSS IMPLEMENTATION STRATEGY FOR THE AFI REGION

1. Introduction

1.1 The purpose of the AFI GNSS strategy is to define an evolution path for replacement of ground-based navigation aids, i.e. VOR/DME/ILS/NDB, ensuring that operational and other concerns such as positive cost-benefit are fully taken into account.

1.2 The AFI GNSS strategy assumes availability of a GNSS meeting of the specified parameters at every phase of deployment. It does not analyze GNSS systems configuration per se nor the advantages and disadvantages of various deployment strategies.

2. General Considerations

2.1 By necessity, satellite-based and ground-based navigation systems will co-exist for a period of time. Considering that the operation of a dual system is detrimental to a positive cost-benefit, users and providers will co-operate with the view of reducing the duration of the transition period as much as possible, having due regard for the following principles:

- The level of safety will not be downgraded during the transition;
- GNSS-based service must, before the end of the transition period, fully meet the required parameters of accuracy, availability, integrity and continuity for all phases of flight;
- During the transition, gradually evolving levels of functionality will be available;
- Operational advantage shall be taken in to consideration the available and capabilities at every step of deployment;
- Methods of application will take into account full consideration of safety considerations of any functional limitations;
- Users must be given sufficient advance notice to re-equip before ground-based systems are decommissioned.

3. Evolving Functionality

3.1 **Phase I (Short term), up to 2012~~:~~**

This phase will allow the use of GNSS as a primary-means of navigation for en-route, and for NPA; and as a supplemental-means navigation system for TMA. Existing ground infrastructure remains intact.

3.2 Phase II (Medium term) -2013 - 2016:

This phase will allow for:

a) <u>En-route phase</u>: sufficient capability to meet en-route navigation requirements everywhere in the AFI Region. GNSS will continue to be used as principal en-route navigation. The same principle will be characterized by a clearly planned transition for the use of GNSS as the sole means for en-route navigation. Navigational aids will accordingly not be replaced, subject to consultation with the users.

b) Terminal areas: sufficient capability to meet TMA navigation requirements everywhere in the AFI region. GNSS is approved as sole-means for TMAs, taking into account technical and legal developments, and institutional aspects.

c) Terminal area VOR/DME/NDB, and Locators not associated with ILS, will not be replaced during Phase II.

d) Approach and landing phase: sufficient capability for APV1 in the whole AFI Region. ILS will continue to be provided at aerodromes[1].

Note 1: Where the requirements for approach and landing can be met by APV 1, ILS CAT I should not be replaced.

During Phase II, the implementation of Long- term GNSS will be developed.

3.3. Phase III (Long term) 2017 onwards:

It is assumed that more constellations of navigation satellites will be available to support GNSS as the sole-means of navigation from en-route to CAT I operations. CAT I by SBAS or GBAS will be available in those locations where analysis of historical MET data or traffic characteristics justifies the requirement. Other requirements will be met by ground-based augmentation system (GBAS). During Phase III, ILS CAT I will not be replaced, subject to consultation with users. Where CAT II/III ILS requirements have been confirmed, these facilities will remain unless technical evolution then demonstrates that the requirement can be supported by GBAS or SBAS.

4. The strategy will be reviewed periodically. In particular, it will be reviewed and updated at the beginning of each planning phase to ensure continuous relevance in support of the global ATM operational concept, taking into account technological evolution and developments in the field of GNSS.

5. Summary of AFI GNSS Strategy

AFI GNSS Strategy – Synopsis

	Short term	**Medium term**	**Long term**
Time scale	2008 – 2012	2013 – 2016	2017 and beyond
Certification	Primary for en-route Supplemental for TMA Non-precision approach (NPA)	Primary means from en route to APV	Primary means from en route to CAT-I
Oceanic and Remote Continental En route	Basic GNSS	Basic GNSS	Multi-constellation GNSS
Continental En route	Basic GNSS	Basic GNSS	Multi-constellation GNSS

	Short term	Medium term	Long term
Terminal	Basic GNSS	Basic GNSS	Multi-constellation GNSS
Approach and Landing	Basic GNSS with Barometric Altimetry	Basic GNSS with ABAS, SBAS*	Multi-constellation GNSS with ABAS, SBAS, GBAS
			CAT I (GLS) CAT II/III/ (GLS) as required

**Note: As from 18 November 2010, it is expected that ICAO Annex 10, Volume I will enable Category I approach operations supported by satellite-based augmentation system (SBAS). The upper vertical alert limit (VAL) for CAT I operations has drastically been increased from 15.0 m to 35.0 m. However, a vertical alert limit greater than 10 m for a specific system design may only be used if a system-specific safety analysis has been completed.*

GNSS INFRASTRUCTURE IN SUPPORT OF PBN REQUIREMENTS

Time scale		Short term 2008 – 2012	Medium term 2013 – 2016	Long term 2017 and beyond
Certification		Primary for en-route Supplemental for TMA Non-precision approach (NPA)	Primary means from en route to APV	Primary means from en route to CAT-I
Oceanic and Remote Continental/ En route	GNSS Configuration	Basic GNSS	Basic GNSS	Multi-constellation GNSS
	PBN Nav Spec	RNAV-10, RNP-4	RNAV-10, RNP-4	RNAV-10, RNP-4
Continental En route	GNSS Configuration	Basic GNSS	Basic GNSS	Multi-constellation GNSS
	PBN Nav Spec	RNAV-5, RNAV-1	RNAV-5, RNAV-2, RNAV-1	RNAV-5, RNAV-2, RNAV-1
Terminal	GNSS Configuration	Basic GNSS	Basic GNSS	Multi-constellation GNSS
	PBN Nav Spec	RNAV-1 in a surveillance environment Basic RNP-1 in non-surveillance environment	Expand RNAV-1, or RNP-1 application Mandate RNAV-1, or RNP-1 in high density TMAs	RNAV-1 in a surveillance environment Basic RNP-1 in non-surveillance environment
Approach	GNSS Configuration	Basic GNSS	Basic GNSS with ABAS, SBAS*	Multi-constellation GNSS with ABAS, SBAS*
	PBN Nav Spec	RNP APCH: NPA RNP APCH: APV with Baro-VNAV or RNP AR APCH: APV with Baro-VNAV	RNP APCH: NPA RNP APCH: Expand APV (with Baro-VNAV and/or augmented GNSS) Expand RNP AR APCH: APV with Baro-VNAV	RNP APCH: NPA RNP APCH: APV (with Baro-VNAV and/or augmented GNSS) RNP AR APCH: APV with Baro-VNAV

****Note: Although SBAS operations not yet included in the PBN concept contained in ICAO Doc 9613, they have been introduced in the spirit of Assembly Resolution A36-23.***

6. SBAS implementation criteria

1. *Availability of conclusive cost-benefit analysis (APIRG Conclusion 17/29 refers)*
2. *Full compliance with ICAO technical requirements (Standards and Recommended Practices);*
3. *Agreement between stakeholders on pre-implementation cost benefit analyses on case by case basis;*
4. *Application of the user pays principle across all sectors (SBAS users). National authorities shall prevent cross-subsidization of non civil aviation users of SBAS.*

-END-

APPENDIX 3.4L

AFI SURVEILLANCE STRATEGY

Draft - Revision 0.1

23 June 2011

REVISION INDEX SHEET

Version	Revision	Date	Reason for Change	Pages Affected
Draft	0	23/06/11	New Document	All

PROLOGUE

Air traffic is growing at a significant rate. There is also an increasing demand for more operating flexibility to improve aircraft efficiency and to reduce the impact of air travel on the environment. Improved tools are required to safely manage increasing levels and complexity of air traffic. Aeronautical surveillance is one such important tool in the air traffic management (ATM) process.

Surveillance plays an important role in air traffic. The ability to accurately determine, track and update the position of aircraft has a direct influence on the minimum distances by which aircraft must be separated (i.e. separation standards), and therefore on how efficiently a given airspace may be utilized.

In areas without electronic surveillance, where air traffic management is reliant on pilots reporting their position verbally, aircraft have to be separated by relatively large distances to account for the uncertainty in the reported position because of the delivery delay and the low rate at which the information is updated.

Conversely, in areas where electronic surveillance systems are used, and aircraft positions are updated frequently, the airspace can be used more efficiently by safely accommodating a higher density of aircraft through reduced separation minima. In this way the surveillance function provides an indication of any unexpected aircraft movements and is an important safety function.

Accurate surveillance can furthermore be used as the basis for automated alerting systems. The ability to accurately track aircraft enables air traffic controllers to be alerted when an aircraft is detected to deviate from its assigned altitude or route or when the future positions of two or more aircraft are predicted to fall below minimum acceptable separation standards. Alerts may also be provided when the aircraft strays below the minimum safe altitude or enters a restricted area.

The existing fixed route structure provides increased certainty of aircraft movements making it easier for controllers to manage air traffic. With improved navigation performance on board aircraft, airspace users are demanding greater flexibility to determine the most efficient routes to satisfy their operating conditions. There is a push for restrictions associated with flying along fixed routes to be lifted. In such an environment, accurate surveillance is required to assist controllers in the detection and resolution of any potential conflicts associated with the flexible use of airspace which will result in a more dynamic environment.

The main objective of this strategy is to propose the surveillance systems that are suitable to be applied in short and medium terms within the AFI Region and to define an evolutionary path that will promote safety, interoperability and cost effectiveness of the required infrastructure to meet the future air traffic management needs. The surveillance strategy should be seen as a guidance document to all stakeholders, without any regulatory or mandatory requirements. Appropriate regulations should be published by Air Navigation Authorities when the use of new surveillance techniques is to be introduced in the States.

This strategy is a live document and should be reviewed and updated every two years.

TABLE OF CONTENTS

AFRICA-INDIAN OCEAN SURVEILLANCE STRATEGY

Introduction

Purpose

The surveillance strategy should be seen as a link between the Global Air Navigation Plan for CNS/ATM Systems (Doc. 9750), the AFI Plan and the individual stakeholders' strategy for the air surveillance applications.

Implementation of surveillance systems should be based on a harmonized strategy for the AFI Region that would take into account the operational requirements and relevant cost-benefit analyses. It should also be based on action plans to ensure that AFI States, Regional and International Organizations implement the necessary systems in accordance with consistent timescales.

The surveillance technologies considered in this strategy, to meet present and future ATM expectations are:

- Voice Reporting;
- Primary Radar (PSR);
- Secondary Surveillance Radar (SSR);
- Multilateration (MLAT);
- Automatic Dependent Surveillance-Contract (ADS-C); and
- Automatic Dependent Surveillance-Broadcast (ADS-B).

In order to provide a global view of the surveillance strategy, the operational drivers, the required surveillance infrastructure and the regional studies and trials proposed in this document have been displayed in each chapter in a chronological presentation.

The timeframes illustrated in this document define the tentative dates when surveillance systems are estimated to become regionally operational. Nevertheless, some of the surveillance systems described in this strategy will be used to solve local issues prior to the timescales in this document, and thereby will migrate from pioneer areas into bigger regional areas.

Applicability

This strategy was developed for use by the following stakeholders group within the Africa-Indian Ocean (AFI) Region:

- The departments of the National Supervisory Authorities of AFI countries who are responsible for verifying ATM Surveillance Systems;
- The departments of the civil and military ANSP of AFI states who are responsible for procuring/designing, accepting, and maintaining ATM Surveillance Systems;
- The Airport Operators, who are responsible for procuring/designing, accepting, and maintaining Surveillance Systems at airports level; and
- The Airspace Users, who are the final client of the ATM Surveillance Systems chain.

Reference Documents

- Doc 9924, Aeronautical Surveillance Manual;

Aeronautical Surveillance – Air-Ground Surveillance Systems

The aeronautical surveillance system may be broadly divided into four parts:

- a "remote surveillance subsystem" installed within the target under surveillance, which has two main functions: to collect the data from different onboard sensors/interfaces and to transmit them to other parts of the system or to other users;

- a sensor system that receives and collects surveillance information about targets under surveillance;

- a communication system which connects the sensor systems to an SDP system and allows transfer of the surveillance data. Ground communication may also support control and monitoring of the sensor; and

- an data processing system that combines the data received from the different sensors in one data stream, optionally integrates the surveillance data with other and provides/distributes the data to the users in a specified manner removing the possible different specificities of the different types of sensors.

The sensor is a significant part of the aeronautical surveillance system. It provides surveillance information which is then presented to air traffic controllers. The available sensors/systems can currently be categorized as:

- Non-Cooperative
- Independent Cooperative
- Dependent Cooperative

The remainder of this section provides an high level overview of the sensors available for aeronautical surveillance applications.

Non-Cooperative Sensors / Systems

Primary Surveillance Radars (PSR)

Primary Surveillance Radars works by detecting reflections to transmitted pulses of radio frequency energy. The ground station typically consists of a transmitter, receiver and rotating antenna. The system transmits the pulses and then detects and processes the received reflections. The slant range of the target is determined by measuring the time from transmission of the signal to reception of the reflected pulses. The bearing of the target is determined by noting the position of the rotating antenna when the reflected pulses are received. Reflections are obtained from targets of interest and fixed objects (e.g. buildings) which tend to create clutter. Special processing techniques are used to remove the clutter.

In the 1960s and 1970s, Primary Surveillance Radars was widely used for en-route surveillance. From the late 1970s many air navigation service providers decided to discontinue use of Primary Surveillance Radars for that application mainly because of its high cost and inability to provide identification, which became more important with increasing traffic densities. Also, mandatory requirements for aircraft to carry transponders in airspace with high traffic meant that surveillance could be provided using Secondary Surveillance Radars. In many countries the use of Primary Surveillance Radars is retained for defence or for weather-monitoring purposes rather than for the provision of civil ATC services.

Primary Surveillance Radars has not been standardized by ICAO, but remains a useful tool in busy terminal areas where it provides surveillance of aircraft not equipped with a transponder (intruder detection). The future use of traditional Primary Surveillance Radars is expected to decrease mainly due to widespread transponder carriage and the introduction of other surveillance technologies.

Primary Surveillance Radars is also used in airport surface surveillance applications to detect objects that stray onto the active areas of the airport and those aircraft with transponders that are configured to ignore SSR interrogations when on the ground.

Presently Primary Surveillance Radars are generally not the main means of providing surveillance because of its inability to provide target identification (this is mitigated to some extent by voice communication and specific procedures).

Independent Cooperative Sensor Systems

Secondary Surveillance Radars (SSR)

The Secondary Surveillance Radar system consists of two main elements, a ground-based interrogator/receiver and an aircraft transponder. The ground station typically consists of a rotating antenna. The aircraft's transponder responds to interrogations from the ground station enabling the aircraft's range and bearing from the ground station to be determined independantly. The bearing of the aircraft from the radar is determined by measuring the position of the rotating antenna when the reply is received. The range accuracy is generally constant within the coverage volume. However the bearing, being an angular measurement, is less accurate for aircraft that are further away from the radar.

The transponder is allowed a fixed delay within which to decode the interrogation and prepare the reply for transmission. This fixed delay is taken into account by the ground sensor when processing the reply.

Reference transponders, installed at known locations on the ground are used to confirm that the radar is operating correctly. The system is usually configured to generate an alert if the radar fails to receive a reply from the site monitor or reports its position outside a predefined area centred on its true position.

Secondary Surveillance Radars evolved from military applications that required an aircraft to be identified as friendly or hostile. The Mode A/C service was subsequently developed for civil aviation. Since then, Secondary Surveillance Radars has been significantly enhanced to include the Mode S service. Secondary Surveillance Radars share the frequencies 1 030 MHz for interrogations and 1 090 MHz for replies with other systems:

- Mode A/C transponders provide an identity (Mode A) code and pressure altitude (Mode C) code in response to radar interrogations. The spacing of the interrogation pulses determines the mode and hence controls the transponder response. The Mode A identity code, in the form of a four-digit octal number, is assigned by ATC and entered into the transponder by the flight crew. The transponder receives altitude from an on-board pressure altitude encoder or air data computer.

- Mode S allows selective addressing of aircraft through the use of a 24-bit aircraft address that uniquely identifies each aircraft and has a two-way data link between the ground station and aircraft for the exchange of information. It was designed to be backward compatible with and supports all functions of Mode A/C. data link allows additional information such as airspeed, heading, ground speed, track angle, track angle rate vertical rate and roll angle to be obtained from the aircraft. Such aircraft derived data may be used to improve the tracking of the aircraft and to alleviate the need for radio calls for obtaining the information. Other information that may be obtained via the Mode S data link includes the aircraft ID, the altitude selected by the flight crew on the aircraft's mode control panel and an ACAS RA report.

Multilateration (MLAT)

A multilateration system relies on signals from an aircraft's transponder being detected at a number of receiving stations. MLAT uses a technique known as TDOA to establish surfaces that represent constant differences in distance between the target and pairs of receiving stations. The aircraft position is determined by the intersection of these surfaces.

Multilateration can theoretically be performed using any signals transmitted periodically from an aircraft. However, systems used for civil purposes are based only on Secondary Surveillance Radars transponder signals. A multilateration system requires a minimum of four receiving stations to calculate an aircraft's position. If the aircraft's pressure altitude is known then the position may be resolved using three receiving stations. However, in practice, operational multilateration systems have many more receiving stations to ensure adequate coverage and performance.

The accuracy of a multilateration system is non-linear within the coverage volume. It is dependent on the geometry of the target in relation to the receiving stations and the accuracy to which the relative time of receipt of the signal at each station can be determined. A multilateration system needs a common time reference to determine the relative TOA of the signal at the receiving stations. This is normally done in one of two ways:

- Centralized: all the received signals are sent to a central processing station where they are time-stamped by a common clock. In this case, the system must determine and make allowance for the message transit time between each receiving station and the central station. The system transmits messages between the central and receiver stations to monitor and adjust the transit time; or

- De-centralized: the clocks in all of the receivers are kept in synchronism by a common reference such as GNSS, or through the use of a transmitter at a known location. The distance between this transmitter and the receiving stations is known, and by monitoring the time of receipt of the signals from this transmitter at each receiving station, adjustments can be made to ensure the receiver clocks remain synchronized.

Multilateration systems may include transmitting stations capable of interrogating aircraft transponders. This may be necessary if there are no other interrogations in the coverage area of the system to generate SSR reply signals. It may also be necessary to obtain Mode A code, pressure altitude and possibly other (through Mode S replies) aircraft data. Some systems also use the interrogations and subsequent replies to measure the range of the aircraft from the transmitting station in a similar manner to radar. This range measurement supplements the multilateration TDOA information.

Multilateration systems can also process extended squitter signals in two ways:

- by using TDOA, as with all other transponder signals; and
- by decoding the message content to determine the aircraft's position (latitude and longitude), pressure altitude and velocity.

MLAT therefore provides a transition to an environment where the majority of aircraft will be equipped with ADS-B.

Multilateration may be used for airport surface, terminal area and en-route surveillance. Its use for surface surveillance applications relies on aircraft transponders being active while being on the ground. In many aircraft, the transponder's operation is controlled by the weight-on-wheels switch, also known as the squat switch. Mode S transponders continue to transmit squitters and may be selectively interrogated while they are on the ground. However, Mode A/C transponders are often inhibited from replying to interrogations while the aircraft is on the ground to reduce the impact on nearby radar systems.

Dependent Cooperative Systems

Automatic Dependant Surveillance – Contract (ADS-C)

In ADS-C the aircraft uses on-board navigation systems to determine its position, velocity and other data. A ground ATM system establishes a "contract" with the aircraft to report this information at regular intervals or when defined events occur. This information is transmitted on point-to-point data links. This means the information cannot be accessed by other parties (i.e. other aircraft or other ATM systems). The aircraft operator and ATM provider each establish agreements with a data link service provider for delivery of the ADS-C messages. Information that may be transmitted in ADS-C reports includes:

- present position (latitude, longitude and altitude) plus time stamp and FOM;
- predicted route in terms of next and (next +1) waypoints;
- velocity (ground or air referenced); and
- meteorological data (wind speed, wind direction and temperature).

The airborne and ground systems negotiate the conditions under which the aircraft submits reports (i.e. periodic reports, event reports demand reports and emergency reports). Reports received by the ATM system are processed to track the aircraft on displays in a way similar to surveillance data obtained from SSR. The reporting rate for current oceanic operations is normally about 15 to 25 minutes. It is however possible for controllers to manually increase the reporting rate to support specific operations.

ADS-C is typically used in oceanic and remote areas where there is no radar. As a result, it is mainly fitted to long-range air transport aircraft and could support more efficient separation standards than in a case where ATC is reliant only on pilot reports. ADS-C is usually used in conjunction with CPDLC, which allows electronic data communication between ATC and flight crew as an alternative to voice communications.

Note: ADS-C is currently used entirely to provide procedural separation.

Automatic Dependant Surveillance – Broadcast (ADS-B)

ADS-B is the broadcast by an aircraft of its position (latitude and longitude), altitude, velocity, aircraft ID and other information obtained from on-board systems. Every ADS-B position message includes an indication of the quality of the data which allows users to determine whether the data is good enough to support the intended function.

The aircraft position, velocity and associated data quality indicators are usually obtained from an on-board GNSS. Current inertial sensors by themselves do not provide the required accuracy or integrity data, although future systems are likely to address this shortcoming. ADS-B position messages from an inertial system are therefore usually transmitted with a declaration of unknown accuracy or integrity. Some new aircraft installations use an integrated GNSS and inertial navigation system to provide position, velocity and data quality indicators for the ADS-B transmission. These systems are expected to have better performance than a system based solely on GNSS, since inertial and GNSS sensors have complementary characteristics that mitigate the weaknesses of each system. Altitude is usually obtained from the pressure altitude encoder (also used as the data source for Mode C replies).

Since ADS-B messages are broadcast, they can be received and processed by any suitable receiver. As a result, ADS-B supports both ground-based and airborne surveillance applications. For aeronautical surveillance, ground stations are deployed to receive and process the ADS-B messages. In airborne applications, aircraft equipped with ADS-B receivers can process the messages from other aircraft to determine the location of surrounding traffic in support of applications such as the CDTI. Other, more advanced ASAs are under development and are expected to have a significant impact on the way in which air traffic is managed.

Three ADS-B data links (or signal transmission systems) have been developed and standardized:

Mode S[1] 1 090 MHz ES (1 090 ES) was developed as part of the Mode S system. The standard Mode S acquisition squitter is 56 bits long. The 1 090 MHz ES contains an additional 56-bit data block containing ADS-B information. Each ES message is 120 microseconds long (8

[1] The manual on Technical Provisions for Mode S Services and Extended Squitter (Doc 9871) contains details on Mode S ES

microseconds of preamble and 12 microseconds of data). The signals are transmitted at a frequency of 1 090 MHz, and have a data transmission rate of 1 Mbps. The ADS-B information is broadcast in separate messages, each of which contains a related set of information (e.g. airborne position and pressure altitude, surface position, velocity, aircraft ID and type, emergency information). Position and velocity are transmitted twice per second. Aircraft ID is transmitted every 5 seconds. The transmission of ES ADS-B is an integral part of many Mode S transponders, although it may also be implemented in a non-Mode S transponder device as well. There is international agreement that Mode S ES will be used for air transport aircraft worldwide to support interoperability, at least for initial implementation.

Universal access transceiver[2] (UAT) has been designed as a general purpose aviation data link to allow uplink of information in addition to the transmission of ADS-B data. Since each UAT transceiver is allocated a time slot, the receiver is able to perform a range check, based on the time of receipt of the message, to provide a rudimentary validation of the broadcast position. This feature also allows aircraft receiving messages to determine their range from the ground station.

VHF digital link Mode 4[3] (VDL Mode 4) was developed as a generic data link supporting CNS functions. The applicability was initially restricted to surveillance applications like ADS-C and ADS-B, but the regulatory restrictions were later removed so that VDL Mode 4 is now available as a CNS data link. The system supports broadcast and point-to-point communications for air-ground and air-air applications.

ATS Services – Evolution of Aeronautical Surveillance

Aeronautical surveillance systems are designed to be used by ATS to improve capacity and to enhance safety. In support of applications, the ATS surveillance system should provide for a continuously updated presentation of surveillance information, including position indications.

En-route control service

En-route control services usually encompass large volumes of airspace (including oceanic areas) where aircraft are well established on their flight paths and are typically in cruise mode. Aircraft generally fly at high speeds in this phase.

A surveillance system for area control typically needs to provide surveillance over large volumes of airspace including remote areas where ground infrastructure may be limited or non-existent. The surveillance system should support controller safety net alerts such as cleared level monitoring, route adherence monitoring and restricted area monitoring. The provision of medium-term conflict detection tools is desirable. Position updates may not need to be as frequent as in other environments.

Surveillance systems suitable for area control include ADS-C, particularly in oceanic and remote areas, SSR, MLAT and ADS-B. The following table summarises the proposed evolution of air traffic surveillance solutions in the region:

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[2] The Manual on the Universal Access Transceiver (UAT) (Doc 9861) contains details of UAT.
[3] The Manual on VHF Digital Link (VDL) Mode 4 (Doc 9816) contains details of the VDL Mode 4.

EN ROUTE AIRSPACE OPERATIONS

	Short term (2008-2015)	**Mid- term (2016-2020)**	**Long term (2020 and beyond)**
	Surveillance technologies*	**Surveillance technologies***	**Surveillance technologies***
Type 1	SSR where implemented ADS-B MLAT	SSR where implemented ADS-B MLAT	Reduced number of SSRs ADS-B MLAT
Type 2	ADS-C SSR where implemented ADS-B MLAT	SSR where implemented ADS-B MLAT	Reduced number of SSRs ADS-B MLAT
Type 3	ADS-C Voice Reporting	ADS-C Voice Reporting	ADS-C Reduced Voice Reporting
Remote	ADS-C Voice Reporting	ADS-C Voice Reporting	ADS-C Reduced Voice Reporting
Oceanic	ADS-C Voice Reporting	ADS-C Voice Reporting	ADS-C Reduced Voice Reporting

*** Only when and where operationally justified and cost-effective.**

Note:

- **Type 1: Complex traffic pattern and a high density traffic;**
- **Type 2: Complex traffic pattern and a medium density traffic; and**
- **Type 3: Low density traffic.**

Approach control service

Approach control services are provided to controlled flights arriving or departing from one or more aerodromes. Vectoring may be performed at higher traffic density levels, and changes in altitude and heading are frequent. Arriving traffic may be placed in holding patterns when demand for services exceeds the aerodrome or airspace capacity.

In this environment, the role of ATM is to manage the flow of traffic to and from the aerodrome, to separate arriving traffic from departing traffic. Aircraft are typically separated by lesser minima than in the case of area control. Aircraft speeds are lower than in the en-route phase of flight.

Surveillance systems suitable for approach control include primary radar, SSR, multilateration (MLAT) and ADS-B. The following table summarises the proposed evolution of air traffic surveillance solutions in the region:

APPROACH AIRSPACE OPERATIONS

	Short term (2008-2015)	Mid- term (2016-2020)	Long term (2020 and beyond)
	Surveillance technologies*	**Surveillance technologies***	**Surveillance technologies***
Type 1	SSR where implemented PSR MLAT ADS-B	SSR where implemented PSR MLAT ADS-B	MLAT ADS-B
Type 2	SSR where implemented PSR MLAT ADS-B	SSR where implemented PSR where justified MLAT ADS-B	MLAT ADS-B
Type 3	Voice Reporting	Voice Reporting	Voice Reporting

*** Only when and where operationally justified and cost-effective.**

Note:
- **Type 1: Complex traffic pattern and a high density traffic;**
- **Type 2: Complex traffic pattern and a medium density traffic; and**
- **Type 3: Low density traffic.**

Aerodrome control service

Aerodrome control service is, inter alia, responsible for preventing collisions between aircraft in the vicinity of the aerodrome and between aircraft and vehicles in the manoeuvring area and between aircraft landing and taking off. Visual sighting of aircraft from the control tower is the primary means of determining position. During busy periods and in low visibility conditions, a surveillance system may be used to improve the safety and efficiency of aerodrome operations.

It also needs a high update rate in order to present a current picture in a rapidly changing environment.

A surveillance system supporting an aerodrome control service needs to have a high degree of accuracy to determine the location of targets on relatively narrow runways and taxiways, with the ability to detect both aircraft and vehicles, and to distinguish between closely spaced targets. The system also needs a high update rate in order to present a current picture in a rapidly changing environment. Aircraft and vehicles need to be clearly labelled on controller displays to avoid confusion. The surveillance system should support runway incursion monitoring and other alerting tools.

Surveillance systems suitable for aerodrome control include primary radar, secondary surveillance, multilateration and ADS-B. The following table summarises the proposed evolution of air traffic surveillance solutions in the region:

TERMINAL AIRSPACE OPERATIONS

	Short term (2008-2015)	Mid- term (2016-2020)	Long term (2020 and beyond)
	Surveillance technologies*	**Surveillance technologies***	**Surveillance technologies***
Type 1	SSR where implemented PSR MLAT ADS-B	SSR where implemented PSR MLAT ADS-B	MLAT ADS-B
Type 2	SSR where implemented PSR MLAT ADS-B	SSR where implemented PSR MLAT ADS-B	MLAT ADS-B
Type 3	Voice Reporting	Voice Reporting	Voice Reporting

*** Only when and where operationally justified and cost-effective.**
Note:

- **Type 1: Complex traffic pattern and a high density traffic;**
- **Type 2: Complex traffic pattern and a medium density traffic; and**
- **Type 3: Low density traffic.**

Data Exchange Format

Motivation on the use of ASTERIX to be included here

Data Sharing Agreement – Template

Proposed data sharing agreement to be included in this section, with the necessary motivation.

Surveillance Performance Framework

En-Route Surveillance

SURVEILLANCE SYSTEMS PERFORMANCE FRAMEWORK	
Performance Benefits	
Safety	Timely availability of reliable infrastructure capabilities will improve ***safety*** and efficiency in aviation as well as improving airspace and aerodrome capacity. Timely availability of adequate radio spectrum will ensure the provision of viable air navigation services on a global basis and thus improve ***safety*** and efficiency in aviation.
Environment	Optimal routing will reduce carbon ***emissions***.
Efficiency	Timely availability of reliable communication capabilities will improve safety and ***efficiency*** in aviation as well as improving airspace and aerodrome capacity. Timely availability of adequate radio spectrum will ensure the provision of viable air navigation services on a global basis and thus improve safety and ***efficiency*** in aviation.
Capacity	Timely availability of reliable infrastructure capabilities will improve safety and

	efficiency in aviation as well as improving airspace and aerodrome ***capacity***.			
Cost Effectiveness	Optimal routing will reduce ***operating cost***			
ATM Operational Concept Components	**Tasks / Project / Initiative**	**Timeframe Start-End**	**Responsibility**	**Status**
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
Risk Management				
Risk Factors	Lack of Funding. Delay of Aircraft Equipage. System inter-operability & Harmonization. Lack of SARPS. Insufficient Data.			
Risk Mitigation	Identification and application of different funding resources. Proactive consultation with ATM Community. Proactive consultation with Regulators. Access to ATM Community planning forums.			
Linkage to GPI's				
GPI-9: Situational Awareness		AO, TS, CM, AUO		

Approach Surveillance

SURVEILLANCE SYSTEMS PERFORMANCE FRAMEWORK	
Performance Benefits	
Safety	Timely availability of reliable infrastructure capabilities will improve ***safety*** and efficiency in aviation as well as improving airspace and aerodrome capacity. Timely availability of adequate radio spectrum will ensure the provision of viable air navigation services on a global basis and thus improve ***safety*** and efficiency in aviation.
Environment	Optimal routing will reduce carbon ***emissions***.
Efficiency	Timely availability of reliable communication capabilities will improve safety and ***efficiency*** in aviation as well as improving airspace and aerodrome capacity. Timely availability of adequate radio spectrum will ensure the provision of viable air navigation services on a global basis and thus improve safety and ***efficiency*** in

	aviation.			
Capacity	Timely availability of reliable infrastructure capabilities will improve safety and efficiency in aviation as well as improving airspace and aerodrome ***capacity***.			
Cost Effectiveness	Optimal routing will reduce ***operating cost***			
ATM Operational Concept Components	**Tasks / Project / Initiative**	**Timeframe Start-End**	**Responsibility**	**Status**
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
Risk Management				
Risk Factors	Lack of Funding. Delay of Aircraft Equipage. System inter-operability & Harmonization. Lack of SARPS. Insufficient Data.			
Risk Mitigation	Identification and application of different funding resources. Proactive consultation with ATM Community. Proactive consultation with Regulators. Access to ATM Community planning forums.			
Linkage to GPI's				
GPI-9: Situational Awareness			AO, TS, CM, AUO	

Terminal Surveillance

SURVEILLANCE SYSTEMS PERFORMANCE FRAMEWORK	
Performance Benefits	
Safety	Timely availability of reliable infrastructure capabilities will improve ***safety*** and efficiency in aviation as well as improving airspace and aerodrome capacity. Timely availability of adequate radio spectrum will ensure the provision of viable air navigation services on a global basis and thus improve ***safety*** and efficiency in aviation.
Environment	Optimal routing will reduce carbon ***emissions***.
Efficiency	Timely availability of reliable communication capabilities will improve safety and

	efficiency in aviation as well as improving airspace and aerodrome capacity. Timely availability of adequate radio spectrum will ensure the provision of viable air navigation services on a global basis and thus improve safety and ***efficiency*** in aviation.
Capacity	Timely availability of reliable infrastructure capabilities will improve safety and efficiency in aviation as well as improving airspace and aerodrome ***capacity***.
Cost Effectiveness	Optimal routing will reduce ***operating cost***

ATM Operational Concept Components	**Tasks / Project / Initiative**	**Timeframe Start-End**	**Responsibility**	**Status**
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				
AOM, DCB, AO, TS, CM, AUO, ATMSDM				

Risk Management	
Risk Factors	Lack of Funding. Delay of Aircraft Equipage. System inter-operability & Harmonisation. Lack of SARPS. Insufficient Data.
Risk Mitigation	Identification and application of different funding resources. Proactive consultation with ATM Community. Proactive consultation with Regulators. Access to ATM Community planning forums.

Linkage to GPI's	
GPI-9: Situational Awareness	AO, TS, CM, AUO

List of Acronyms and Abbreviations

3D	Three Dimensional
3G	Third Generation
3GPP	Third Generation Partnership Project
AAIM	Aircraft Autonomous Integrity Monitoring
ABAS	Aircraft –based Augmentation
ACARS	Aircraft Communications, Addressing and Reporting System
ACAS	Airborne Collision Avoidance System
ACC	Area Control Centre
ADF	Automatic Direction Finder
ADS	Automatic Dependent Surveillance
ADS – B	Automatic Dependant Surveillance – Broadcast
ADS – C	Automatic Dependant Surveillance – Contract
AERMAC	Aeronautical Message and Communication (Software Product)
AFI	Africa – Indian ocean area
AFN	ATC Facilities Notification (Fans 1/A Message)
AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunications Network
AGC	Automatic Gain Control
AIDC	Air Traffic Services Inter – Facility Data Communications
AIMU	Aeronautical Information Management Unit
AIP	Aeronautical Information Publication
AIREP	Air Report
AMC	Airspace Management Cells
AMCP	Aeronautical Mobile Communications Panel
AMHS	ATS message Handling System
AMS	Aeronautical Mobile Service
AMS® S	Aeronautical Mobile-Satellite (R) Service
AMSS	Aeronautical Mobile-Satellite Service
ANR’s	Air Navigation Regulations
AO	Aircraft Operators
AOC	Aircraft Operating Company / Committee
AORRA	Atlantic Ocean Random Route Area
APIRG	AFI Planning and Implementation Regional Group
APN	Access Point Name
APP	Approach
APR	Automatic Position Reporting
APV	Approach with Vertical Guidance
AR	Area of Routing
ASM	Airspace Management
A-SMGCS	Advanced Surface Movement Guidance & Control System
ASP	Aeronautical Surveillance Panel
ATA	Actual Time of Arrival
ATD	Actual Time of Departure
ATFM	Air Traffic Flow Management
ATIS	Automatic Terminal Information Service
ATN	Aeronautical Telecommunications Network

ATOM	ADSAT Trials Operations Manual
ATS	Air Traffic Services or Aircraft Tracking System
ATS/DS	Air Traffic Service / Direct Speech
ATSMHS	Air Traffic Services Message Handling System
BA	Business Analyst
BER	Bit Error Rate / Beyond Economical Repair
BITE	Build-in Test Equipment
BOM	Bill of Material
BSA	Business Systems Administrator
CAMU	Central Airspace Management Unit
CAPEX	Capital Expenditure
CATS-ACCID &INCID	Civil Aviation Technical Standards / Accidents and Incidents
CATS-AIRS	Civil Aviation Technical Standards / Met Information And Aeronautical Info Services
CATS-ARM	Civil Aviation Technical Standards / Aircraft Registration Markings
CATS-ATO	Civil Aviation Technical Standards / Aviation Training Organisations
CATS-ATS	Civil Aviation Technical Standards / Air Traffic Services
CATS-DG	Civil Aviation Technical Standards / Dangerous Goods
CCA	Commissioner Civil Aviation
CDI	Course Deviation Indicator
CDP	Communications Data Processor
CDR's	Conditional Routes
CDRL	Contract Document Requirement List
CDU	Control and Display unit
CEU	Central Executive Unit
CFE	Customer Furnished Equipment
CFIT	Controlled Flight Into Terrain
CFMU	Central Flow Management Unit
CLD	Clearance Delivery
CM	Context Management
CNS	Communications, Navigation and Surveillance
COM	Communications
CPDLC	Controller Pilot Data Link Communication
CRC	Cycle Redundancy check
CRM	Customer Relationship Management
CRM	Collision Risk Modelling
CSD	Circuit Switched Data
CTA	Control Area
CTR	Control Zone
CUG	Closed User Group
DAIW	Danger Area Infringement Warning
DARPs	Dynamic user preference re-routes
D-ATIS	Digital Automatic Terminal Information System
DCPC	Direct Controller Pilot Communications (voice/data)
DCW	Digital Chart of The World
DDP	Delivered Duty Paid
DECT	Digital Enhanced Cordless Telecommunications
DEP	Departure

DF	Directional Finder
D-FIS	Digital Flight Information Service
DGNSS	Differential Global Navigation Satellite System
DHCP	Dynamic Host Configuration Protocol
DI	Direction Indicator
DL	Data Link
DLC	Departure Clearance
DME	Distance Measuring Equipment
DTED	Digital Terrain Elevation Data
DTM	Dual Transfer Mode
DTMF	Dual Tone Multi Frequency
DVD	Digital Versatile Disk
DVOR	Doppler VOR
DVR	Digital Video Recorder
EASA	European Aviation Safety Agency
EATCHIP	European Air Traffic Control Harmonisation and Integration Program
EATMS	European Air Traffic Management System
ECAC	European Civil Aviation
ECP	Engineering Change Proposal
EGNOS	European Geostationary Navigation Overlay System
ETA	Estimated Time of Arrival
EUR	European Region
EUROCAE	European Organisation for Civil Aviation Equipment
Eurocontrol	European Organisation for the Safety of Air Navigation
FAA	Federal Aviation Administration
FANS	Future Air Navigation Systems
FAT	Factory Acceptance Tests
FDP	Flight Data Processor
FDPS	Flight Data Processing System
FET	Further Education & Training
FIC	Flight Information Centre
FIR	Flight Information Region
FIS	Flight Information Service
FL	Flight Level
FMC	Flight Management Computer
FMECA	Failure Mode Effect and Critical Analyses
FMP	Flow Management Position
FMS	Flight Management System
FOB	Free on Board
FOR	Free on Rail
FPL	Flight Plan
FRACAS	Failure Mode Effect and Corrective Action System
FRT	Fixed Radius Transition
FTA	Fault Tree Analyses
FTE	Flight Technical Error
FUA	Flexible Use of Airspace
GAAP	General Aviation Accident Prevention
GBAS	Ground Based Augmentation System

GES	Ground Earth Station
GIC	GNSS Integrity Channel
GLONASS	Global Navigation Satellite System (Russian Federation)
GNSS	Global Navigational Satellite System
GPRS	General Packet Radio Service
GPS	Global Positioning System
GS	Ground Speed
GSM	Global System for Mobile Communications
GUI	Graphical User Interface
HDL	HF Data Link
HF	High Frequency
HFDL	High Frequency Data Link
HFP	Human Factors Practitioner
HFS	Human Factor Specialist
HME	Height Monitoring Equipment
HMI	Human Machine Interface
HMU	Height Monitoring Unit
HTTP	Hyper Text Transfer Protocol
IAS	Indicated Air Speed
ICG	Implementation Coordination Group
ICT	Information Communication Technology
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IMAP	Internet Message Access Protocol
INS	Inertial Navigation System
IORRA	Indian Ocean Random Route Area
IP	Internet Protocol
IRS	Inertial Reference System
IRU	Inertial Reference Unit
ISD	Integrated Service Digital Network
ISS	Investigation and Standards Specialist
IT	Information Technology
JAA	Joint Aviation Authorities
JIT	Just In Time
KSIA	King Shaka International Airport
LAAS	Local Area Augmentation System
LAN	Local Area Network
LCC	Life Cycle Cost
LCD	Liquid Crystal Display
LIS	Logistic Information System
LNAV	Lateral Navigation
LRU	Line Replaceable Unit
LS	Logistic Support
LSA	Logistic Support Analyses
LSP	Logistic Support Plan
LSPP	Logistic Support Programme Plan
MACS	Minimum Acceptable Communication Service
MARS	Minimum Acceptable Radar Service
MASPS	Minimum Aviation System Performance Standards

MCDU	Multi Purpose Control and Display Unit (Acars and FMC)
MCO	Marketing communications Officer
MCOMS	Marketing and Communications Specialist
MDF	Main Distribution Frame/ Management Development Facilitator
MDP	Management Development Program
MEL	Minimum Equipment List
MER	Manager Employee Relations
MET	Meteorological
METAR	Aviation routine weather report
MLS	Microwave Landing System
MMR	Multimode Receiver
MMS	Maintenance Management System (Software product)
MNPS	Minimum Navigation Performance Specifications
MNT	Mach Number Technique
MODE S	Mode S SSR Data Link
MRT	Multi Radar Tracking
MSA	Minimum Sector Altitude
MSAW	Minimum Safe Altitude Warning System
MSSR	Monopulse Secondary Surveillance Radar
MTBF	Mean Time Before Failure
MTCA	Medium Term Conflict Alert
MTTR	Mean Time To Repair
NAVAID	Navigation Aids
NDB	Non Directional Beacon
NM	Nautical Mile
NOTAM	Notice To Airmen
NPA	Non-precision Approach
NQF	National Qualifications Framework
NSE	Navigation System error
NSTB	National Satellite Test Bed
OEM	Original Equipment Manufacturer
OLDI	On Line Data Interchange
OPS	Operations
ORTIA	OR Tambo International Airport
PANS-OPS	Procedure for ANS-Aircraft Operations
PBN	Performance Based Navigation
PBU	Period Of Beneficial Use
PBX	Private Branch eXchange
PCM	Pulse Code Modulation
PCUG	Private Closed User Group
PDA	Personal Digital Assistant
PDC	Pre Departure Clearance
PHS&T	Packaging, Handling, Storage and Transportation
POP	Post Office Protocol
POTS	Plain Old Telephone System
PPP	Point-to-Point Protocol
PSR	Primary Surveillance Radar
PSTN	Public Switched Telephone Network
PTN	Private Telecommunication Network

PVN	Private Voice Network
PWT	Personal Wireless Telecommunications
QNH	Pressure Setting for Altimeters (Usually In Hecta Pascals)
R/T	Radiotelephony
RA	Resolution Advisory (ACAS A\C Warning)
RAFC	Regional Area Forecasting Centre
RAIM	Receiver Autonomous Integrity Monitoring
RAM	Reliability, Availability and Maintainability
RAN	Regional Air Navigation
RCMMS	Remote Control Monitoring & Maintenance System
RCMS	Remote Control and Monitoring System
RCP	Required Communication Performance
RDP	Radar Data Processor
RF	Radius to Fix Area Navigation
RFC	Request for Change
RFP	Request for Proposal / Radar Front Processor
RFQ	Request for Quotation
RFT	Request for Tender
RNAV	Required Area Navigation
RNP	Required Navigation Performance
ROD	Record of Decision
ROI	Registration of Interest
ROT	Runway Occupation Time
ROX	Rate of Exchange
RPL	Repetitive Flight Plan/ Recognition of prior Learning
RPS	Recording And Playback System
RSP	Required Surveillance Performance
RTCA	Requirements and Technical Concepts for Aviation
RVR	Runway Visual Range
RVSM	Reduced Vertical Separation Minima
SAM	South American Region
SARP's	Standards and Recommended Practices
SAT	Site Acceptance Tests or South Atlantic
SATCOM	Satellite Communications
SBAS	Satellite – based Augmentation System
SBAS	Space Based Augmentation System
SDH	Synchronous Digital Hierarchy
SE	Systems Engineer
SID	Standard Instrument Departure
SIGMET	Information concerning en-route phenomena which may affect the safety of aircraft operations
SIGWX	Significant Weather
SLA	Service Level Agreement
SME	Small and Medium Size Enterprise
SMS-C	Short Message Service Center
SNMP	Simple Network Management Protocol
SRA	Special Rules Airspace / Surveillance Radar Approach
SRE	Surveillance Radar Element
SRU	Shop Replace able Unit / Surveillance Radar Unit

SSR	Secondary Surveillance Radar
SSS	System Support Suite
STAR	Standard Terminal Arrival Route
STCA	Short Term Conflict Alert
SWC	Soccer World Cup
TA	Traffic Advisory (TCAS A/C Warning, Tactical Manoeuvre Required)
TAAMS	Total Airport And Airspace Modelling Software
TAF	Terminal Area Forecast
TAR	Terminal Approach Radar
TAS	True Air Speed
TAT	Turn Around Time
TCAS	Traffic Collision Avoidance System
TCP	Transmission Control Protocol
TDM	Track Definition Message (Time Division Multiplex)
TET	Trainee Engineering Technician
TGO	Target generating Officer
TL	Technologist Logistics
TLS	Target Level of Safety
TMA	Terminal Control Area (Terminal Maneuvering Area)
TMS	Air Traffic Management Specialist
TOS	Traffic Orientation Scheme
TSA	Temporary Segregated Area
TSE	Total System Error
UHF	Ultra High Frequency
URS	User Requirement Statement / Specification
USB	Universal Serial Bus
VCCS	Voice Communication and Control Switch
VCR	Visual Control Room
VDF	VHF Directional Finder
VDL	VHF Data Link
VFR	Visual Flight Rules
VHF	Very High Frequency
VNAV	Vertical Navigation
VoIP	Voice Over Internet Protocol
VOR	VHF Omni directional Range
VOR	VHF Omni directional Radio Range
VPN	Virtual Private Network
VSAT	Very Small Aperture Terminal
WAAS	Wide Area Augmentation System
WAFS	World Area Forecast System
WAN	Wide Area Network
WANA	Wide Area Network A
WAP	Wireless Application Protocol
WBS	Work Breakdown Structure
WGS-84	World Geodetic Reference System 1984
WiFi	Wireless Fidelity
WLAN	Wireless Local Access Network
WWW	World Wide Web

APPENDIX 3.4L

Terms of Reference, Composition and Work Programme of AFI Aeronautical Surveillance Implementation Task Force

Term of Reference

The AFI Aeronautical Surveillance terms of reference are to:

1. Determine the operational performance requirements for aeronautical surveillance in the AFI Region, en-route, terminal areas (TMAs) and aerodromes operations.

2. Identify and quantify near term and long term benefits of relevant candidate surveillance systems.

3. Develop a draft AFI Surveillance plan including recommended target dates of implementation, taking into account:

- Availability of SARPs,
- Readiness of airspace users and air navigation service providers
- Relevant RAN and APIRG recommendations, conclusions and decisions pertaining to aeronautical surveillance.
- Work done by ICAO Surveillance Panel with the view to avoiding any duplication

Note: *The Task Force should report to the next APIRG meeting with preliminary report to the ATM/AIM/SAR and CNS sub-groups*.

Composition:

- Core members: ATNS (South Africa), ASECNA, IATA, Algeria, Ghana, Kenya, Nigeria, Rwanda, Tanzania and IFALPA.

  - States with large oceanic FIRs interface with other ICAO Regions and large continental coverage to be added to the composition as core members. (Democratic Republic of Congo, Mauritius and Seychelles)

Working Groups:

Working Group for the development of the AFI En-route Surveillance strategy

- Seychelles (Team Leader)
- South Africa
- Nigeria
- Ghana
- DRC
- IATA
- Mauritius
- Angola

Working Group for the development of the AFI Terminal Area Surveillance strategy

- ASECNA (Team Leader)
- Zambia
- South Africa
- IATA
- Tanzania

Future Work Programme

No.	Activity	Target dates
1.	Review and amend the AFI Surveillance Strategy as necessary, based on available ICAO SARPs and relevant guidance material	CNS SG5 2013
2.	Collect relevant data to support categorization of AFI Terminal Areas (TMAs) and Aerodromes, in coordination with the ATM/AIM/SAR Sub-group.	CNS/SG/5 2013
3.	Develop Surveillance Distribution Data Format (ASTERIX)	CNS SG/5 2013
4.	Develop Guidelines for Surveillance Data Exchange Agreements based on other regions best practices	CNS SG/5 2013
5.	Develop Surveillance Data Distribution Format	CNS SG/5 2013
6.	Monitor the status of implementation of the AFI Surveillance Plan	CNS/SG/5 2013
7.	Develop amendment proposals to the AFI Air Navigation Plan (Doc 7474), FASID, CNS Tables 4A and 4B	CNS SG/5 2013
8.	Develop regional performance objectives and metrics	CNS/SG/5 2013

-END-

APPENDIX-3.5A

Insert Logo Here Organisation 1	Insert Logo Here Organisation 2	Insert Logo Here Organisation 3

Service Level Agreement Template

Edition	:	
Edition Date	:	
Status	:	

DOCUMENT APPROVAL

The following table identifies all management authorities that have successively approved the present issue of this document.

In witness whereof, the undersigned have executed this Agreement as of the date previously mentioned in this Agreement.

[Insert authority names below as appropriate]

AUTHORITY	NAME AND SIGNATURE	DATE
Aeronautical Information Services		
Data Originator		
Regulator		

DOCUMENT CHANGE RECORD

The following table records the complete history of the successive editions of the present document.

EDITION	DATE	REASON FOR CHANGE	SECTIONS PAGES AFFECTED

TABLE OF CONTENTS

Appendix A to WP/17 on Agenda Item 3.5

1. INTRODUCTION

1.1 Scope

This Service Level Agreement (SLA) documents the agreed provision of service for the supply of aeronautical information (Data) by **[organisation name]** (The Data Originator) to **[organisation name]** (The AISP) and the agreed standards to which the said information shall be published by the AISP. **This SLA is overseen and managed by the [organisation name] (The Regulator).**

1.2 Benefits Gained from an SLA

An SLA is a contract between parties that defines the services provided, the indicators associated with these services, acceptable and unacceptable service levels, liabilities on the part of the service provider and the customer, and actions to be taken in specific circumstances.

In the scope of this SLA only modes of operation are discussed and formalised and financial components are not considered.

The basic objectives of an SLA are as follows:

- **Better communication. It facilitates two-way communication between the parties. This communication starts at the beginning of the process to establish an SLA and continues throughout the life of the arrangement. The parties involved come together in order to understand each other's needs, priorities and concerns, and to gain an insight into the problems which may be faced by each party through the failure of each party to fulfil their obligations.**

- **Guards against expectation creep. It is not uncommon for one party's expectations of another to be higher than that which may be considered reasonable. Discussing these expectations and the resource commitments necessary to meet them is one activity undertaken in the establishment of an SLA. The process facilitates the identification and discussion of expectations. As a result, it helps identify service levels that are considered acceptable by each party and which are attainable and achievable.**

- **Mutually agreed standard. It sets an agreed standard against which performance may be measured. It identifies customer expectations, defines the boundaries of the service provision and clarifies responsibilities. In the absence of a shared understanding about needs and priorities, it is easy for conflicts to arise between parties. An SLA and the communication process involved in establishing it help to minimise the conflicts between the parties and provides a means for conflict resolution should a problem arise.**

- **A process for gauging service effectiveness. As the SLA defines standards against which the service may be measured and evaluated, it provides the basis for performing an assessment of the effectiveness of the service.**

1.3 Parties to the Agreement

The following table describes and names the legal entities and their representatives who have reviewed and approved this SLA.

Entity [Insert Regulator details here]	Address	Re presentative
[Insert AISP details here]		
[Insert Data Originator details here]		

Table 1: Parties to Agreement

1.4 Perspective – Regulative Environment

A number of documents specify the regulatory requirements for the provision of information by Data Originators and its subsequent processing by AIS. These include:

- ICAO Annex 4 “Aeronautical Charts”;
- ICAO Annex 5 “Units of Measurement to be Used in Air and Ground Operations”;
- ICAO Annex 11 “Air Traffic Services”;
- ICAO Annex 14 “Aerodromes”;
- ICAO Annex 15 “Aeronautical Information Services”.

These documents are further supported by guidance material, including:

- ICAO Doc 8126 “AIS Manual”;
- ICAO Doc 8697 “Aeronautical Chart Manual”;
- ICAO Doc 9674 “WGS-84 Manual”;
- Operating Procedures for AIS Dynamic Data (OPADD).

[Add any State applicable regulation here]

1.5 Term

The term of this SLA shall be as follows:

Start Date: **[Insert start date here]**

End Date: **[Insert end date here]**

Duration: **[Insert duration here]**

Once agreed The AISP and The Data Originator cannot withdraw from all or part of this agreement within the above dates.

[Add any other agreed constraints of / specification for the scope here.]

1.6 Conventions

Within this SLA, the following conventions are used:

1.6.1 Time

1.6.2 Presentation of Date and Time in All-numeric Form

This SLA uses Co-ordinated Universal Time (UTC) as described in Attachment D of Annex 5.

This SLA uses the procedures for writing the date and time in all-numeric form as described in Attachment E of Annex 5.

Times expressed as a number of “Office hours” include the hours from 8:00 to 16:00 Dutch local time (Monday to Friday).

Times expressed as a number of “Office hours” include business hours, Monday through Friday, excluding designated holidays.

Unless specifically mentioned otherwise, all durations specified are in working days.

1.6.3 Quality Attributes / Definitions

Accuracy: A degree of conformance between the estimated or measured value and the true value.

AIRAC System: A system aimed at advance notification based on common effective dates, of circumstances that necessitate significant changes in operating practices.

NOTAM System: A system of distributing notices by means of telecommunication, that contain information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Resolution: A number of units or digits to which a measured or calculated value is expressed and used.

Integrity: A degree of assurance that an aeronautical data item and its value have not been lost or altered since its origination or authorised amendment.

Timeliness: A characteristic by which either data is provided or actions performed, with sufficient time remaining so as not to impact later actions and possibly jeopardise the achievement of the required result within due time.

1.6.4 Data Categories

The following data classifications are used within this document:

Routine: There is a very low probability when using corrupted routine data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

The permitted maximum error rate is 1 in 1000, providing an integrity level of 1 x 10^{-3}.

Essential: There is a low probability when using corrupted essential data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

The permitted maximum error rate is 1 in 100,000, providing an integrity level of 1×10^{-5}.

Critical: There is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe.

The permitted maximum error rate is 1 in 100,000,000, providing an integrity level of 1×10^{-8}.

1.7 Entities Involved for Data Provision

The following entities categories involved are used within this document:

1. Civil Aviation Authority (CAA)

   The national body responsible for the overall supervision of aviation-related activities.

2. **[Insert Organisation Name Here]**

   The organisation responsible for the provision of Air Navigation Services for the State.

3. Aeronautical Information **Management**/Services **(AIM/AIS)**

   The unit of the ANSP responsible for the provision of Aeronautical Information Services (AIS) for the State.

4. **Data Originator**

   Describe the data originator body here.

5. National Supervisory Authority (NSA)

2. SERVICES AND SERVICE LEVELS

2.1 Service Description

The Data Originator will provide the AISP with the Data for which it is responsible as listed in Table 2, below.

Data Entity	Description
X	
Y	
Z	

Table 2: Data to be Provided

The AISP will, in turn, publish the information within the National Publication and in accordance with ICAO and National regulations.

2.1.1 Regulation

[Detail here the regulation that applies to this SLA]

2.2 Optional Services

[Detail any further services required here]

2.3 Exclusions

[Detail any further services required here]

2.4 Limitations

[Detail any further services required here]

2.5 Entities Involved

[Detail any the entities involved here]

2.6 Service Levels

2.6.1 Data Originator

All Data shall be provided in accordance with the following criteria:

1. The Data shall include its effective date.
2. The Data shall include its period of validity.
3. The Data shall be provided with the requested publication.
4. The Data shall be prepared in accordance with the following standards:
   a. **[List standards here]**

Additionally, the Data Originator shall provide each of the identified Data items in Table 2, in accordance with the following specific criteria:

2.6.1.1 *Data Item x – Repeat for each data item.*

The Data shall be provided at least **[insert timeliness requirement]** days prior to the effective date.

The Data shall be provided by **[insert delivery requirement]** means.

The Data shall be provided in **[insert required format of delivery].**

The Data shall be provided with the following quality attributes:

Attribute	Accuracy	Resolution	Inte grity Level	Note
X'1	**20 m**	**1 second**	**Critical**	
X'2	**1 ft**	**0.1 ft**	**Essential**	
X'3	**n/a**	**n/a**	**Routine**	**Textual data**

Table 3: Data Attributes – Entity X

The Data shall be provided by with the following mete-data:

1. **[insert meta-data requirement].**

[Add more requirements for the provision of information]

2.6.2 AISP

The AISP shall process the Data upon receipt.

The AISP shall present a draft publication including the Data for approval by **[insert approver]** at least **[insert timeliness requirement]** days prior to the effective date.

The AISP shall publish the Data within the requested publication unless otherwise agreed, in writing, with the Data Originator.

[Add more requirements for the publication of information]

2.7 Service Level Indications

The following measures will be used to assess the performance of the service:

Measure	Description	Target
		Target date[1]. Late provision must be alerted to the AIM as soon as known. The publication of this information will then be the subject of negotiation.
Format	The Data is provided by the Data Originator to the AIM, without errors in presentation or content, in the format detailed within this SLA.	95%
Draft Publication	The AIM will present a draft publication to the Data Originator for approval within the specified timeframe.	95% by required due date[2]. 100% within one day following due date[2].
Publication	The AIM will publish the Data within the required period (e.g. in compliance with the AIRAC cycle).	95% by required due date.
Quality of Publication	The IAIP product prepared will be provided in accordance with the applicable standards.	95%
Add and amend indications as required.		

Due date is used to mean the number of days in advance of the effective date that the information is to be provided to the AIS. This period is defined in section 2.6.1.

Measure	Description	Target
Quality of Data	The Data is delivered by the Data Originator to the AIM with the required quality levels.	100%
Timeliness	The Data is delivered by the Data Originator to the AIM within the specified timeframe.	95% by required due date[1]. 100% within three days following due

Table 4: Service Level Indications

[2] Due date is used to mean the number of days in advance of the effective date that the draft publication is to be provided to the Data Originator.

3. MANAGEMENT ELEMENTS

3.1 Rewards and Remedies

[Detail rewards and remedies here]

3.2 Escalation Procedures

[Detail any escalation procedures here]

3.3 SLA Lifecycle

3.3.1 Reporting

[Detail any reporting here]

3.3.2 Reviews

[Detail any reviews here]

3.3.3 Change Process

[Detail the change process here]

3.4 Points of Contact

The following points of contact for execution of the SLA are:

Organisation	Primary Contact	Secondary Contact
[Insert Regulator details here]	[Insert Primary Contact details here, including name, role/job title, address, telephone, fax and email]	[Insert Secondary Contact details here, including name, role/job title, address, telephone, fax and email]
[Insert AISP details here]	[Insert Primary Contact details here, including name, role/job title, address, telephone, fax and email]	[Insert Secondary Contact details here, including name, role/job title, address, telephone, fax and email]
[Insert Data Originator details here]	[Insert Primary Contact details here, including name, role/job title, address, telephone, fax and email]	[Insert Secondary Contact details here, including name, role/job title, address, telephone, fax and email]

Table 5: Points of Contact

4. FUTURE INTENTIONS

4.1 General

Although outside the scope of this SLA, AIM and the **[Data Originator]** have a number of intentions for improvement which may have a consequential impact on this SLA.

The following sections outline these and should be considered during the review of the SLA, once it is in operation.

4.2 Describe future intentions here

5. REFERENCES

5.1 Refer to docs and add a short description.

End of Document

a) Proposal for Amendment to the AFI Basic ANP (Doc 7474 Vol. II) for the introduction of a new Section related to e-TOD

World Geodetic System – 1984 (WGS-84)

67. In order to ensure that quality (accuracy, resolution and integrity) and traceability requirements for the WGS-84 related geographical coordinate data are met, States must take measures to develop and introduce a quality system programme. This programme containing procedures, processes and resources should be in conformity with the International Organization for Standardization (ISO) 9000 series of quality assurance standards.

(Insert the following new Text)

Electronic Terrain and Obstacle Data (eTOD) Requirements

(FASID Table AIS 9)

68. Recognizing that significant safety benefits for international civil aviation will be provided by in-flight and ground-based applications that rely on quality electronic Terrain and Obstacle Data (eTOD), States should make every effort to implement the eTOD provisions in accordance with Chapter 10 of Annex 15 and Doc 9881.

69. FASID Table AIS-X sets out the requirements for the provision of Electronic Terrain and Obstacle Data (e-TOD) to be provided by States.

70. The implementation of e-TOD should involve different Administrations within and outside the Civil Aviation Authority i.e.: AIS, Aerodromes, Military, National Geographic and Topographic Administrations/Agencies, procedure designers, etc.

71. States, while maintaining the responsibility for data quality and availability, should consider to which extent the provision of electronic terrain and obstacle data could be delegated to national geodetic Institutes/Agencies, based on Service Level Agreement reflecting such delegation.

72. States should consider carefully the required level of details of collected terrain and obstacle data with particular emphasis on obstacle data and associated cost.

73. States should take into consideration the requirements for update/maintenance of data, especially related to obstacles.

74. States should work co-operatively with regard to the cross-border issue, for the sake of harmonization and more efficient implementation of e-TOD.

(Renumber the following paragraphs)

FASID TABLE AIS-X — e-TOD REQUIREMENTS

EXPLANATION OF THE TABLE

1 Name of the State, territory or aerodrome for which electronic Terrain and Obstacle Data (e-TOD) are required with the designation of the aerodrome use:

RS — international scheduled air transport, regular use RNS — international non-scheduled air transport, regular use RG — international general aviation, regular use
AS — international scheduled air transport, alternate use

2 Runway designation numbers

3 Type of each of the runways to be provided. The types of runways, as defined in Annex 14, Volume 1, Chapter I, are:

NINST — non-instrument runway;
NPA — non-precision approach runway
PA1 — precision approach runway, Category I; PA2 — precision approach runway, Category II; PA3 — precision approach runway, Category III.

4 Requirement for the provision of Terrain data for Area 1, shown by an ‘‘X’’ against the State or territory to be covered.

5 Requirement for the provision of Terrain data for Area 2 (TMA), shown by an ‘‘X’’ against the aerodrome to be covered.

6 Requirement for the provision of Terrain data for Area 2 (45 Km radius from the ARP), shown by an ‘‘X’’ against the aerodrome to be covered.

7 Requirement for the provision of Terrain data for Area 3, shown by an ‘‘X’’ against the aerodrome to be covered.

8 Requirement for the provision of Terrain data for Area 4, shown by an ‘‘X’’ against the runway threshold to be covered.

9 Requirement for the provision of Obstacle data for Area 1, shown by an ‘‘X’’ against the State or territory to be covered.

10 Requirement for the provision of Obstacle data for Area 2 (TMA), shown by an ‘‘X’’ against the aerodrome to be covered.

11 Requirement for the provision of Obstacle data for Area 2 (45 Km radius from the ARP), shown by an ‘‘X’’ against the aerodrome to be covered.

12 Requirement for the provision of Obstacle data for Area 3, shown by an ‘‘X’’ against the aerodrome to be covered.

13 Remarks (timetable for implementation)

Note: For Columns 4 to 12 use the following symbols:

X- Required but not implemented
XI- Required and implemented

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
1	2	3	4	5	6	7	8	9	10	11	12	13
ALGERIA												
DAUA ADRAR/Touat RS	04 22	**NPA**										
DAAG ALGER/Houari Boumediene RS	05 23 09 27	NPA PA2 PA1 NPA										
DABB ANNABA/El Mellah RS	01 19 05 23	NPA PA1 NPA NINST										
DABC CONSTANTINE/Mohamed Boudiaf RS	14 32 16 34	NPA PA1 NPA PA1										
DAUG GHARDAIA/Nouмérate RS	12 30	NPA PA1 NINST										
DAUH HASSI-MESSAOUD/Oued Irara RS	18 36 1 01 19	PA1 NPA										
DAUI IN-SALAH/ AS	05 23	NPA NPA										
DAOO ORAN/Es Sénia RS	07 25	NPA PA2										
DAAT TAMANRASSET/Aguennar AS	02 20 08 26	NPA PA1 NPA										
DABS TEBESSA/Tébessa RS	11 29 12 30	NPA NPA NPA NINST										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
DAON TLEMCEN/Zénata RS	09 27	NPA NPA										
DAUZ ZARZAITINE/In Amenas RS	05 23 15 33	NPA NPA										
ANGOLA												
FNHU HUAMBO/Albano Machado RS	11 29	NPA NPA										
FNLU LUANDA/4 de Fevereiro RS	05 23 07 25	NPA PA1										
BENIN												
DBBB COTONOU/Cadjehoun RS	06 24	NPA PA1										
BOTSWANA												
FBFT FRANCISTOWN/ Francistown RS	11 29	NINST NINST										
FBSK GABORONE/Sir Seretse Khama Intl RS	08 26	PA1 NPA										
FBKE KASANE/Kasane RS	08 26	NPA NINST										
FBMN MAUN/Maun RS	08 26	NINST NINST										
FBSP SELEBI-PHIKWE/Selebi-Phikwe RS	12 30	NINST PA1 NINST										
BURKINA FASO												

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
DFOO BOBO-DIOULASSO/Bobo-Dioulasso RS	06 24	PA1 NPA										
DFFD OUAGADOUGOU/Ouagadougou RS	04L 22R	PA1 NPA										
BURUNDI												
HBBA BUJUMBURA/Bujumbura RS	18 36	PA1 NPA										
CAMEROON												
FKKD DOUALA/Douala RS	12 30	NPA PA2										
FKKR GAROUA/Garoua RS	09 27	PA1 NPA										
FKKL MAROUA/Salak RS	13 31	NPA NINST										
FKKN N'GAOUNDERE/N'Gaoundere AS	03 21	NPA NINST										
FKYS YAOUNDE/Nsimalen RS	01 19	NINST PA2										
CAPE VERDE												
GVFM PRAIA/Francisco Mendes RS	**04 22**	NPA NINST										
GVAC SAL I./Amilcar Cabral RS	**01 19 07 25**	PA1 NPA										
CENTRAL AFRICAN REPUBLIC												

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
FEFF BANGUI/M'Poko RS	**17** **35**	NPA PA1										
FEFT BERBERATI/Berberati RS	**17** **35**	NPA NINST										
CHAD												
FTTJ N'DJAMENA/N'Djamena RS	**05** **23**	PA1 NPA										
COMOROS												
FMCV ANJOUAN/Ouani RS	**10** **28**	NPA NPA										
FMCZ DZAOUDZI/Pamanzi, Mayotte I. RS	**16** **34**	NINST NPA										
FMCH MORONI/Prince Said IbrahimHahaia RS	**02** **20**	PA1 NPA										
CONGO												
FCBB BRAZZAVILLE/Maya-Maya RS	**06** **24**	PA1 NPA										
FCPP POINTE NOIRE/Agostino Neto RS	**17** **35**	NPA NPA										
COTE D'IVOIRE												
DIAP ABIDJAN/Felix Houphouet Boigny Intl RS	**03** **21**	NPA PA2										
DIBK BOUAKE/Bouake RS	**03** **21**	NPA PA1										
DEMOCRATIC REPUBLIC OF THE CONGO												

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			**TERRAIN DATA REQUIRED**					**OBSTACLE DATA REQUIRED**				**REMARKS**
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
FZNA GOMA/Goma RS	**18** **36**	NINST NPA										
FZAA KINSHASA/N'Djili RS	**06** **24**	NPA PA1										
FZIC KISANGANI/Bangoka AS	**13** **31**	NPA NPA										
FZQA LUBUMBASHI/Luano AS	**07** **25**	PA1 NPA										
FZWA MBUJI MAYI/Mbuji Mahi AS	**17** **35**	NPA NINT										
DJIBOUTI												
HDAM DJIBOUTI/Ambouli RS	**09** **27**	NPA PA1										
EGYPT												
HEBL ABU-SIMBEL/Abu-Simbel RS	**15L** **33R** **15L** **33R**	NPA NPA NPA NPA										
HEAX ALEXANDRIA/Alexandria RS	**04** **22** **18** **36**	NPA NPA NPA NPA										
HESN ASWAN/Aswan RS	**17** **35**	NPA PA1										
HECA CAIRO/Cairo Intl RS	**05L** **23R** **05R** **23L** **16** **34**	PA2 PA2 PA2 PA2 NPA NPA										
HEGN HURGHADA/Hurghada RS	**16** **34**	NPA PA1										
HELX LUXOR/Luxor RS	**02** **20**	NPA PA1										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
HEMM MERSA-MATRUH/Mersa-Matruh RS	15 33	NPA NPA										
HESH SHARM EL SHEIKH/Sharm El Sheikh RS	04L 22R 04R 22L	PA1 NINST										
HESC ST. CATHERINE/St. Catherine RS	17 35	NPA NINST										
HETB TABA/Taba RS	04 22 14 32	NINST NPA										
EQUATORIAL GUINEA												
FGSL MALABO/Malabo RS	05 23	PA1 NPA										
ERITREA												
HHAS ASMARA/Asmara Intl RS	07 25 12 30	PA1 NPA										
HHSB ASSAB/Assab RS	12 30	NPA NINST										
ETHIOPIA												
HAAB ADDIS ABABA/Bole Intl RS	07 25	NPA PA1										
HADR DIRE DAWA/Dire Dawa Intl RS	15 33	NINST NPA										
FRANCE (ILE DE LA REUNION)												
FMME SAINT-DENIS/Gilot La Reunion RS	12 30 14 32	NINST NPA PA1 NINST										
GABON												

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
FOON FRANCEVILLE/M'Vengue RS	**15** **33**	PA1 NPA										
FOOL LIBREVILLE/Leon M'Ba RS	**16** **34**	PA1 NPA										
FOOG PORT GENTIL/Port Gentil RS	**03** **21**	NPA PA1										
GAMBIA												
GBYD BANJUL/Banjul Intl RS	**14** **32**	NPA PA1										
GHANA												
DGAA ACCRA/Kotoka Intl RS	**03** **21**	NPA PA1										
DGSI KUMASI/Kumasi RS	**02** **20**	NPA NPA										
DGLE TAMALE/Tamale RS	**05** **23**	NPA NPA										
GUINEA												
GUCY CONAKRY/Gbessia RS	**06** **24**	PA1 NPA										
GUXN KANKAN/Diankana RS	**10** **28**	NPA NINST										
GULB LABE/Tata RS	**06** **24**	NINST NINST										
GUNZ N'ZEREKORE/Konia RS	**18** **36**	NPA NINST										
GUINEA-BISSAU												
GGOV BISSAU/Osvaldo Vieira Intl RS	**03** **21**	NPA PA1										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
KENYA												
HKEL RS ELDORET/Eldoret Intl	**08 26**	PA2 NPA										
HKMO RS MOMBASA/Moi Intl	**03 21 15 33**	NPA PA1										
HKJK RS NAIROBI/Jomo Kenyatta Intl	**06 24**	PA2 NPA										
LESOTHO												
FXMM RS MASERU/Moshoeshoe I. Intl	**04 22**	NINST PA1										
LIBERIA												
GLRB RS MONROVIA/Roberts Intl	**04 22**	PA2 NPA										
LIBYAN ARAB JAMAHIRIYA												
HLLB RS BENGHAZI/Benina	**15L 33R 15R 33L**	PA1 NPA NPA PA1										
HLLS RS SEBHA/Sebha	**13 31**	PA1 NPA										
HLLT RS TRIPOLI/Tripoli Intl	**06 24 09 27 18 36**	PA1 PA2										
MADAGASCAR												
FMMI RS ANTANANARIVO/Ivato	**11 29**	PA1 NPA										
FMNA RS ANTSIRANANA/Arrachart	**13 31**	NPA NINST										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
FMNM MAHAJANGA/Amborovy RS	14 32	NPA NINST										
FMNN NOSY-BE/Fascene RS	05 23	NPA PA1										
FMMS SAINTE-MARIE/Sainte-Marie RS	01 19	NPA NPA										
FMMT TOAMASINA/Toamasina RS	01 19	NPA PA1										
FMSD TOLAGNARO/Tolagnaro RS	07 25	NPA NPA										
MALAWI												
FWCL BLANTYRE/Chileka RS	10 28	PA1NPA NPA										
FWLI LILONGWE/Lilongwe Intl RS	14 32	PA1 NPA										
MALI												
GABS BAMAKO/Senou RS	06 24	PA1 NPA										
GAGO GAO/Gao RS	07 25	NPA NINST										
GAKY KAYES/Kayes RS	08 26	NPA NINST										
GAKL KIDAL/Kidal RS	10 28	NPA NINST										
GAMB MOPTI-BARBE/Mopti-Barbe RS	05 23	NPA NINST										
GANR NIORO/Nioro RS	08 26	NPA NINST										
GATB TOMBOUCTOU/ Tombouctou RS	07 25	PA1 NPA										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
MAURITANIA												
GQPA ATAR/Atar RS	04 22	NPA NINST										
GQNI NEMA/Nema RS	10 28	NINST NPA										
GQPP NOUADHIBOU/Nouadhibou RS	03 21	PA1 NPA										
GQNN NOUAKCHOTT/Nouakchott RS	05 23	PA1 NPA										
GQPZ ZOUERATE/Zouerate RS	28 10	NPA NPA										
MAURITIUS												
FIMP MAURITIUS/Sir Seewoosagur Ramgoolam Intl RS	14 32	PA1 NPA										
MOROCCO												
GMAD AGADIR/Al Massira RS	10 28	NPA PA1										
GMTA AL HOCEIMA/Cherif Al Idrissi RS	18 36	PA1 NINST										
GMMN CASABLANCA/Mohammed V RS	17 35	NPA PA2										
GMFK ERRACHIDIA/Moulay Ali Cherif AS	13 31	NPA PA1										
GMFF FES/Saïss RS	10 28	NPA PA1										
GMMX MARRAKECH/Ménara RS	10 28	PA1 NPA										
GMMZ OUARZAZATE/Ouarzazate RS	12 30	NPA PA1										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
GMFO OUJDA/Angads RS	06 24	PA1 NINST										
GMME RABAT/Salé RS	04 22	PA1 NPA										
GMTT TANGER/Ibnou-Batouta RS	10 28	NPA PA1										
GMAT TAN-TAN/Plage Blanche RS	14 22	NPA NINST										
GMTN TETOUAN/Saniat-Rimel RS	06 24	NPA NINST										
MOZAMBIQUE												
FQBR BEIRA/Beira RS	12 30 06 24	PA1 NPA										
FQMA MAPUTO/Maputo Intl RS	05 23	NPA PA1										
NAMIBIA												
FYKT KEETMANSHOOP/Keetmans hop RS	04 22 18 36	NPA NPA										
FYWB WALVIS BAY/Walvis Bay RS	09 27 12 30	NPA NPA										
FYWH WINDHOEK/Hosea KutakoWindhoek RS	08 26 16 34	PA1 NPA										
NIGER												
DRZA AGADES/Sud RS	07 25	NPA NINST										
DRRN NIAMEY/Diori Hamani Intl RS	09R 27L 09L 27R	PA1 NPA										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	RWY No	RWY TYPE	Area 1	Area 2		Area 3	Area 4	Area 1	Area 2		Area 3	
				TMA	45 Km				TMA	45Km		
DRZR ZINDER/Zinder AS	06 24	NPA NINST										
NIGERIA												
DNAA ABUJA/Nnamdi Azikiwe RS	04 22	NPA PA1										
DNCA CALABAR/Calabar RS	03 21	NPA PA1										
DNIL ILORIN/Ilorin AS	05 23	PA1 NPA										
DNKA KADUNA/Kaduna RS	05 23	PA1 NPA										
DNKN KANO/Mallam Aminu Kano Intl RS	06 24 05 23	PA2 PA2										
DNMM LAGOS/Murtala Muhammed RS	01L 19R 01R 19L	PA2 PA2 NPA PA2										
DNMA MAIDUGURI/Maiduguri RS	05 23	PA2 NPA										
DNPO PORT HARCOURT/Port Harcourt Intl RS	03 21	NPA PA1										
DNSO SOKOTO/Abubakar Saddiq III Intl RS	08 26	PA1 NPA										
RWANDA												
HRYR KIGALI/Gregoire Kayibanda RS	10 28	NPA PA1										
SAO TOME AND PRINCIPE												
FPST SAO TOME/Sao Tomé RS	11 29	PA1 NPA										
SENEGAL												

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
GOGS CAP SKIRING/Cap Skiring RS	**15 33**	NINST NPA										
GOOY DAKAR/Leopold Sedar Senghor Intl RS	**18 36 03 21**	PA2 NPA										
GOSS SAINT LOUIS/Saint Louis RS	**18 36**	NPA NINST										
GOTT TAMBACOUNDA/Tambacounda RS	**06 24**	NPA NPA										
GOGG ZIGUINCHOR/Ziguinchor RS	**10 28**	NINST NPA										
SEYCHELLES												
FSIA MAHE/Seychelles Intl RS	**13 31**	NPA PA1										
SIERRA LEONE												
GFLL FREETOWN/Lungi RS	**12 30**	NPA PA1										
SOMALIA												
HCMI BERBERA/Berbera AS	**05 23**	NINST NINST										
HCMV BURAO/Burao RS	**13 31**	NINST NINST										
HCMH HARGEISA/Hargeisa RS	**06 24**	NPA NPA										
HCMK KISIMAYU/Kisimayu AS	**05 23**	NPA PA1										
HCMM MOGADISHU/Mogadishu RS	**05 23**	NPA PA1										
SOUTH AFRICA												

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
FAAB ALEXANDER BAY/Alexander Bay RS	**01 19 07 25 11 29**	NPA NINST										
FABL BLOEMFONTEIN/Bloemfontein AS	**02 20 12 30**	PA1 NPA NINST NINST										
FACT CAPE TOWN/Cape Town RS	**01 19 16 34**	PA1 NPA										
FADN DURBAN/Durban RS	**05 23**	NPA PA1										
FAJS JOHANNESBURG/Johannesburg RS	**03L 21R 03R 21L 15 33**	PA2 MINST PA2 PA2 NINST NINST										
FAGM JOHANNESBURG/Rand RS	**18 36**	NPA NPA										
FALA LANSERIA/Lanseria RS	**06L 24R 06R 24L 17 35**	NPA NINST										
FAUP UPINGTON/Upington RS	**01 19 08 26**	NPA NPA										
SPAIN												
GCLP GRAN CANARIA/Gran Canaria, Canary I. RS	**03L 21R 03R 21L**	PA1 NPA NINST NINST										
GCHI HIERRO/Hierro, Canary I. RS	**16 34**	NPA NINST										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
GCLA LA PALMA/La Palma, Canary I. RS	**01** **19**	NPA NINST										
CGRR LANZAROTE/Lanzarote, Canary I. RS	**04** **22**	NPA NPA										
GEML MELILLA/Melilla RS	**15** **33**	NPA NINST										
GCFV FUERTEVENTURA/ Fuerteventura, Canary I. RS	**01** **19**	PA1 NPA										
GCXO TENERIFE NORTE/Los Rodeos, Canary I. RS	**12** **30**	NPA NPA										
GCTS TENERIFE SUR/Reina Sofia, Canary I. RS	**08** **26**	PA1 NPA										
SUDAN												
HSSJ JUBA/Juba RS	**13** **31**	PA1 NINST										
HSKA KASSALA/Kassala AS	**02** **20**	NINST NINST										
HSSS KHARTOUM/Khartoum RS	**18** **36**	PA1 NPA										
HSPN PORT SUDAN/Port Sudan Intl RS	**18** **36**	NPA PA1										
SWAZILAND												
FDMS MANZINI/Matsapha RS	**07** **25**	NPA NINST										
TOGO												
DXXX LOME/Tokoin RS	**05** **23**	NPA PA1										
DXNG NIAMTOUGOU/Niamtougou RS	**03** **21**	PA1 NPA										

Appendix 3.5C

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
TUNISIA												
DTTJ DJERBA/Zarzis RS	**09** **27**	PA1 NPA										
DTMB MONASTIR/Habib Bourguiba RS	**08** **26**	PA1 NPA										
DTTX SFAX/Thyna RS	**15** **33**	NPA NPA										
DTKA TABARKA/7 NOVEMBRE RS	**09** **27**	NPA PA1										
DTTZ TOZEUR/Nefta RS	**09** **27**	PA1 NPA										
DTTF GAFSA/Ksar RS	**05** **23**	PA1 NPA										
DTTA TUNIS/Carthage RS	**01** **19** **11** **29**	NPA PA1 NPAIN ST PA1NP A										
UGANDA												
HUEN ENTEBBE/Entebbe Intl RS	17 35	PA1 NPA										
UNITED REPUBLIC OF TANZANIA												
HTDA DAR-ES-SALAAM/Dar-Es-Salaam RS	**05** **23**	PA1 NPA										
HTKJ KILIMANJARO/Kilimanjaro Intl RS	**09** **27**	PA1 NPA										
HTZA ZANZIBAR/Zanzibar RS	**18** **36**	NINST NPA										

STATE, TERRITORY OR AERODROME FOR WHICH eTOD IS REQUIRED			TERRAIN DATA REQUIRED					OBSTACLE DATA REQUIRED				REMARKS
CITY/AERODROME	**RWY No**	**RWY TYPE**	**Area 1**	**Area 2**		**Area 3**	**Area 4**	**Area 1**	**Area 2**		**Area 3**	
				TMA	**45 Km**				**TMA**	**45Km**		
WESTERN SAHARA												
GSAI EL AAIUN/El Aaiun RS	**04** **22**	NPA PA1										
GSMA SMARA/Smara RS	**17** **35**	NINST NINST										
GSVO VILLA CISNEROS/Villa Cisneros RS	**04** **22**	NINST NPA										
ZAMBIA												
FLLI LIVINGSTONE/Livingstone Intl RS	**10** **28** **15** **33**	NPA PA1 NPA										
FLLS LUSAKA/Lusaka Intl RS	**10** **28**	PA1 NPA										
FLMF MFUWE/Mfuwe RS	**08** **26**	NPA NPA										
FLND NDOLA/Ndola RS	10L 28R 10R 28L	NPA PA1 NPA										
ZIMBABWE												
FVBU BULAWAYO/Bulawayo RS	13 31	NPA NPA										
FVHA HARARE/Harare RS	06 24	PA1 PA1										
FVFA VICTORIA FALLS/Victoria Falls RS	12 30	PA1 NINST										

AFI Region
E-TOD IMPLEMENTATION PLAN
Updated Timelines

Timelines:

GLOBAL

REGIONAL

NATIONAL

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Terrain Data for Area 1**																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Obstacle Data for Area 1**																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d’Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Terrain Data for Area** 2																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
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	Guinea																	
	Guinea Bissau																	
	Kenya																	
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	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Obstacle Data for Area** 2																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Terrain Data for Area 3**																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Obstacle Data for Area** 3																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																	
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Terrain Data for Area 4**																	
States	Angola																	
	Benin																	
	Burkina Faso																	
	Botswana																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

AFI REGION - E-TOD Implementation Timelines																		
		2000	**01**	**02**	**03**	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Global	**Provision of Obstacle Data for Area 4**																	
States	Angola																	
	Benin																	
	Botswana																	
	Burkina Faso																	
	Burundi																	
	Cape Verde																	
	Central African Republic																	
	Chad																	
	Comoros																	
	Congo																	
	Cote d'Ivoire																	
	Democratic Republic of Congo																	
	Djibouti																	
	Equatorial Guinea																	
	Eritrea																	
	Ethiopia																	
	Gabon																	
	Gambia																	
	Ghana																	
	Guinea																	
	Guinea Bissau																	
	Kenya																	
	Lesotho																	
	Liberia																	
	Madagascar																	
	Malawi																	
	Mali																	
	Mauritanie																	
	Mauritius																	
	Mozambique																	
	Namibia																	
	Niger																	
	Nigeria																	
	Rwanda																	
	Sao Tome and Principe																	
	Senegal																	
	Seychelles																	
	Sierra Leone																	
	Somalia																	
	South Africa																	
	Swaziland																	
	Togo																	
	Uganda																	
	United Republic of Tanzania																	
	Zambia																	
	Zimbabwe																	

X = Implemented
N = Non Implemented
P = Plan Implementation

AIM PERFORMANCE OBJECTIVES
(AIS-AIM Transition)

REGIONAL PERFORMANCE OBJECTIVES / NATIONAL PERFORMANCE OBJECTIVES TRANSITION FROM AIS TO AIM				
Benefits				
Environment **Efficiency** **Safety**	. reductions in fuel consumption; . improved planning and management of flights; . efficient use of airspace; . improved safety			
KPI	Status of implementation of the AIRAC system in the AFI Region Status of implementation of QMS in the AFI Region Status of implementation of AIS Automation in the AFI Region			
Proposed Metrics AIS and data programmes AIM	Number of States complying with the AIRAC procedures Number of Posting of AIS information on the ICAO AFI Forum Number of States having developed and signed service Level Agreements between Originators Number of States having organized QMS awareness campaigns and training Number of States having implemented QMS Number of States having developed eAIP Number of States having developed a National Plan for the transition from AIS to			
Strategy ***Short term (2010-2011)*** ***Medium term (2011 – 2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AUO, ATM SDM	• Improve the compliance with the AIRAC system	Ongoing	States & AFI AIMTF	Valid
	• Use of the internet, including the ICAO AFI Forum, for the advance posting of the aeronautical information considered of importance to users;	2009 – 2011	States & ICAO	Valid
	• Signature of service Level Agreements between AIS and data originators;	2009 – 2011	States	Valid
	• Foster the implementation of AFI QMS based on the AFI Region Methodology for the implementation of QMS ;	2009 – 2011	ICAO & AFI AIMTF & States	Valid
	• Monitor the implementation of QMS until complete implementation of	2008 - 2013	ICAO & AFI AIMTF	Valid

	the requirements by all AFI States;			
	• Foster the development of eAIPs by AFI States;	2009 - 2013	States & AFI AIMTF	Valid
	• Monitor the implementation of AIS automation in the AFI Region in order to ensure availability, sharing and management of electronic aeronautical information;	2008 -2013	ICAO & AFI AIMTF	Valid
	• Foster the development of National/regional AIS databases;	2010 – 2015	ICAO & AFI AIMTF & States	Valid
Linkage to GPIs	GPI-5: performance-based navigation; GPI-11: RNP and RNAV SIDs and STARs; GPI-18: Aeronautical Information			

Abbreviations used in the Global ATM Operational Concept:

AO	Aerodrome Operations
AOM	Airspace Organization and Management
ATM SDM	ATM Service Delivery Management
AUO	Air User Operations
CM	Conflict Management
DCB	Demand and Capacity Balancing
TS	Traffic Synchronization

AIM PERFORMANCE OBJECTIVES
(AIS-AIM Transition)

NATIONAL PERFORMANCE OBJECTIVE - IMPLEMENTATION OF WGS-84 AND e-TOD	
Benefits	
Environment **Efficiency** **Safety**	• Supporting benefits described in performance objectives for PBN • WG8 -84 is a prerequisite for performance-based navigation, benefits described in performance objectives for PBN. • support approach and departure procedure design and implementation • improve aircraft operating limitations analysis • support aeronautical chart production and on-board databases • improve situational awareness • support determination of emergency contingency procedures • support technologies such as ground proximity and minimum safe altitude warning systems • see benefits described in performance objectives for PBN
KPI	• status of implementation of WGS-84 in the AFI Region • status of implementation of e-TOD in the AFI Region (for Areas 1 & 4)
Proposed Metrics	• number of States having fully implemented WGS-84 • number of States having organized e-TOD awareness campaigns and training programmes • number of States having implemented e-TOD for Areas 1 & 4.
Strategy ***Short term (2010-2012)*** ***Medium term (2012 - 2016)***	

ATM OC COMPONENTS	TASKS	TIMEFRAME START-END	RESPONSIBILITY	STATUS
ATM CM	***Electronic terrain and obstacle data (e-TOD)*** • share experience and resources in the implementation of e-TOD through the establishment of an e-TOD working group	2008-2011	APIRG States	e-TOD WG has been established
	• report requirements and monitor implementation status of e-TOD using a new AIS Table of the AFI FASID (Ref. Appendix B)	2008-ongoing	APIRG States	APIRG/18 for amendment of FASID
	• develop a high level policy for the management of a national e-TOD programme	2008-~~2009~~2012	States	APIRG/18 for endorsement of e-TOD WG proposals
ATM OC	***Electronic terrain and obstacle data (e-TOD)*** • Provide Terrain and Obstacle data for area 1	2008-2012	States	AFI AIM TF to review
	• Provide Terrain and Obstacle data for area 4	2008-2012	States	AFI AIM TF to review
	• assessment of Annex 15 requirements related to the provision of e-TOD for area 2 and 3	2010-2012	States	AFI AIM TF to review

	• development of an action plan for the provision of e-TOD for area 2 and 3	2013	States	AFI AIM TF to review
	• provide necessary Terrain and Obstacle data for area 2	2015	States	AFI AIM TF to review
	• provide necessary Terrain and Obstacle data for area 3	2015	States	AFI AIM TF to review
ATM AUO	**WGS-84** • establish WGS-84 implementation goals in coordination with the national PBN implementation plan • report requirements and monitor implementation status of WGS-84 using the new AIM-5 Table of the AFI FASID and take remedial action if required • completeWGS-84 implementation	2008-~~2009~~2012 2011- 2013 2013	States APIRG States States	APIRG/18 AFI AIM-TF
Linkage to GPIs	GPI-5: Performance-based navigation; GPI-9: Situational awareness; GPI-ll: RNP and RNAV SIDs and STARs; GPI-18: Aeronautical Information; GPI-20: WGS-84; GPI-2l: Navigation systems			

AIS/MAP PERFORMANCE OBJECTIVES
(AIS-AIM Transition)

ELIMINATION OF IDENTIFIED AIS/MAP DEFICIENCIES **(implementation of WGS-84 coordinates, publication of aeronautical charts and timely publication and updating of AIS/MAP documents, i.e. NOTAMs, AIPs, AICs, etc.)**				
Benefits				
Efficiency	• improved collaborative decision-making through sharing aeronautical data information			
Safety	• enhance safety by timely exchange air safety data, i.e. electronically and wider distribution of such data			
Strategy ***Short term (2010)*** ***Medium term (2011 - 2015)***				
ATM OC COMPONENTS	**TASKS**	**TIMEFRAME START-END**	**RESPONSIBILITY**	**STATUS**
AIS/MAP	• publication of relevant aeronautical charts.	2008 - ~~2009~~2011	States/ANSPs	Survey for APIRG
	• publication of WGS-84 coordinates for en-route waypoints and use for GNSS coordinates for terminal approaches and departure procedures	2008 - ~~2009~~2011	States/ANSPs	Survey for APIRG
	• publication of AIPs, NOTAMs and AICs using standards formats.		States/ANSPs	
	• States concerned to develop action plan to eliminate the deficiencies	2008 -~~2009~~2011	States/ANSPs	Survey for APIRG
Linkage to GPIs	GPI/18: Aeronautical information; GPI/20: WGS-84			

Table AIM-1

Responsibility for the provision of AIM Services

EXPLANATION OF THE TABLE

Column:

1	Name of the State or territory
2	Designated international NOTAM Office (NOF)
3	Designated State for AIP production
4	Designated State for aeronautical charts (MAP) production
5	Designated State for the provision of the authoritative Integrated Aeronautical Information Database (IAID)
6	Designated State for the provision of the Pre-flight information services
7	Remarks — additional information, as appropriate.

FASID TABLE AIM-1

Responsibility for the provision of AIM Services

State	NOF	AIP	MAP	IAID	Pre-Flight Briefing	Remarks
1	2	3	4	5	6	7
Angola						
Benin						
Burkina Faso						
Botswana						
Burundi						
Cape Verde						
Central African Republic						
Chad						
Comoros						
Congo						
Cote d'Ivoire						
Democratic Republic of Congo						
Djibouti						
Equatorial Guinea						
Eritrea						
Ethiopia						
Gabon						
Gambia						
Ghana						
Guinea						
Guinea Bissau						
Kenya						
Lesotho						
Liberia						
Madagascar						
Malawi						
Mali						
Mauritanie						
Mauritius						
Mozambique						
Namibia						
Niger						
Nigeria						
Rwanda						
Sao Tome and Principe						
Senegal						
Seychelles						
Sierra Leone						
Somalia						
South Africa						
Swaziland						
Togo						
Uganda						
United Republic of Tanzania						
Zambia						
Zimbabwe						

Table AIM-2 - Transition from AIS to MAP

Provision of AIM products and services based on the Integrated Aeronautical Information Database (IAID)

EXPLANATION OF THE TABLE

Column:

1 Name of the State or territory for which the provision of AIM products and services based on the IAID is required.

2 Requirement for the implementation and designation of the authoritative IAID, shown by:
- FI – Fully Implemented
- PI – Partially Implemented
- NI – Not Implemented

Note 1 — The IAID of a State is a single access point for one or more databases (AIS, Terrain, Obstacles, AMDB, etc). The minimum set of databases which should be integrated is defined in Annex 15.

Note 2 — Information providing detail of "PI" should be given in the Remarks column (the implemented components of the IAID).

Note 3 — The information related to the designation of the authoritative IAID should be published in the AIP (GEN 3.1)

3 Requirement for an IAID driven AIP production, shown by:
- FC – Fully compliant (eAIP: Text, Tables and Charts)
- PC – Partially compliant
- NC – Not compliant

Note 4 — AIP production includes, production of AIP, AIP Amendments and AIP Supplements

4 Requirement for an IAID driven NOTAM production, shown by:
- FC – Fully Compliant
- NC – Not compliant

5 Requirement for an IAID driven SNOWTAM production, shown by:
- FC – Fully Compliant
- NC – Not compliant

6 Requirement for an IAID driven PIB production, shown by:
- FC – Fully compliant
- NC – Not compliant

7 Requirement for Charting systems to be interoperable with the IAID, shown by:
- FC – Fully compliant
- PC – Partially compliant
- NC – Not compliant

8 Requirement for Procedure design systems to be interoperable with the IAID, shown by:
- FI – Fully Implemented
- PI – Partially Implemented
- NI – Not Implemented

9 Requirement for ATS systems to be interoperable with the IAID, shown by:

FI – Fully Implemented
PI – Partially Implemented
NI – Not Implemented

10 Action Plan — short description of the State's Action Plan with regard to the provision of AIM products and services based on the IAID, including planned date(s) of full compliance, as appropriate.

11 Remarks — additional information, including detail of "PC", "NC", "PI" and "NI", as appropriate.

FASID TABLE AIM-2
Integrated Aeronautical Information Database (IAID)

State	IAID	AIP	NOTAM	SNOWTAM	PIB	Charting	Procedure design	ATS	Action Plan	Remarks
1	2	3	4	5	6	7	8	9	10	11
Angola										
Benin										
Burkina Faso										
Botswana										
Burundi										
Cape Verde										
Central African Republic										
Chad										
Comoros										
Congo										
Cote d’Ivoire										
Democratic Republic of Congo										
Djibouti										
Equatorial Guinea										
Eritrea										
Ethiopia										
Gabon										
Gambia										
Ghana										
Guinea										
Guinea Bissau										
Kenya										
Lesotho										
Liberia										
Madagascar										

Appendix 3.5F2

State	IAID	AIP	NOTAM	SNOWTAM	PIB	Charting	Procedure design	ATS	Action Plan	Remarks
1	2	3	4	5	6	7	8	9	10	11
Malawi										
Mali										
Mauritanie										
Mauritius										
Mozambique										
Namibia										
Niger										
Nigeria										
Rwanda										
Sao Tome and Principe										
Senegal										
Seychelles										
Sierra Leone										
Somalia										
South Africa										
Swaziland										
Togo										
Uganda										
United Republic of Tanzania										
Zambia										
Zimbabwe										

Table AIM-3

Terrain and Obstacles datasets and Airport Mapping Databases (AMDB)

EXPLANATION OF THE TABLE

Column

1 Name of the State or territory for which Terrain and Obstacles datasets and AMDB are required.

2 Compliance with requirement for the provision of Terrain datasets, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

3 Compliance with requirement for the provision of Obstacle datasets, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

4 Implementation of AMDB, shown by:
FI – Fully Implemented
PI – Partially Implemented
NI – Not implemented

5 Action plan — short description of the State's Action Plan with regard to compliance with the requirements for provision of Terrain and Obstacles datasets and implementation of AMDB.

6 Remarks— additional information, including detail of "PC" and "NC", as appropriate.

FASID TABLE AIM-3
Terrain and Obstacle datasets and Airport Mapping Database (AMDB)

State	Terrain Datasets	Obstacle datasets	AMDB	Action Plan	Remarks
1	2	3	4	5	6
Angola					
Benin					
Burkina Faso					
Botswana					
Burundi					
Cape Verde					
Central African Republic					
Chad					
Comoros					
Congo					
Cote d’Ivoire					
Democratic Republic of Congo					
Djibouti					
Equatorial Guinea					
Eritrea					
Ethiopia					
Gabon					
Gambia					
Ghana					
Guinea					
Guinea Bissau					
Kenya					
Lesotho					
Liberia					
Madagascar					
Malawi					
Mali					
Mauritanie					
Mauritius					
Mozambique					
Namibia					
Niger					
Nigeria					
Rwanda					
Sao Tome and Principe					
Senegal					
Seychelles					
Sierra Leone					

State	Terrain Datasets	Obstacle datasets	AMDB	Action Plan	Remarks
1	**2**	**3**	**4**	**5**	**6**
Somalia					
South Africa					
Swaziland					
Togo					
Uganda					
United Republic of Tanzania					
Zambia					
Zimbabwe					

Table AIM-4

Aeronautical Data Quality

EXPLANATION OF THE TABLE

Column:

1 Name of the State or territory.

2 Compliance with the requirement for implementation of QMS for Aeronautical Information Services including safety and security objectives, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

3 Compliance with the requirement for the establishment of formal arrangements with approved data originators concerning aeronautical data quality, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

4 Implementation of digital data exchange with originators, shown by:
FI – Implemented
PI – Partially Implemented
NI – Not implemented
Note 1 — Information providing detail of "PI" and "NI" should be given in the Remarks column (percentage of implementation).

5 Compliance with the requirement for metadata, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

6 Compliance with the requirements related to aeronautical data quality monitoring (accuracy, resolution, timeliness, completeness), shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

7 Compliance with the requirements related to aeronautical data integrity monitoring, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

8 Compliance with the requirements related to the AIRAC adherence, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

9 Action Plan — short description of the State's Action Plan with regard to aeronautical data quality requirements implementation, including planned date(s) of full compliance, as appropriate.

10 Remarks — additional information, including detail of "PC", "NC", "PI" and "NI", as appropriate.

FASID TABLE AIM-4
Aeronautical Data Quality

State	QMS	Establishment of formal agreements	Digital data exchange with originators	Metadata	Data quality monitoring	Data integrity monitoring	AIRAC adherence	Action Plan	Remarks
1	2	3	4	5	6	7	8	9	10
Angola									
Benin									
Burkina Faso									
Botswana									
Burundi									
Cape Verde									
Central African Republic									
Chad									
Comoros									
Congo									
Cote d'Ivoire									
Democratic Republic of Congo									
Djibouti									
Equatorial Guinea									
Eritrea									
Ethiopia									
Gabon									
Gambia									
Ghana									
Guinea									
Guinea Bissau									
Kenya									
Lesotho									

Appendix 3.5F4

State	QMS	Establishment of formal agreements	Digital data exchange with originators	Metadata	Data quality monitoring	Data integrity monitoring	AIRAC adherence	Action Plan	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Liberia									
Madagascar									
Malawi									
Mali									
Mauritanie									
Mauritius									
Mozambique									
Namibia									
Niger									
Nigeria									
Rwanda									
Sao Tome and Principe									
Senegal									
Seychelles									
Sierra Leone									
Somalia									
South Africa									
Swaziland									
Togo									
Uganda									
United Republic of Tanzania									
Zambia									
Zimbabwe									

Table AIM-5

World Geodetic System-1984 (WGS-84)

EXPLANATION OF THE TABLE

Column:

1 Name of the State or territory for which implementation of WGS-84 is required.

2 Compliance with the requirements for implementation of WGS-84 for FIR and Enroute points, shown by:
   FC – Fully compliant
   PC – Partially compliant
   NC – Not compliant

3 Compliance with the requirements for implementation of WGS-84 for Terminal Areas (arrival, departure and instrument approach procedures), shown by:
   FC – Fully compliant
   PC – Partially compliant
   NC – Not compliant

4 Compliance with the requirements for implementation of WGS-84 for Aerodrome, shown by:
   FC – Fully compliant
   PC – Partially compliant
   NC – Not compliant

5 Compliance with the requirements for implementation of Geoid Undulation, shown by:
   FC – Fully compliant
   PC – Partially compliant
   NC – Not compliant

6 Action Plan — short description of the State's Action Plan with regard to WGS-84 implementation, including planned date(s) of full compliance, as appropriate.

7 Remarks — additional information, including detail of "PC" and "NC", as appropriate.

FASID TABLE AIM-5
World Geodetic System-1984 (WGS-84)

State	FIR/ENR	Terminal	AD	GUND	Action Plan	Remarks
1	2	3	4	5	6	7
Angola						
Benin						
Burkina Faso						
Botswana						
Burundi						
Cape Verde						
Central African Republic						
Chad						
Comoros						
Congo						
Cote d'Ivoire						
Democratic Republic of Congo						
Djibouti						
Equatorial Guinea						
Eritrea						
Ethiopia						
Gabon						
Gambia						
Ghana						
Guinea						
Guinea Bissau						
Kenya						
Lesotho						
Liberia						

State	FIR/ENR	Terminal	AD	GUND	Action Plan	Remarks
1	**2**	**3**	**4**	**5**	**6**	**7**
Madagascar						
Malawi						
Mali						
Mauritanie						
Mauritius						
Mozambique						
Namibia						
Niger						
Nigeria						
Rwanda						
Sao Tome and Principe						
Senegal						
Seychelles						
Sierra Leone						
Somalia						
South Africa						
Swaziland						
Togo						
Uganda						
United Republic of Tanzania						
Zambia						
Zimbabwe						

Table AIM-6

AERONAUTICAL CHARTS

EXPLANATION OF THE TABLE

Column

1 Name of the State or territory for which aeronautical charts are required.

2 Compliance with the requirements for the Enroute Chart — ICAO (ENRC) and the ATC Surveillance Minimum Altitude Chart — ICAO (ATCSMAC), shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

3 Compliance with requirements for charts related to terminal areas (IAC, ARC, SID, STAR, VAC) shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

4 Compliance with the requirement for Aerodrome charts (ADC, ADGMC and APDC), shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

5 Compliance with the requirements for Obstacle Charts (AOC-A, PATC, AOC-E) shown by:
FC – Fully compliant)
PC – Partially compliant
NC – Not compliant

6 Compliance with the requirement for WAC, shown by:
FC – Fully compliant
PC – Partially compliant
NC – Not compliant

7 Action plan — short description of the State's Action Plan with regard to aeronautical charts implementation, including planned date(s) of full compliance, as appropriate.

8 Remarks— additional information, including detail of "PC" and "NC", as appropriate.

FASID TABLE AIM-6
Aeronautical Charts

State	ENR & ATCSMAC	Charts related to Terminal Areas	AD Charts	Obstacle Charts	WAC	Action Plan	Remarks
1	2	3	4	5	6	7	8
Angola							
Benin							
Burkina Faso							
Botswana							
Burundi							
Cape Verde							
Central African Republic							
Chad							
Comoros							
Congo							
Cote d'Ivoire							
Democratic Republic of Congo							
Djibouti							
Equatorial Guinea							
Eritrea							
Ethiopia							
Gabon							
Gambia							
Ghana							
Guinea							
Guinea Bissau							
Kenya							
Lesotho							
Liberia							
Madagascar							
Malawi							
Mali							
Mauritanie							
Mauritius							
Mozambique							
Namibia							
Niger							
Nigeria							
Rwanda							
Sao Tome and Principe							

State	ENR & ATCSMAC	Charts related to Terminal Areas	AD Charts	Obstacle Charts	WAC	Action Plan	Remarks
1	2	3	4	5	6	7	8
Senegal							
Seychelles							
Sierra Leone							
Somalia							
South Africa							
Swaziland							
Togo							
Uganda							
United Republic of Tanzania							
Zambia							
Zimbabwe							

FASID Table AIM-7

PRODUCTION RESPONSIBILITY FOR SHEETS OF THE WORLD AERONAUTICAL CHART - ICAO 1:1 000 000

EXPLANATION OF THE TABLE

Column:

1 Name of the State accepting production responsibility.
2 World Aeronautical Chart — ICAO 1:1 000 000 sheet number(s) for which production responsibility is accepted.
3 Remarks.

Note 1— When Aeronautical Charts — ICAO 1:500 000 or Aeronautical Navigation Charts — ICAO Small Scale, are made available instead of the 1:1 000 000 chart, this is to be indicated in the Remarks column.

Note 2— In those instances where the production responsibility for certain sheets has been accepted by more than one State, these States by mutual agreement should define limits of responsibility for those sheets.

FASID Table AIM-7
Production responsibility for sheets of the
World Aeronautical Chart - ICAO 1:1 000 000 (WAC)

1	2	3
State	**Sheet number(s)**	**Remarks**
Angola		
Benin		
Burkina Faso		
Botswana		
Burundi		
Cape Verde		
Central African Republic		
Chad		
Comoros		
Congo		
Cote d'Ivoire		
Democratic Republic of Congo		
Djibouti		
Equatorial Guinea		
Eritrea		
Ethiopia		
Gabon		
Gambia		
Ghana		
Guinea		
Guinea Bissau		
Kenya		
Lesotho		
Liberia		
Madagascar		
Malawi		
Mali		
Mauritanie		
Mauritius		
Mozambique		
Namibia		
Niger		
Nigeria		
Rwanda		
Sao Tome and Principe		
Senegal		
Seychelles		
Sierra Leone		

Somalia		
South Africa		
Swaziland		
Togo		
Uganda		
United Republic of Tanzania		
Zambia		
Zimbabwe		

Table AIM-8

Pre-Flight Information Services

EXPLANATION OF THE TABLE

Column:

1 Name of the State or territory.

2 Compliance with the requirements for the provision of Pre-Flight Information Bulletins (PIB), shown by:
- FC – Fully compliant, against each type of PIB
- PC – Partially compliant, against each type of PIB
- NC – Not compliant, against each type of PIB

Note 1 — AD: Aerodrome type bulletins
Area: Area type bulletins (FIR or group of FIRs or States)
FIR route: FIR route specific bulletin
Narrow route: Narrow path route specific bulletin

3 Compliance with the requirements for the availability of the elements of the Integrated Aeronautical Information Publications (IAIP), maps and charts to the flight operations personnel, shown by:
- FC – Fully compliant
- PC – Partially compliant
- NC – Not compliant

4 Requirement for a common point of access to aeronautical information and meteorological information briefings, shown by:
- FI – Fully Implemented
- PI – Partially Implemented
- NI – Not implemented

5 Action Plan — short description of the State's Action Plan with regard to Pre-Flight Information Services, including planned date(s) of full compliance, as appropriate.

6 Remarks — additional information, including detail of "PC", "NC", "PI" and "NI", as appropriate.

FASID TABLE AIM-8
Pre-Flight Information Services

State	PIB				IAIP	Aeronautical Information and Meteorological information Integrated Briefing	Action Plan	Remarks
	AD	Area	FIR route	Narrow route				
1	2				3	4	5	6
Angola								
Benin								
Burkina Faso								
Botswana								
Burundi								
Cape Verde								
Central African Republic								
Chad								
Comoros								
Congo								
Cote d'Ivoire								
Democratic Republic of Congo								
Djibouti								
Equatorial Guinea								
Eritrea								
Ethiopia								
Gabon								
Gambia								
Ghana								
Guinea								
Guinea Bissau								
Kenya								

State	PIB				IAIP	Aeronautical Information and Meteorological information Integrated Briefing	Action Plan	Remarks
	AD	Area	FIR route	Narrow route				
1	2				3	4	5	6
Lesotho								
Liberia								
Madagascar								
Malawi								
Mali								
Mauritanie								
Mauritius								
Mozambique								
Namibia								
Niger								
Nigeria								
Rwanda								
Sao Tome and Principe								
Senegal								
Seychelles								
Sierra Leone								
Somalia								
South Africa								
Swaziland								
Togo								
Uganda								
United Republic of Tanzania								
Zambia								
Zimbabwe								

Table AIM-9

AIM Certification

EXPLANATION OF THE TABLE

Column:

1 Name of the State or territory for which implementation of AIM Certification is required.

2 Availability of AIM Regulations, shown by:

FC – Fully compliant
PC – Partially compliant
NC – Not compliant

Note — Please provide in the Remarks column detail of "PC" and "NC".

3 Compliance with the requirements for the establishment of a Safety Oversight System for ensuring the effective implementation of safety-related policy and procedures in the area of AIM, shown by:

FC – Fully compliant
PC – Partially compliant
NC – Not compliant

Note 1. — Please provide in the Remarks column detail of "PC" and "NC".

Note 2. — A Safety Oversight System is based on the eight (8) Critical Elements (CEs) as defined in the ICAO Safety Oversight Manual (Doc 9734, Part A).

Note 3. — As part of the Safety Oversight System, States should, in particular:

a) establish an entity responsible for the safety oversight of the AIS/AIM service provider(s)(not necessarily limited to the safety oversight of AIM) with clearly defined functions and responsibilities, or delegate this function to a Regional/Sub-Regional Organization;

b) ensure the availability of sufficient number of qualified AIM inspectors;

c) establish minimum qualifications and experience for the AIM inspectorate staff ;

d) establish detailed job descriptions reflecting all the regulatory and safety oversight tasks for the AIM inspectorate staff;

e) establish the necessary procedures for the AIM inspectorate staff;

f) establish and implement a formal surveillance programme for the continuing supervision of the AIS/AIM service provider(s) and ensure that safety oversight is effectively conducted; and

g) establish and implement a mechanism/system for the elimination of deficiencies identified by the AIM inspectorate staff.

4 Compliance with the requirements for implementation of AIM certification, shown by:

FC – Fully compliant
PC – Partially compliant
NC – Not compliant

Note 4. — AIM Certification may be performed within the framework of ANS Certification

5 Action Plan — short description of the State's Action Plan with regard to the implementation of the different requirements of AIM certification, including planned date(s) of full compliance, as appropriate.

6 Remarks — additional information, including detail of "PC" and "NC", as appropriate.

FASID TABLE AIM-9
AIM Certification

State	AIM Regulations	AIM Safety Oversight	AIM Certification	Action Plan	Remarks
1	2	3	4	5	6
Angola					
Benin					
Burkina Faso					
Botswana					
Burundi					
Cape Verde					
Central African Republic					
Chad					
Comoros					
Congo					
Cote d'Ivoire					
Democratic Republic of Congo					
Djibouti					
Equatorial Guinea					
Eritrea					
Ethiopia					
Gabon					
Gambia					
Ghana					
Guinea					
Guinea Bissau					
Kenya					
Lesotho					
Liberia					
Madagascar					

Appendix 3.5F9

State	AIM Regulations	AIM Safety Oversight	AIM Certification	Action Plan	Remarks
1	2	3	4	5	6
Malawi					
Mali					
Mauritanie					
Mauritius					
Mozambique					
Namibia					
Niger					
Nigeria					
Rwanda					
Sao Tome and Principe					
Senegal					
Seychelles					
Sierra Leone					
Somalia					
South Africa					
Swaziland					
Togo					
Uganda					
United Republic of Tanzania					
Zambia					
Zimbabwe					

PROPOSAL FOR AMENDMENT TO THE AFI BASIC FASID (DOC 7474 VOL.II) FOR THE INCLUSION OF MATERIALS RELATED TO TRANSITION FROM AIS TO AIM

Amendment of the AIS Parts of the AFI Basic ANP and FASID in order to introduce/develop Planning material related to the transition from AIS to AIM consisting of new AIM Tables.
This amendment proposal to Doc. 7474 (Vol. I and II) relates to the requirement for an overview of the Air Navigation Plan and the requirements for FASID tables, along with amendments to text which will be relevant to operations within the AFI Region of responsibility.

AFI ANP, VOLUME II, FASID
PART x - AERONAUTICAL INFORMATION MANAGEMENT (AIM)

(Insert the following new Text)

1. INTRODUCTION

1.1 The material in this part complements that contained in Part x — AIM of the AFI Basic ANP and should be taken into consideration in the overall planning processes for the AFI region.

1.2. This part contains the details of the facilities and services to be provided to fulfill the basic requirements of the plan as agreed between the provider and user States concerned. Such agreement indicates a commitment on the part of the State(s) concerned to implement the requirement(s) specified. It provides a structured framework for States to plan and to monitor their progress and supports regional and national plans to implement the transition to AIM. This element of the FASID, in conjunction with the AFI Basic ANP, is kept under constant review by APIRG in accordance with its schedule of management, in consultation with user and provider States and with the assistance of the ICAO AFI Regional Office.

1.3. To satisfy new requirements arising from the Global Air Traffic Management Operational Concept, aeronautical information services must transition to a broader concept of aeronautical information management, with a different method of information provision and management given its data-centric nature as opposed to the product-centric nature of AIS. AIM is the dynamic, integrated management of aeronautical information services – safely, economically and efficiently – through the provision and exchange of quality assured digital aeronautical data in collaboration with all parties.

2. ORGANISATION AND PROVISION OF AIM FACILITIES AND SERVICES

2.1. AIM requires all aeronautical information to be stored as data sets that can be accessed by user applications. The establishment and maintenance of an Integrated Aeronautical

Information Database where data sets are integrated and used to produce current and future AIM products and services is a fundamental step in the transition to AIM. The following AIM FASID tables contain planning criteria and provisions requiring implementation and compliance by States:

- Responsibility for the provision of AIM Services
- Provision of AIM products and services based on the Integrated Aeronautical Information Database (IAID)
- Terrain and Obstacle data sets and Airport Mapping Databases (AMDB)
- Aeronautical Data Quality
- World Geodetic System – 1984 (WGS84)
- Aeronautical Charts
- Production Responsibility for sheets of the World Aeronautical Chart – ICAO 1:1 000 000
- Pre-Flight Information Services
- AIM Certification

2.2. FASID Table AIM-1 sets out the responsibilities for the provision of AIM services in the AFI Region. It takes into account the current situation and new developments specific to the AFI Region where States delegate certain AIS/AIM services to a Regional Agency (e.g. with the establishment of Functional Airspace Blocs (FAB). The responsibilities for the provision of aeronautical data, products and services in such cases need to be clearly assigned.

2.3. FASID Table AIM-2 sets out the requirements for the Provision of AIM products and services based on the Integrated Aeronautical Information Database (IAID). It reflects the transition from the current product centric AIS to data centric AIM. For the future digital environment it is important that the -2 authoritative databases are clearly designated and such designation must be published for the users. This is achieved with the concept of the Integrated Aeronautical Information Database (IAID), a single access point for one or more authoritative databases (AIS, Terrain, Obstacles, AMDB, etc) for which the State is responsible.

2.4. FASID Table AIM-3 sets out the requirements for the provision of Terrain and Obstacles datasets and Aerodrome Mapping Data Bases (AMDB). The AFI e-TOD implementation Checklist at **Attachment A1** and the AFI e-TOD implementation strategy at **Attachment A2** to Part x - AIM of the AFI FASID is developed to assist States in the process of e-TOD implementation.

2.5. FASID Table AIM-4 sets out the requirements for aeronautical data quality. **Attachment B** to Part x - AIM of the AFI FASID describes the safety and security objectives to be included in the Quality Management System of AIM. **Attachment C** to Part x - AIM of the AFI FASID lists the data originators and the type of aeronautical data/information required to be exchanged by direct electronic connection.

2.6. FASID Table AIM-5 sets out the requirements for the implementation of the World Geodetic System – 1984 (WGS-84).The requirement to use a common geodetic system remains essential to facilitate the exchange of data between different systems. The expression of all coordinates in the AIP and charts using WGS-84 is an important first step for the transition to AIM.

2.7. FASID Table AIM-6 sets out the requirements for the production of aeronautical charts. The provision of digital mapping data bases e.g. AMDB, allows for the provision and use of electronic aeronautical charts. Annex 4 SARPs include the requirement for an Electronic Aerodrome Terrain and Obstacle Chart.

2.8. FASID Table AIM-7 sets out the responsibilities for the production of the sheets of the World Aeronautical Chart 1: 1 000 000 (WAC). The assignment of the WAC sheets is determined by regional agreement, based on the delineation of areas specified in Appendix 5 to Annex 4 and taking into consideration the cross-border issues.
Note.- The World Aeronautical Chart 1: 1 000 000 provides information to satisfy the requirements of visual air navigation.

2.9. FASID Table AIM-8 sets out the requirements for the provision of pre-flight information services.

2.10. FASID Table AIM-9 sets out the requirements for AIM Certification.

AFI REGION QUESTIONNAIRE FOR STATE'S TRANSITION FROM AIS TO AIM

National Plan for the transition from AIS to AIM

a) Have you developed a National Plan for the transition from AIS to AIM? If Yes, is it based on the ICAO Roadmap (Phases 1, 2 and 3) ?		YES	NO
Sample	No formal plan has been developed for the whole transition but a set of initiatives for several steps of the Roadmap. Phase 1 is fully covered by our initiatives / Phases 2 and 3 are partly covered by our initiatives.		X
STATE			

1. Phase 1 – Consolidation (2009)

a) What do you consider a realistic timeframe for the implementation of Phase 1?	
Sample	2013 – due to the implementation of QMS by the raw data originators Quality measures will be reinforced to ensure the required level of quality of the aeronautical information. Before end of June 2013. Incremental improvements in data quality will be achieved through the implementation of the revised QMS. Data quality is expected to be fully compliant before the end of June 2017.
a) What do you consider a realistic timeframe for the implementation of Phase 1?	
STATE	

b) What is the status of implementation of the following steps of Phase 1 in your State?			
P-03 — AIRAC adherence monitoring			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	Implemented up to the process step "publication" in the frame of the Quality Management System.		There seems currently no effective means available to monitor the process steps after "publication", (which is beyond our influence and control (mailing).
STATE			
b) What is the status of implementation of the following steps of Phase 1 in your State?			
P-03 — AIRAC adherence monitoring			

	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

b) What is the status of implementation of the following steps of Phase 1 in your State?			
P-05 — WGS-84 implementation			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	Implemented – since 1998		Geoid Undulation not yet implemented
STATE			

b) What is the status of implementation of the following steps of Phase 1 in your State?			
P-04 — Monitoring of States' differences to Annex 4 and Annex 15			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	During preparations for ICAO USOAP all differences to Annex 4 and Annex 15 have been identified and recorded, using standard checklists supplied from ICAO. Since then, some of those differences are removed and some standards are changed, checklists were updated. Differences are published in the AIP.		Dialogs are conducted concerning differences between CAA and service provider about measures and time frame.
STATE			

b) What is the status of implementation of the following steps of Phase 1 in your State?			
P-17 — Quality			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	Partially achieved. Not in place for all data throughout the data management chain. Partly implemented concerning integrity.		Data exchange tool will improve data integrity.
STATE			

Phase 2 – Going Digital (2009 – 2011)

a) What do you consider a realistic timeframe for the implementation of Phase 2?	
Sample	Many steps of Phase 2 are already implemented; however the entire scope of data will be covered by 2015.
STATE	

b) What is the status of implementation of the following steps of Phase 2 in your State?			
P-01 — Data quality monitoring			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	A structured monitoring system is not implemented. Quality management in the chain is fractured.		State policy under development
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-02 — Data integrity monitoring			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-06 — Integrated aeronautical information database			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	AISP operates a database of static aeronautical data based on AICM/AIXM 4.5 and a separate database for dynamic aeronautical data. The database was converted to the current AIXM 4.5 version with the effective date of 4th of June 2010. Obstacle data database with only one way exchange from (originator) to AISP under test operation.	With the introduction of a system based on AIXM 5.1 an integration of the static and dynamic database is expected. The deadline for the transition to AIXM 5.1 is not specified yet.	
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-07 — Unique identifiers			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	AISP uses a model of unique feature identification based on natural keys in compliance with AIXM 4.5.	With the introduction of a system based on AIXM 5.1 the universally unique identifier (UUID) model will be implemented. We expect possible difficulties in the transition process to the new unique identifiers.	
STATE			

b) What is the status of implementation of the following steps of Phase 2 in your State?			
P-07 — Unique identifiers			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE		.	

a) What is the status of implementation of the following steps of Phase 2 in your State?
P-08 — Aeronautical information conceptual model

	Implemented (specify how)	Planned (specify when/how)	Additional comments/clarification required
Sample	The data model which is used by AIXM 4.5 is implemented.	With the introduction of a system based on AIXM 5.1 the appropriate data model will be implemented.	

b) What is the status of implementation of the following steps of Phase 2 in your State?			
P-08 — Aeronautical information conceptual model			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-11 — Electronic AIP			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

b) What is the status of implementation of the following steps of Phase 2 in your State?			
P-11 — Electronic AIP			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	No	Initial eAIP produced May 11. Operational version planned for Sep 11.	AIP available in digital format (PDF) on CD and on the web
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-13 — Terrain			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample		Terrain datasets are available, but unfit to cover all eTOD requirements. Implementation is planned until mid 2013	Implementation Project is ongoing, charging mechanism under discussion. State policy under development.
STATE			

b) What is the status of implementation of the following steps of Phase 2 in your State?			
P-13 — Terrain			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification**
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-14 — Obstacles			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	Partially provided but not compliant with chapter 10 of ICAO Annex 15 Data collected for Area 1	Area 1 planned for 2012 Area 2 and Area 3 planned 2015	State policy under development.
STATE			

b) What is the status of implementation of the following steps of Phase 2 in your State?			
P-14 — Obstacles			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

a) What is the status of implementation of the following steps of Phase 2 in your State?			
P-15 — Aerodrome mapping			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	No	No concrete planning available yet, still under review.	
STATE			

3. Phase 3 – Information Management (2011 – 2016)

a) What do you consider a realistic timeframe for the implementation of Phase 3?	
Sample	We believe that the foreseen implementation time frame of Phase 3 is too ambitious and think that 2013-2018 would be a more realistic time frame.
STATE	

a) What is the status of implementation of the following steps of Phase 3 in your State?

P-09 — Aeronautical data exchange

	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	An AIXM interface from/to the central aeronautical database (refer to P-06) is available.	It is planned to implement the exchange model and mechanisms together with AICM 5.1. This starts in 2013	Not implemented between data providers and AIS
STATE			

b) What is the status of implementation of the following steps of Phase 3 in your State?

P-09 — Aeronautical data exchange

	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

a) What is the status of implementation of the following steps of Phase 3 in your State?

P-10 — Communication networks

	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	AISP has been using the Internet for static and dynamic data exchange for some time already. AFTN is also being used, currently in the role of a backup network for dynamic data exchange. Starting August 2010 the AISP is using PENS for dynamic data exchange.	Migration to AMHS completed. For some specific services Internet is being used.	In some specific cases the ANSP is delivering aeronautical data to customers (airlines) through business-to-business (B2B) web services (industry standard). Briefing services (self- and home briefing) are provided by making use of the Internet in line with the ICAO Doc 9855 (requires update in line with latest developments).

STATE			
a) What is the status of implementation of the following steps of Phase 3 in your State?			
P-12 — Aeronautical information briefing			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	For many years the ANSP is applying enhanced NOTAM selection criteria for the delivery of NOTAMs to airlines going beyond the ICAO provisions (enhancing the operational relevance for the airline). This procedure is applied in agreement with the Regulator.		Despite the constraints with the current NOTAM selection criteria, the presentation of all required pre-flight information (AIS, FPL and MET) has been improved in an integrated system allowing for custom tailored information.
b) What is the status of implementation of the following steps of Phase 3 in your State?			
P-12 — Aeronautical information briefing			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

a) What is the status of implementation of the following steps of Phase 3 in your State?			
P-16 — Training			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample			Currently it is not clear what is expected under the training header. ICAO training manual has to be developed to reflect the new competencies required by the transition to AIM, before national requirements can be developed.

STATE			

a) What is the status of implementation of the following steps of Phase 3 in your State?			
P-18 — Agreements with data originators			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	Partially achieved, some requirements in current CAA publications.	By July 2013 – Implementation of CAA Policy for Agreements with Data Originators.	Under Development. See P-01.
STATE			

a) What is the status of implementation of the following steps of Phase 3 in your State?			
P-19 — Interoperability with meteorological products			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample	Partially implemented, pre-flight information briefing is provided in harmonized way (one stop shop) in accordance with current ICAO Annex 3 and ICAO Annex 15 requirements.	Next step (fully integrated briefing) will be implemented after the design and implementation of the appropriate data exchange technology is finished (WXXM – Weather Exchange Model).	
STATE			

P-20 — Electronic aeronautical charts			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample			More detailed specification are required; Annex 4, Chapter 20 Electronic Aeronautical Chart Display is too general.
a) What is the status of implementation of the following steps of Phase 3 in your State?			
P-20 — Electronic aeronautical charts			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
STATE			

a) What is the status of implementation of the following steps of Phase 3 in your State?			
P-21 — Digital NOTAM			
	Implemented (specify how)	**Planned (specify when/how)**	**Additional comments/clarification required**
Sample		Plan to provide digital NOTAM by Jul 2017.	AIXM 5.1 will be the enabler to digital NOTAM.
STATE			

4. Do you expect any specific difficulty which could impede the transition from AIS to AIM?

	YES	**NO**

Sample	x Potential for the non-participation of key stakeholders providing e-TOD data. x Continuation of downturn in aviation industry causing financial constraints on the State AIS provider and other key stakeholders supplying aeronautical data. x Non-agreement by airports to establishment of SLA with State AIS for provision of data. x Justification to aerodromes for additional costs related to the provision of survey data for digital mapping. x Funding, decision making on all levels, manpower capacity, availability of knowledge, technical infrastructure, acceptance by all stakeholders, timescales unrealistic.	X	
STATE			

5. What kind of assistance/support do you expect from ICAO to expedite the transition from AIS to AIM?

Sample	x Specific guidance material for implementation of each subject. Development of more detailed guidance materials, manuals, best practices examples and other supporting documents. x Expeditious revisions to Annex 15 and 4 when appropriate. x Regional workshops and seminars to ensure consistency in the transition to AIM.
STATE	

6. Do you have any suggestion to update/improve the ICAO Roadmap for the Transition from AIS to AIM?

Sample	x In the first version of the Roadmap document the description of the steps is quite basic and insufficient. Those definitions should be expanded and/or reference to specific standards, manuals and other documents should be provided within it. x Timelines should be permanently monitored and adapted accordingly.
STATE	

7. Any other suggestion on the subject?

Sample	x ICAO Doc 9881 is only a draft, but the content is paramount for the transition to AIM - e.g. the attributes of terrain and obstacle data need clear definitions and explanations – including examples of obstacles together with attributes.
STATE	

STATUS REPORT AGAINST THE 21 STEPS OF THE ICAO ROADMAP FOR THE TRANSITION FROM AIS TO AIM

State AIS AIM Transition Table

Phase 1

P~03 —AIRAC adherence monitoring
P~04 —Monitoring of States'differences to Annex 4 and Annex 15
P~05 —WGS~84 implementation
P~17 —Quality

Phase 2

P~01 —Data quality monitoring
P~02 —Data integrity monitoring
P~06 —Integrated aeronautical information database
P~07 —Unique identifiers
P~08 —Aeronautical information conceptual model
P~11—Electronic AIP
P~13 —Terrain
P~14 —Obstacles
P~15—Aerodrome mapping

Phase 3

P~09 —Aeronautical data exchange
P~10—Communication networks
P~12 —Aeronautical information briefing
P~16 —Training
P~18 —Agreements with data originators
P~19 —Interoperability with meteorological products
P~20 —Electronic aeronautical charts
P~21 —Digital NOTAM

Appendix I to WP/17 on Agenda Item 3.5

Appendix -H
Date Last
Amended:

	Phase 1 Consolidation				Phase 2 Going Digital									Phase 3 Information Management							
	P~03	P~04	P~05	P~17	P~01	P~02	P~06	P~07	P~08	P~11	P~13	P~14	P~15	P~09	P~10	P~12	P~16	P~18	P~19	P~20	P~21
Angola																					
Benin																					
Burkina Faso																					
Burundi																					
Cape Verde																					
Central African Republic																					
Chad																					
Comoros																					
Congo																					
Cote d'Ivoire																					
Democratic Republic of																					
Djibouti																					
Equatorial Guinea																					
Eritrea																					
Ethiopia																					
Gabon																					
Gambia																					
Ghana																					
Guinea																					
Guinea Bissau																					
Kenya																					
Lesotho																					
Liberia																					

Appendix I to WP/17 on Agenda Item 3.5

Madagascar																					
Malawi																					
Mali																					
Mauritanie																					
Mauritius																					
Mozambique																					
Namibia																					
Niger																					
Nigeria																					
Rwanda																					
Sao Tome and Principe																					
Senegal																					
Seychelles																					
Sierra Leone																					
Somalia																					
South Africa																					
Swaziland																					
Togo																					
Uganda																					
United Republic of Tanzania																					
Zambia																					
Zimbabwe																					

X= Implemented
N= Non Implemented
P= Plan Implementation

NOTAM Templates related to the operational impact and limited access of airspace and routes affected by volcanic ash

NOTAM Templates

General

Structure of NOTAM content

For each operational area, a short description is given for in which situations the examples can be used. It follows by a description of the structure of the NOTAM text, providing the sequence of the free text information to be inserted in item E). The structure of the information is in accordance with a dedicated digital NOTAM event scenario.

Filling instructions and NOTAM codes

The NOTAM examples include some instructions in completion of the qualifier line, the recommended NOTAM code and instruction in how to describe a published airspace in item E).

Navigation warnings

Type of operational impact/event

These templates apply for the issuance of navigation warnings for potential volcanic activity:

a) pre-eruption notification and outbreak of a volcano including detailed information regarding the activity,

b) volcano ash contamination areas forecast spread and movement, for which an area restriction has not been established

Structure of information

The examples follow the structure of the digital NOTAM event scenario *Ad-hoc special activity area:*

airspace type – activity/reason – location note (ex. name of volcano) – geometry (horizontal/vertical) – note(s);

The structure of the information is illustrated by color coding in the NOTAM example 2.2.3.1 with the following meaning:

Red = airspace type
Blue =activity/reason for the area establishment
Green =location note of the activity
Purple = Geometry
Orange = airspace activity note #1(there may be as many Notes as necessary)
Brown = airspace activity note #2 (there may be as many Notes as necessary)

NOTAM examples

Pre-eruptive volcanic alert

(A0777/10 NOTAMN
Q) BIRD/QWWLW*/IV/NBO/W/000/999/6337N01901Wxxx**
A) BIRD B) 1002260830 C) 1002261100
E) PRE-ERUPTIVE ACTIVITY ALERT FOR VOLCANIC ACTIVITY, POSSIBLY INDICATING IMMINENT ERUPTION (VOLCANO KATLA 1702-03 ICELAND-S) AS FOLLOWS: CIRCLE WITH CENTRE 6337.5N 01901.5W AND RADIUS OF XXXNM***.

VOLCANIC ASH CLOUD IS EXPECTED TO REACH 50.000 FEET AMSL FEW MINUTES FROM START OF ERUPTION. AIRCRAFT ARE REQUIRED TO FLIGHT PLAN TO REMAIN AT LEAST XXXM CLEAR OF VOLCANO AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR AREA
F) GND G) UNL
*) *Recommended NOTAM code: QWWLW "Significant volcanic activity will take place…(specify)".*
***) A radius shall be included in the qualifier line in a way that encompasses the total area of influence of the NOTAM.*
****) XXX is a distance established by the Provider State and shall correspond to the radius in the qualifier line.*

Reporting on outbreak of volcanic eruption

(A0778/10 NOTAMR A0777/10
Q) BIRD/QWWLW/IV/NBO/W/000/999/6337N01901Wxxx
A) BIRD B) 1002261000 C) 1002261300
E) VOLCANIC ERUPTION CONFIRMED IN VOLCANO KATLA 17-2-03 ICELAND-S. CIRCLE WITH CENTRE 6337.5N 01901.5W AND RADIUS OF XXXNM. VOLCANO ASH CLOUD IS EXPECTED TO REACH 50 000 FEET AMSL. AIRCRAFT ARE REQUIRED TO REMAIN AT LEAST XXXNM CLEAR OF VOLCANO AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR BIRD AREA.
F) GND G) UNL

Reporting on forecasted volcanic ash area [of Medium or High, High/Medium or High/Medium/Low contamination]

(A0207/10 NOTAMN
Q) EIAA/QWWLW/IV/NBO/W /000/200/xxxxNxxxxxE (orW)/xxx*)
A)EIAA B) 1005190700 C) 1005191300
E) VOLCANIC ASH AREA OF MEDIUM CONTAMINATION FORECAST AS FOLLOWS:
5243N 00853W - 5330N 00618W - 5150N 00829W - 5243N 00853W**)
F)SFC G) FL200
**) The geographical reference (coordinates lat/long) shall represent the approximate centre of a circle whose radius encompasses the whole area of influence. A radius shall be included in a way that encompasses the total area of influence of the NOTAM.*
***) Definition of the area should be done by radius/circle or coordinates only. Definition of airspace by the use of geographical or administrative features such as State borders, rivers, sea shores etc) is not supported by the digital NOTAM event scenario and is therefore not recommended. If operational necessary, this can be defined by providing a simplified polygon larger than the area and excluding a neighbouring FIR, for example.*
Coordinates defining the lateral limits of the area (polygon) should be enumerated in clockwise order, each point separated by space-hyphen-space. The last and the first points of the list shall be the same.

Airspace restrictions

Type of operational impact/event

These templates apply for established temporary airspace restrictions for areas affected by volcanic activity:

a) temporary airspace restriction due to outbreak of volcanic eruption,

b) temporary airspace restrictions based on forecast ash contamination areas spread and movement

Structure of information

The examples follow the structure of the digital NOTAM event scenario *Ad-hoc special activity area:*
airspace type – activity/reason – location note (ex. name of volcano) – geometry (horizontal/vertical) – note(s);

The structure of the information is illustrated by color coding in the NOTAM example 2.3.3.1 with the following meaning:
Red = airspace type
Blue =activity/reason for the area establishment
Green =location note of the activity
Purple = Geometry
Orange = airspace activity note #1(there may be as many Notes as necessary)
Brown = airspace activity note #2 (there may be as many Notes as necessary)

NOTAM examples

Established temporary airspace restriction for confirmed volcanic eruption

(A0255/11 NOTAMN
Q) BIRD/QRDCA*/IV/NBO/W/000/500/6337N01901Wxxx**
A) BIRD B) 1103260800 C) 1103261200
E) TEMPORARY DANGER AREA ESTABLISHED FOR CONFIRMED VOLCANIC ERUPTION VOLCANO KATLA 1702-03 ICELAND-S AS FOLLOWS: CIRCLE WITH CENTRE 6337.5N 01901.5W AND RADIUS OF XXXNM*** VOLCANIC ASH CLOUD REPORTED REACHING FL500. AIRCRAFT ARE REQUIRED TO REMAIN CLEAR OF AREA AND MAINTAIN WATCH FOR NOTAM/SIGMET FOR BIRD AREA.
F) SFC G) FL500
**) Recommended NOTAM code: QRTCA "Temporary restricted area activated", QRDCA "Danger area activated" and QRPCA " Prohibited area activated", based on States decision on established restriction.*
***) A radius shall be included in the qualifier line in a way that encompasses the total area of influence of the NOTAM.*
****) XXX is a distance established by the Provider State and shall correspond to the radius in the qualifier line*

Established airspace restriction including volcanic ash area of High [or High/Medium or High/Medium/Low] contamination

(A0503/10 NOTAMN

Q) EGGN/QRTCA/IV/NBO/W/000/350/xxxxNxxxxxW (or E)xxx*
A)EGPX B)1005182300 C)1005190500
E)TEMPORARY RESTRICTED AREA ESTABLISHED FOR VOLCANIC ASH AREA OF HIGH CONTAMINATION AS FOLLOWS: 5812N 00611W - 5718N 00216W - 5552N 00426W - 5629N 00652W - 5812N 00611W**)
F)SFC G) FL350

(A0886/10 NOTAMR A0884/10
Q) BIRD/QRDCA/IV/NBO/W/000/250/xxxxNxxxxxW(orE)xxx*
A) BIRD B) 1011301214 C) 1011301814
E) TEMPORARY DANGER AREA ESTABLISHED FOR VOLCANIC ASH AREA OF MEDIUM AND HIGH CONTAMINATION AS FOLLOWS:
7134N 00843W - 7134N 00801W - 6931N 00508W - 6606N 00732W - 6208N 01334W - 6254N 01419W - 6823N 00925W - 7134N 00843W**)
F)SFC G)FL250

**) The geographical reference (coordinates lat/long) shall represent the approximate centre of a circle whose radius encompasses the whole area of influence. A radius shall be included in a way that encompasses the total area of influence of the NOTAM.*
***) Definition of the area should be done by radius/circle or coordinates only. Definition of airspace by the use of geographical or administrative features such as State borders, rivers, sea shores etc) is not supported by the digital NOTAM event scenario and is therefore not recommended. If operational necessary, this can be defined by providing a simplified polygon larger than the area and excluding a neighboring FIR, for example.*
Coordinates defining the lateral limits of the area (polygon) should be enumerated in clockwise order, each point separated by space-hyphen-space. The last and the first points of the list shall be the same.

Aerodrome/heliport closure

Type of operational impact/event

These templates cover the event of a temporary closure of an airport/heliport. The closure can be total (any traffic is forbidden) or partial (with the exception of particular operations, flight or aircraft categories).

Structure of information

The proposed structure of data items in the examples follow the digital NOTAM event scenario *Airport/Heliport closure*:
designator - *operational status* - *forbidden operation* - *permitted operation* – *reason* - *start closure* - *end closure* – *note(s)*
The structure of the information is illustrated by color coding in the NOTAM example 2.3.3.1, with the following meaning:

Red = designator
Blue =operational status (closure/limitation)
Green = forbidden operation (flight/aircraft)
Purple = permitted operation (flight/aircraft) and PPR details
Orange = reason for aerodrome/heliport closed
Indigo = start closure

Pink = end closure, schedule
Brown = further instructions concerning the airport closure Note (there may be as many Notes as necessary)

NOTAM examples

Aerodrome/Heliport closed for all traffic

(A1340/10 NOTAMN
Q)EFIN/QFALC/IV/NBO/A/000/999/6455N01252E/010
A)EFOU B) 1012151600 C) 1012151900EST
E) AD*) EFOU CLOSED FOR ALLTRAFFIC DUE TO VOLCANIC ASH AREA OF HIGH CONTAMINATION FORECAST FOR INFO CALL + 35885207700

*) *If the designator concerns a heliport, the word "HELIPORT" shall be included.*

Aerodrome/Heliport closed for IFR traffic

(A0468/10 NOTAMN
Q)EFIN/QFALT/I/NBO/A/000/999/6455N012521E/010
A)EFOU B) 1003211000 C) 1003211300EST
E) AD EFOU CLOSED FOR IFR TRAFFIC DUE TO VOLCANIC ASH AREA OF MEDIUM CONTAMINATION FOR INFO CALL + 35885207700

Restrictions on route portions/flight levels

Type of operational impact/event

These templates cover the event of a temporary closure of one or more route portions (could be on different routes) due to a common cause, such as the activation of a temporary restricted area.
If more than one route portion is concerned, the eventual vertical layers and schedules specified by the data originator are assumed to apply identically to all route portions (routes); if one route portion has different layers or schedules, it shall be considered a separate event and a separate NOTAM shall be issued.

Structure of information

The proposed structure of data items in the examples follow the digital NOTAM event scenario *Route portion closure*:
route availability - *route designator* - *start point* - *end point* - *direction* - *lower level* - *upper level* - *start time* - *end time* - *schedule* - *reason* - *note(s)*
The structure of the information is illustrated by color coding in the NOTAM example 2.5.3.1 with the following meaning:
Red = route availability
Blue =route designator
Green = start point (designator of the significant point, and the type in case of a navaid)
Purple = end point (designator of the significant point and the type in case of a navaid)
Indigo = lower level/upper level
Orange = start time/end time/schedule
Pink = reason (explanation of the situation that triggered the closure of the route)
Brown = further instructions concerning the route portion closure Note (there may be as many Notes as necessary)
:

NOTAM examples

Area Navigation (RNAV) routes portion closure with vertical layer

(A0515/10 NOTAMN
Q) ENOR/QANLC/I/NBO/E/285/400/6230N00300E/085
A)ENOR B) 1004151200 C) 1004151400EST
E) RNAV ROUTE SEGMENTS CLSD
UM 996 ISVIG – VIGRA DVOR/DME (VIG)
UL727 ISVIG – FLORO DVOR/DME (FLO)
UP607 INGAL – FLORO DVOR/DME (FLO)
FROM FL285 TO FL400
DUE TO VOLCANIC ASH AREA OF HIGH CONTAMINATION FORECAST

ATS route *) portion closure with vertical layer

A0515/10 NOTAMN
Q) LFFF/QARLC/IV/NBO/E/200/400/4920N0015E/060
A)LFFF B) 1011030800 C) 1011031000EST
E) ATS ROUTE SEGMENTS CLSD UL612 XAMAB – RESMI FROM FL 200 TO FL 400 03 NOV 2010 08:00 TO 03 NOV 2010 10:00EST DUE TO TEMPORARY ESTABLISHED DANGER AREA FOR VOLCANIC ASH AREA OF MEDIUM AND HIGH CONTAMINATION.

**)The second and third NOTAM code letters AR apply for conventional ATS routes, TACAN routes and routes other than Area Navigation routes.*

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFI MET BULLETINS EXCHANGE (AMBEX) HANDBOOK

Seventh Edition – Amendment 2

July - 2011

Prepared by the ICAO ESAF & WACAF Offices
And published under the authority of the Secretary General

Record of amendments

Inscription des amendements

AMBEX HANDBOOK - 7TH EDITION -

MANUEL AMBEX - 7EME EDITION -

Amendment No. Amendement No.	Dated En date du	Date entered Date d'inscription	Entered by Inscrit par
1	15/03/2010	01/04/2010	RO/MET
2	01/07/2011	15/08/2011	MET/SG Secretariat

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ABBREVIATIONS AND ACCRONYMES

ADMIN	Administrative
AFI	Africa and Indian Ocean region of ICAO
AFMAG	AFI MET Advisory Group
AFS	Aerodrome flight information service
AFTN	Aeronautical fixed telecommunication network
AIREP	Air-report
AMBEX	AFI MET Bulletins Exchange (System)
AMD	Amend/Amended
ANP	Air Navigation Plan
APIRG	AFI Planing and Implementation regional Group
ASIA/PAC	Asia and Pacific Region of ICAO
BCC	Bulletin Compilation Centre
BRDO	Banque Régionale des Données OPMET
COM	Communications
ESAF	East and South African (Office)
EUR	Europe region of ICAO
FASID	Facilities and Services Implementation Document
ICAO	International Civil Aviation Organization
ICD	Interface Control Document
IROG	Inter-regional OPMET gateway
ISCS	International Satellite Communication System
MET	Meteorology
MET/SG	MET Sub-group
METAR	Aerodrome routine meteorological report
MID	Middle East region of ICAO
NAM	North American region of ICAO
NOC	National OPMET Centre
ODREP	OPMET Data Regional Exchange Points
OMM	Organisation Météorologique Mondiale
OPMET	Operational meteorological *(information)*
RODB	Regional OPMET Data Bank
SADIS	Satellite Distribution of Aeronautical Information
SAM	South African (Office)
SARP	Standards and Recommended Practices [ICAO]
SIGMET	Information concerning en-route weather phenomena which may affect the safety of aircraft operation
SPECI	Aerodrome special meteorological report *(in meteorological code)*
TAF	Aerodrome forecast
TCA	Tropical Cyuclone Advisory
TCAC	TCA Centre
VAA	Volcanic Ash Advisory
VAAC	VAA Centre
WACAF	Western and Central African (Office) of ICAO
WMO	World Meteorological organization

1. INTRODUCTION

1.1 The Africa- Indian (AFI) Meteorological Bulletin Exchange (AMBEX) scheme was established by the **AF**I Planning and Implementation Regional Group (APIRG) in 1986. The scheme became operational in 1986 and has since then been successfully serving the ICAO AFI Region in the exchange of the required OPMET information.

> Note: AFI Meteorological Advisory Group (AFMAG) was created by the LIM AFI (COM/MET/RAC) RAN Meeting in Lome April 1988 and established by APIRG/6 Meeting in November 1989.AFMAG was replaced by AFI Meteorology Sub Group (MET/SG) at APIRG/11 Nairobi 1998. AMBEX was implemented starting on 29 August 1986.

1.2 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 Advisory (VAA) and tropical Cyclone (TCA) has been 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 Centre. The operational exchange has been carried out according to agreed transmission schedules; the bulletin contents were specified in the AMBEX Handbook.

1.3 The procedures described hereunder are based to a significant degree on corresponding procedures in use in the Regional OPMET Bulletin Exchange (AMBEX) Scheme (AFI). Although uniformity is desired, the AMBEX Scheme is not intended as a rigid scheme for the AFI Region where variations or adaptation of the basic principles appear more efficient. AMBEX centre authorities are strongly requested to suggest to the Secretary of the MET/SG any local changes that are considered desirable for the enhancement of the efficiency of the scheme.

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

1.5 Recently, it has been identified that significant changes in the scheme were needed in order to make it compatible with the existing COM environment and satisfy the evolving user requirements. In view of this, APIRG adopted conclusions that called for further development of the AMBEX scheme according to the new operational requirements.

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

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

2. AMBEX SCHEME - GENERAL

2.1 Objective

2.1.1 The main purpose of the AFI Meteorological Bulletins Exchange (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.

2.2 Structure

2.2.1 The above objective is achieved by implementing 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 should be developed in compliance with similar structures in the other ICAO regions, as well as with the aeronautical fixed system (AFS) satellite distribution systems used to disseminate OPMET data.

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

2.3 Products

2.3.1 The AMBEX scheme prepares and delivers to the aviation users the required OPMET information in the form of **bulletins.** The scheme should handle all types of OPMET information in alphanumeric bulletin form and should provide facilities and services for scheduled and non-scheduled delivery of OPMET information to users.

2.4 Communications -General

2.4.1 Use of AFS Components

According to Annex 3, 11.2,” telecommunications facilities used for the exchange of operational meteorological information should be the aeronautical fixed service”. The use the AFS for the OPMET exchange encompass two components:

- Use of terrestrial AFTN circuits; and
- Use of satellite distribution systems-SADIS .

2.4.2 Use of the AFTN

2.4.2.1 In the AMBEX scheme AFTN circuits are used for collection of the OPMET messages by the AMBEX centres and for regional and inter-regional exchanges of OPMET bulletins. The access to the regional OPMET data banks (request-reply service provided by the RODBs) is also provided through the AFTN.

2.4.2.2 OPMET bulletins transmitted via the AFTN shall be in encapsulated in the text part of the AFTN message format (Annex 3, Appendix 10, 2.1.4).

2.4.2.3 Transit times of the AFTN messages and bulletins containing OPMET information are specified in Annex 3, Appendix 10, 1.1

2.4.2.4 OPMET bulletins via AFTN should use the following **priority indicators:**

- **FF: SIGMET, AIREP SPECIAL, VAA,TCA and TAF amend (** cf. Annex 10 Vol II, 4.4.1.1.3)
- **GG: TAF, METAR and SPECI (cf. Annex 10 VolI, 4.4.1.1.4)**

2.4.2.5 **Filing times** of the bulletins should be according to Annex 3, Appendix 10, 2.1.2

2.4.3 Use of the Satellite Distribution System for aeronautical information (SADIS-operated by the UK)

2.4.3.1 SADIS satellite broadcast is used by the authorized users in the States for receiving global OPMET DATA.

2.4.3.2 FASID Table MET 7 of the AFI regional plans contains a list of authorized users for the SADIS broadcast.

2.5 <u>Use of the Internet</u>

2.5.1 Internet may be used to the dedicated internationally agreed circuits for exchange of meteorological data. An internet based FTP service to SADIS has been operational since 2002.

2.5.2 In future, it is intended that RODBs should also provide internet based facilities for retrieval of OPMET information. RODB Dakar is already using the Internet to provide METARs and TAFs.

2.6 <u>Management</u>

2.6.1 Monitoring of the 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. In order to achieve these tasks, the AMBEX implementation status and planning is part of the agenda of the AFI MET Sub-group MET/SG.

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

2.6.2 Any proposals for amendments to the AMBEX Scheme , which States or international organizations concerned consider it necessary, 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 my be.

2.7 Documentation

2.7.1 The AMBEX Handbook is the main guidance material related to the AMBEX Scheme. It should be kept up-to-date by the ICAO Regional offices referred to above coordinated by the Secretary of the OPMET Task Force in close coordination with the Secretary of the MET Sub-group.

2.7.2 The AFI OPMET Data Banks Interface Control Document(ICD) is a supplementary document which provides users with guidance on the interrogation procedures and the content of the RODBs.

3. DEFINITIONS AND SYMBOLS

3.1 Within the AMBEX Scheme, the following definitions and symbols are used:

i) AMBEX: AFI MET Bulletins Exchange (Scheme);

ii) 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;

iii) ***National OPMET center (NOC).*** Normally, a NOC is associated with the State's national AFTN centre/switch. The role of the NOC is to collect all OPMET messages generated by the originating stations in the State and to send them to the responsible AMBEX bulletin compiling center (AMBEX BCC). Some NOCs serve also as AMBEX BCCs. National regulations should be developed to ensure that NOCs disseminate the international OPMET data within their own State, as necessary.

iv AMBEX Bulletin Compiling Centre (BCC): AMBEX centres (former TCC, MCC or ACC, etc..) are responsible for collection of OPMET messages from the originating stations or NOCs in their area of responsibility and for compiling these messages into AMBEX bulletins. FASID Tables MET 4A and MET 4B determine the areas of responsibility (or, collection areas) of the AMBEX centres for METAR/SPECI, and TAF, respectively.

v) OPMET Inter-regional Gateway (IROG) A designated centre charged with the responsibility of exchanging OPMET data between stations within the AFI Region and in adjacent regions, as prescribed in this Handbook. The plan of OPMET data exchange between regions through an IROG is based on pre-determined distributions responsibilities, and/or on a request/reply basis;

vi) YPYX: Fifth, sixth, seventh and eighth letter of an addressee indicator to be used:

a) with the normal four-letter location indicators, to designate BCCs

b) with indicators for pre-determined distribution within a BCC collection area.

vii) Regional OPMET Data Bank (RODB): A centre charged with task to collect 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

Note: The designated RODB and their responsibilities are described in ***Appendix E***

4. OPMET INFORMATION AND OPMET EXCHANGES

4.1 OPMET Data Type

4.1.1 The following OPMET data types should be 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

4.2 OPMET bulletins

4.2.1 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.

4.2.2 The format of OPMET bulletins is determined by:

- *ICAO Annex 10*, *Aeronautical telecommunications*, as regards the 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.

4.3 Types of OPMET exchange

4.3.1 Regional exchange – AMBEX scheme

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

4.3.1.1.1 *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.

4.3.1.1.2 *Non-regular exchange.* This includes:

a) *Exchange on request (request-reply service).* The RODBs store OPMET data and make them available on request.

b) *Exchange of non-routine reports:* SPECI; TAF AMD; SIGMET; TCA and VAA; ADMIN messages.;

4.3.2 Inter-regional OPMET exchange

4.3.2.1 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: The former name of these centres is ODREP.

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

4.3.3 Exchange of OPMET information through the satellite segment of the AFS

4.3.3.1 The three satellite broadcasts provided by the United Kingdom (Satellite Distribution System for Aeronautical Information Relating to Air Navigation - SADIS) and the United States (International Satellite Communication System – ISCS/1 and ISCS/2), form 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.

4.3.3.2 All AFI data handled by the AMBEX scheme should be relayed to the SADIS for global broadcast.

4.3.4 Other OPMET exchanges

4.3.4.1 Where OPMET exchanges described in the above paragraphs are not sufficient, direct AFTN addressing should be utilized by the originating centres.

5 COMPOSITION OF AMBEX

5.1 Components of the AMBEX

5.1.1 AMBEX scheme involves a number of aeronautical meteorological stations, aeronautical telecommunication stations, aerodrome meteorological offices and other operational units. The following operational units should be considered as components of the AMBEX scheme:

- Originating station
- National OPMET center (NOC)
- AMBEX bulletin compiling centre (BCC)-AMBEX Centre
- Regional OPMET Data Banks (RODBs)
- Interregional OPMET gateway (IROG) .

5.2 Originating Station

5.2.1 It is an aeronautical meteorological station or an aerodrome meteorological office, or a forecasting office, or a MWO, or a TCAC, or a VAAC. The duties and responsibilities of these originating stations should be defined by the State's meteorological authority.

5.3 National OPMET Center (NOC).

5.3.1 Normally, a NOC is associated with the State's national AFTN centre/switch. The role of the NOC is to collect all OPMET messages generated by the originating stations in the State and to send them to the responsible AMBEX bulletin compiling center (AMBEX BCC). Some NOCs serve also as AMBEX BCCs. National regulations should be developed to ensure that NOCs disseminate the international OPMET data within their own State, as necessary.

5.4 AMBEX Bulletin Compiling Centre (AMBEX BCC or, in brief, AMBEX centre).

5.4.1 AMBEX centres are responsible for collection of OPMET messages from the originating stations or NOCs in their area of responsibility and for compiling these messages into AMBEX bulletins. FASID Tables MET 4A and MET 4B determine the areas of responsibility (or, collection areas) of the AMBEX centres for METAR/SPECI and AIREP SPECIAL, and TAF, respectively.

5.4.2 The AMBEX centres are responsible for the transmission of the bulletins compiled by them to:

- other AMBEX centres, according to predefined distribution lists, specific for each bulletin;
- AFI RODBs (Dakar and Pretoria);
- NOCs or other COM or MET offices in the States in their area of responsibilities, as agreed between the AMBEX centre and the States' authorities concerned.

Note: The former AMBEX scheme involved separate compiling centres for METAR and TAF (METAR Collection Centres, and TAF Collection Centres. In some cases, METAR from an aerodrome was compiled by one center, and the TAF from another center. The evolution of AMBEX should be towards unified AMBEX centers responsible for collecting/distributing of all OPMET data types within their area of responsibility.

5.5 Regional OPMET Data Banks (RODB)

5.5.1 Two centres have been designated by APIRG (APIRG/13 Conclusion 13/67, 2001), to serve as Regional OPMET Data Banks: Dakar and Pretoria. FASID Table MET 4C reflects the requirements for the operation of the AFI OPMET data banks to support the AMBEX Scheme.

5.5.2 The **main responsibilities** of the RODBs are defined, as follows:

- to support the AMBEX Scheme and to facilitate a regular exchange of OPMET information based on predetermined distribution within the AFI Region;
- to operate as Inter-regional OPMET Gateway (IROG) with responsibility of exchanging OPMET information between AFI Region and the adjacent Regions; and
- to provide facilities for request/response type of access to the stored OPMET data for users to obtain non-regular or occasional information.

Note. — The interrogation procedures applicable to the OPMET data banks and catalogues are provided in the "AFI Regional Interface Control Document (ICD) - OPMET Data Bank Access Procedures", *published and maintained by the ICAO Regional Offices in Dakar and Nairobi*

5.6 Inter-regional OPMET Gateways (IROG).

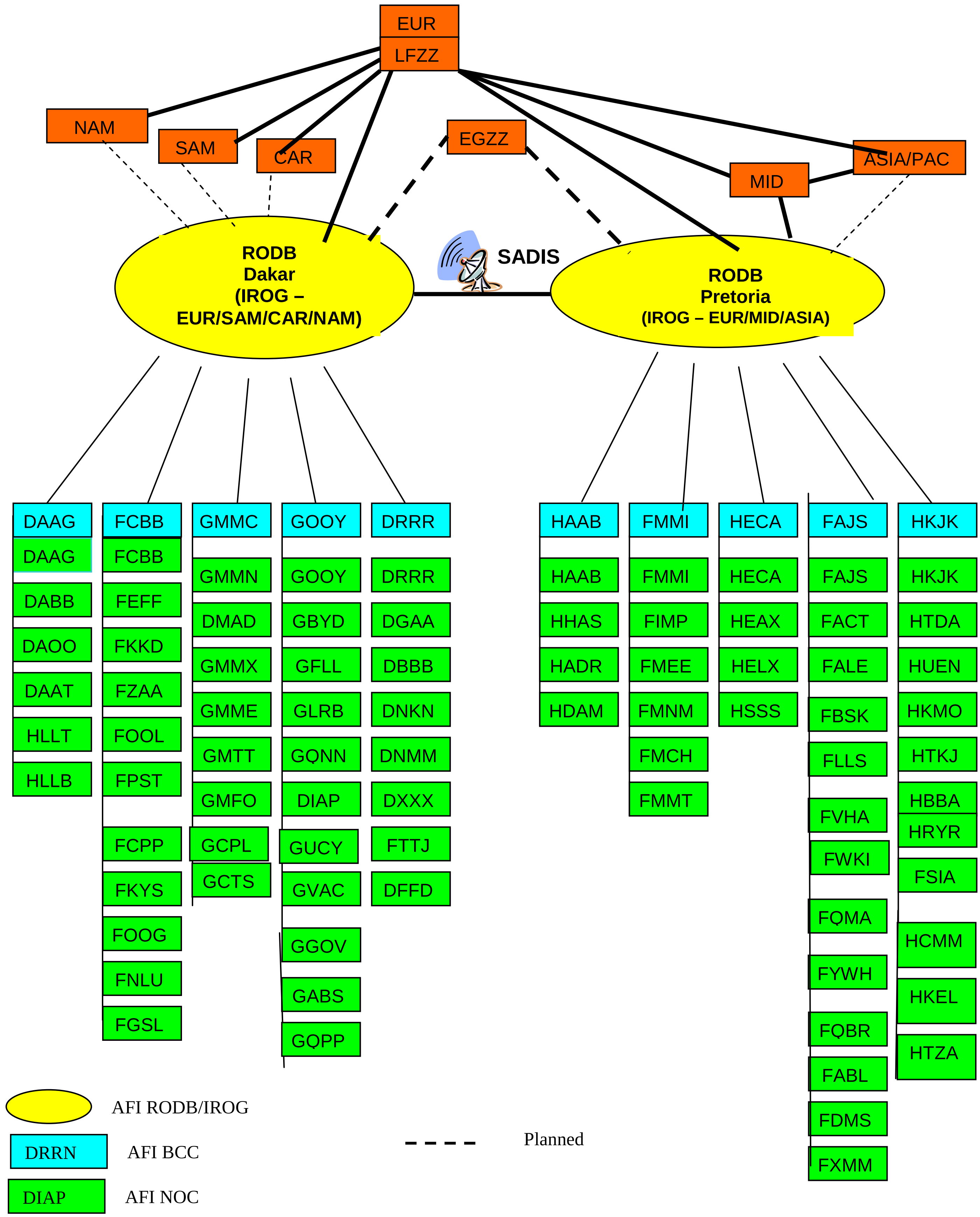
5.6.1 The Inter-regional OPMET Gateways in the AFI Region are the designated RODBs. Each RODB is assigned responsibility for exchange of OPMET information with other ICAO Regions. The responsibilities of the IROGs for AFI is shown in para. 11.1 of this Handbook.

5.6.2 ***Support to the SADIS broadcast.*** The RODBs and IROGs should facilitate the global exchange of OPMET data carried out through the SADIS satellite broadcast. In order to achieve this, close liaison should be maintained between the IROGs and the corresponding SADIS gateways. Availability of AFI data on SADIS should be monitored and any systematic shortfalls of data identified should be reported to the relevant ICAO regional office.

5.7 Structure of the AMBEX Scheme

5.7.1 The overall structure of the AMBEX scheme is presented in the following diagram

AMBEX SCHEME



6. TAF EXCHANGE

6.1 General

6.1.1 Aerodrome forecast (TAF) should be prepared by the aerodrome meteorological offices (AMOs) or other meteorological offices, designated for provision of TAF by the State's meteorological authority, for all international aerodromes, for which TAF is required according to FASID Table MET 1A of the AFI ANP.

6.1.2 All TAFs required should be included in the regular AMBEX exchange. In addition, TAFs from a number of other, including domestic aerodromes, required by the users, should also be included in the regular AMBEX exchange, if so agreed by the States concerned.

Notes: 1) *The recent requirement by airlines is that TAF for all international aerodromes listed in AFI FASID Table MET 1A should be available through regular exchange and through the satellite distribution system SADIS..*

2) *SADIS User Guide (SUG) Annex 1 presents the requirements for OPMET data (METAR and TAF) by aviation users. When OPMET data from domestic airports (so called non-AOP airports) is required by users, the corresponding State is consulted on its agreement for providing this additional information. If the information is available and the State agrees to include it in the exchange, the additional airports are included in SUG Annex 1 and the State should provide the additional OPMET information on a continuous basis.*

6.1.3 TAF exchanges not covered by the AMBEX Scheme, but required operationally, should be met by means of direct addressed AFTN messages.

6.1.4 The requirements for the exchange of 24 or 30-hour TAFs (so called "long" TAFs with WMO data designator – FT), are set in FASID Table MET 1A of the ANP. "Short" TAFs with 9- or 12-hour period of validity (WMO data designator - FC), are no longer issued by States in the AFI region

6.1.5 AMBEX messages and bulletins are normally sent via the AFTN. In exceptional circumstances, when the AFTN cannot give adequate support to AMBEX traffic, the temporary use of alternative existing communications systems should as far as possible be coordinated with the ICAO Regional Offices concerned.

6.1.6 Each AMBEX message and AMBEX bulletin should conform strictly to the Annex 10 message format.

6.1.7 Each AMBEX message and AMBEX bulletin should carry a WMO abbreviated heading (see **Appendix C)**.

6.1.8 Each AMBEX message or bulletin, should terminate with an equal (=) sign (signal no. 22 of International Telegraph Alphabet no.2 in the figure case).

6.1.9 The procedures described in this Handbook are intended for the manual preparation of AMBEX messages and bulletins. It is not intended, however, that the Handbook precludes the use of automated or semi-automated procedures. When required, the procedures described hereunder should be modified and applied in a manner which will fully exploit the capabilities of the equipment available. The

AMBEX messages and bulletins produced by application of such modified procedures should be in a format compatible with the format described in this Handbook.

6.2 Responsibilities and procedures to be followed by originating aerodrome meteorological offices (AMOs) and NOCs

6.2.1 Originating AMOs (or other designated forecasting offices) should prepare the required TAF messages for the periods of validity indicated in **Appendix B**. TAFs should be sent by the AMOs or NOCs and to the responsible AMBEX center before the cut-off time set up by this centre.

6.2.2 Aerodrome meteorological offices in preparing TAF should follow strictly the template for TAF in Annex 3, Appendix 5 and the WMO TAF code form (FM 51-XII TAF, WMO – No. 306, *Manual on Codes*, Volume I.1, Part A – *Alphanumeric Codes*).

6.2.3 TAFs should be monitored by the originating AMOs and amended TAF (TAF AMD) should be issued according to the established criteria. Amended TAFs should be sent by the originating station to the responsible AMBEX centre with no delay. The optional group BBB should be used in the WMO abbreviated heading to indicate amended TAF in accordance with **Appendix C**.

6.2.4 TAF messages should be quality controlled by the originating meteorological offices and, when necessary, a corrected TAF (TAF COR) should be sent immediately after an error in an already transmitted message had been identified.

6.2.5 Within five minutes of the time of preparation of the TAFs, an AMBEX message should be filed for transmission to the BCC concerned.

6.2.6 Not later than five minutes after being filed for transmission, the AMBEX messages should be sent to the BCCs. This means that BCCs should have available AMBEX messages from all stations in their area of responsibility (AOR) within ten minutes of the times shown in column 6 of **Appendix B.**

6.2.7 The following is an outline of the procedures to be applied in preparing an AMBEX message at an office other than a BCC:

<u>Parts of Message</u>		<u>Resulting Page Copy</u>
a)	Priority Indicator and Address	GG DRRNYPYX
b)	Date and Time of Filing and Originator	281010 DGAAYMYX
c)	WMO Abbreviated Heading (see **Appendix C)**	FTGH31 DGAA 281000
d)	TAF	TAF DGAA 281030Z 2812/2912 13010KT 9000 BKN020 TEMPO 2816/2820 3000 DZ BKN005 OVC05 FM290430 17010KT 9999 BKN015 BKN100 =
e)	Normal Ending.	

6.2.8 If an amendment to a TAF previously issued becomes necessary, a new AMBEX message should be prepared and sent to the BCC concerned. The WMO abbreviated heading for this message should be the same as for the AMBEX message containing the original TAF, with the addition of the optional groups AAA, AAB, AAC etc. (to indicate the first, second, third etc. amendment to the original TAF). Optional groups are also used for sending delayed TAFs, RRA, RRB, RRC, etc and corrected TAFs CCA, CCB, CCC, etc in accordance with **Appendix C**.

6.2.9 TAFs for individual aerodromes in the AMBEX Scheme should not be addressed to aerodromes in those cases where the AMBEX Scheme already caters reliably for their dissemination.

6.2.10 Requests for missing bulletins should be sent to the BCC responsible for compiling the bulletins and should be in the following format:

Parts of Message		Resulting Page Copy
a)	Priority Indicator and Address of the BCC concerned	GG HKJKYPYX
b)	Date and Time of filing and Originator	051305 FMMIYMYX
c)	**Text**	**RQM/SAYSSY, YBBN, YMML=**
d)	Normal ending	NNNN.

Note: Certain BCCs may require AFTN addresses other than those of the BCCs themselves to be used for request messages. A list of such addresses will be compiled and included in the AMBEX Handbook.

6.2.11 Provisions concerning request messages to the AFI RODBs are given in the ICD of the Dakar and Pretoria RODBs.

6.3 Responsibilities and procedures to be followed the AMBEX Centres (BCCs)

6.3.1 AMBEX centres should collect TAFs from the AMOs and/or NOCs in their area of responsibility and compile TAF Bulletins according to **Appendix B**. The areas of responsibility, as far as practicable, should group together aerodromes and their alternates. AMBEX centres should ensure that TAFs within their area of responsibility have common periods of validity.

6.3.2 AMBEX centres should establish a cut-off time for reception of TAFs from AMOs and/or NOCs in their area of responsibility, e.g., 15 minutes before the filing/transmission times specified in **Appendix B**. At the cut-of time AMBEX centres should compile TAF bulletin(s) containing all prescribed aerodromes, without indicating any missing TAF with "NIL".

6.3.3 The filing time for 24- and 30-hour TAF bulletins should be **two hours** before the start of the validity period.

6.3.4 AMBEX centres should transmit the compiled TAF bulletins to other AMBEX centres and the RODBs according to the distribution lists as specified for each TAF bulletin in **Appendix B**.

6.3.5 AMBEX centres should transmit the TAF bulletins compiled by them, as well as TAF bulletins received from other AMBEX centres, as necessary, to the NOCs and/or other offices in the States in their area of responsibility, as agreed between the AMBEX centre and the meteorological authorities of the States concerned.

6.3.6 A TAF message received by a AMBEX centre after the scheduled transmission of the corresponding bulletin is a delayed TAF. The AMBEX centre should then prepare an AMBEX bulletin of all TAFs received. If a TAF is not available, for any reason, at the cut-off time, the latest **still valid** TAF for the missing station may be included instead.

6.3.7 Amended TAF (TAF AMD) received from an AMO or NOC should be distributed with no delay as an amended TAF bulletin to all recipients in the distribution list for the TAF bulletin, to which the originating aerodrome belongs. The optional BBB group should be used in the WMO bulletin heading accordingly.

6.3.8 Each BCC should establish a cut-off time for the reception of AMBEX messages from stations within its AOR. The cut-off time should be about **twenty minutes** after the times of preparation of TAFs shown in column 6 of **Appendix B.**

6.3.9 A new tape, containing the address, origin and WMO abbreviated heading of the bulletin, is prepared. The bulletin is then assembled by combining this new tape with the text portions of the AMBEX messages received and adding a normal ending. Details of the WMO abbreviated headings that should be used by BCCs in their bulletins are given in **Appendix C**.

6.3.10 AMBEX centres should disseminate their own bulletins to the stations listed in column 9 of **Appendix B**. This dissemination should take place some **thirty minutes** after the time for preparation of the TAFs shown in column 6 of **Appendix B**.

6.3.11 No addresses other than those listed in column 10 of **Appendix B** should be used except in response to request messages.

6.3.12 The following is an outline of the procedures to be followed by AMBEX centres in the preparation of AMBEX bulletins.

<u>Parts of Bulletin</u>	<u>Resulting Page Copy</u>
a) Priority Indicator and Address	GG DAZZYPYX FAJSYMYX FCZZXLBX GOOZZSNGX HAZZYPYX HEZZYPYX HKZZYPBX
b) Date and Time of Filing and Originator	281030 DRRNYPYX
c) WMO Abbreviated Heading (see **Appendix B**)	FTA033 DRRN 281000
d) TAFs received from the stations in the AOR, in order shown in column 2 of **Appendix B**	TAF DRRN 281010Z 2812/2912 24003KT 8000 BKN020 BECMG 2813/2815 SCT018CB BKN020 TEMPO 2817/2820 VRB03 TSRA SCT015CB BKN020 FM290600 16008KT 9999 BKN020 BKN120 =

TAF DGAA 281020Z 2812/2912 13010KT 9000 BKN020 TEMPO 2816/2820 3000 DZ BKN005 OVC050 FM290400 17010KT 9999 BKN015 BNK100 =

TAF DBBB 281030Z 2812/2912 26008KT 9000 BKN020 PROB30 TEMPO 2815/2818 3000 TSRA BKN005 SCT020CB FM290000 24006KT 9000 BKN010 =

TAF DNKN 281030Z 2812/2912 VRB03KT 9999 BKN015 PROB30 TEMPO 2813/2816 2000 FG BKN003 BKN010 FM282000 24006KT 9000 BKN020 =

TAF DNMM 281028Z 2812/2912 24006KT 9000 BKN020 PROB30 TEMPO 2814/2816 3000 DZ BKN005 BKN010=

TAF DXXX 281030Z 2812/2912 26008KT 9999 BKN015 BECMG 2815/2817 SCT015CB BKN020 TEMPO 2818/2820 22020G35KT 2000 TSRA SCT010CB BKN020 FM282030 26006 9999 BKN020 BKN100 =

TAF FTTJ 281030Z 2812/2912 12006KT CAVOK TEMPO 2818/2820 SCT030 =

TAF DFFD 281030Z 2812/2912 20004KT 9999 BKN020 BECMG 2814/2816 SCT018CB BKN020 TEMPO 2816/2818 24010KT TSRA SCT015CB BKN020 FM290600 22008KT 9999 BKN020 BKN100 =

e) Normal Ending NNNN.

6.3.13 TAFs received by an AMBEX Centre after the cut-off time, and which have still at least 6-hour validity left, should be included in one or more bulletins of delayed TAFs. The WMO Abbreviated Heading for such bulletins should be the same as for the bulletin from which the TAFs are missing, with the addition of the optional groups RRA, RRB, RRC etc. (to indicate the first, second, third etc. bulletin of delayed TAFs), in accordance with **Appendix C,** paragraph 4.

6.3.14 When an AMBEX centre receives amended TAFs from originating stations or NOCs, it should prepare bulletins of amended TAFs. The WMO abbreviated heading for such bulletins should be the same as for the bulletin containing the original TAF, with the addition of the optional groups AAA, AAB, AAC etc. (to indicate the first, second, third etc. amendment to TAFs in the original bulletin), in accordance with **Appendix C**, paragraph 4.

6.3.15 "NIL" to indicate a missing TAF should not be used in AMBEX bulletins.

6.3.16 If an AMBEX centre finds it impossible to meet the specified filing times due to systematic late receipt of TAFs from originating stations or NOCs, it should reach an agreement with these stations on another filing time for their AMBEX messages and thereafter propose to the Secretary of the AFI MET/SG that this filing time be incorporated in the Handbook.

6.3.17 In addition to its own AMBEX bulletins, each BCC should distribute bulletins received from other BCCs to the MET offices within its originating stations or NOCs.

6.4 Format and content of TAF bulletins

6.4.1 Issuance and period of validity:

6.4.1.1 24- and 30-hour TAFs should be issued at intervals of six hours, with the period of validity beginning at one of the main synoptic hours (00, 06, 12, 18 UTC), as shown in the table below.

Synoptic hours (UTC)	24-hour TAF		30-hour TAF	
	Period of validity	Filing Time	Period of validity	Filing Time
00	00-24	22 (-1)*	00-06 (+1)	22 (-1)*
06	06-06	04	06-12 (+1)	04
12	12-12	10	12-18 (+1)	10
18	18-18	16	18-24 (+1)	16

**Note: "-1" indicates the previous day and "+1" indicates the next day*

6.4.1.2 All TAFs in a AMBEX TAF bulletin should have a common period of validity. It is not allowed to mix "long" and "short" TAFs in one bulletin.

6.4.2 Each TAF message in a TAF bulletin should start with the code word TAF followed by the ICAO location indicator (CCCC) of the aerodrome and the date/time group (YYGGggZ), indicating the official time of issuance. Corrected TAF messages, should start with TAF COR. Amended forecasts should start with TAF AMD.

6.4.3 The use of the BBB group in the WMO heading for delayed, corrected, or amended TAFs is described in **Appendix C**.

6.4.4 The following is an outline of the format to be applied by a AMBEX centre in preparing a TAF bulletin, containing "long" TAFs (24 or 30 hour):

Parts of Message	AMBEX FT Bulletin
AFTN header	
Priority Indicator and Address	GG YBBBYPYX
Date and Time of filing and Originator	271104 ZBBBYPYX
WMO Abbreviated Heading	FTCI31 ZBBB 271100
TAF messages	TAF ZBAA 271000Z 2712/2812..…= TAF ZBTJ 271000Z 2712/2818…….=
AFTN Normal Ending	NNNN…..

6.4.5 A missing TAF in a non TAF bulletin should be indicated with "NIL", as shown in the following example:

TAF VTBD 281000Z NIL=

6.4.6 A cancelled TAF in a TAF bulletin should be indicated with "CNL", as shown in the following example:

TAF VTBD 281000Z 2812/2912 CNL=

7. SPECIAL AIREP EXCHANGE

7.1 The meteorological watch offices (MWO) are responsible for collection through their associated ATS units of special air reports (AIREP SPECIAL) received from aircrafts within their FIR or CTA.

Note: – Routine air-reports received by data-link communications should be relayed directly to the WAFCS by the ATS unit.

7.2 MWOs should collect all special air-reports and prepare one-hour collectives in the form of a UA bulletin for transmission to the responsible AMBEX centre at the time specified by the AMBEX centre.

Notes:

1) The transmission of air-reports to the WAFCs as required by Annex 3 should be arranged by the meteorological authorities concerned.

2) MWOs should follow the special requirements for the dissemination of special air-reports as defined by Annex 3,

7.3 AFI FASID Table 2B describes the exchange of SIGMET and special AIREP reports procedures.

8. METAR/SPECI EXCHANGE

8.1 General

8.1.1 Hourly METAR reports should be prepared by all international aerodromes listed in FASID Table MET 1A. METAR should be issued **on an hour intervals** for those aerodromes, included in the HF VOLMET broadcasts (cf. FASID Table ATS 2 – HF Radiotelephony VOLMET Broadcasts), or D-VOLMET.

8.1.2 METAR from all international aerodromes listed in Table AOP 1 of the Basic ANP and , in FASID Table MET 1A, should be included in the regular AMBEX exchange. In addition, METAR from a number of domestic aerodromes, required by the users, should also be included in the regular AMBEX exchange in accordance with para. 12.1.3, if so agreed by the States concerned.

Note: SADIS User Guide (SUG) Annex 1 presents the requirements for OPMET data (METAR and TAF) by aviation users. When OPMET data from domestic airports (so called non-AOP airports) is required by users, the corresponding State is consulted on its agreement for providing this additional information. If the information is available and the State agrees to include it in the exchange, the additional airports are included in SUG Annex 1 and the State should provide the additional OPMET information on a continuous basis.

8.1.3 Description of the AFI METAR bulletins included in the regular AMBEX exchange, containing the responsible compiling AMBEX centre, WMO bulletin identification, and the list of aerodromes included in the bulletin, is given in **Appendix A**.

8.1.4 The official hour of observation to be included in the METAR bulletin heading is indicated in the table in **Appendix A**.

8.1.5 All METAR bulletins should be sent to both RODBs Dakar and Pretoria. AMBEX centres should exchange METAR bulletins according to the distribution lists given in **Appendix A**.

7.1.6 SPECI reports should be disseminated in the same way as the METAR reports originated by the same aerodrome.

8.1.7 Exchange of METAR/SPECI messages outside AMBEX scheme, if necessary should be carried out by direct AFTN addressed messages.

8.2 Responsibilities of originating stations and NOCs

8.2.1 The originating stations (aeronautical meteorological stations) and/or NOCs should prepare METAR messages for the observation times indicated in **Appendix A** and send them to their responsible AMBEX center.

8.2.2 SPECI should be prepared between the regular observation times, following the requirements set in Annex 3 and sent with no delay to the responsible AMBEX centre.

8.2.3 In preparing METAR and SPECI messages the originating stations should follow strictly the specifications for METAR and SPECI in Annex 3 (Chapter 4 and Appendix 3 including the template in Table A3-2) and the WMO METAR and SPECI code forms (FM 15-XII METAR and FM 16-XII SPECI, WMO – No. 306, *Manual on Codes*, Volume I.1, Part A – *Alphanumeric Codes*).

8.2.4 METAR messages should be sent to the responsible AMBEX centre before the cut-off time specified by the AMBEX centre, to allow for timely compilation of the METAR bulletin. If, for some reason, a METAR message has not been sent before the cut-off time, the originating station/NOC should send it as soon as possible after that, as a **delayed message**. The originating stations/NOCs should follow strictly the schedules specified for METAR messages and keep to a minimum the number of delayed messages.

8.2.5 METAR and SPECI messages should be quality controlled by the originating stations/NOCs and, when necessary, a corrected message should be sent immediately after an error in an already transmitted message had been identified.

Note: Procedures applying to the corrected and delayed messages are given in ***Appendix C****.*

8.3 Responsibilities of AMBEX Centres

8.3.1 AMBEX centres should collect METAR messages from the aerodromes in their area of responsibility and compile METAR bulletins, according to **Appendix A**. The content of bulletins and the order of stations in each bulletin should be kept fixed until a bulletin change is requested and coordinated according to the established procedure.

8.3.2 AMBEX centers should determine a cut-off time for the reception of METAR from the stations in their area of responsibility. At the cut-off time, the AMBEX centre should compile METAR bulletin(s) containing all prescribed aerodromes, indicating any missing METAR with “NIL”.

8.3.3 At scheduled transmission times AMBEX centres should transmit the compiled METAR bulletins to other AMBEX centres and RODBs according to the distribution lists specified for each METAR bulletin in **Appendix A**. METAR bulletins should be filed for transmission not later than 5 minutes after the observation time.

8.3.4 AMBEX centres should transmit the METAR bulletins compiled by them, as well as bulletins received from other AMBEX centres, as necessary, to the NOCs and/or other offices in the States in their area of responsibility, as agreed between the AMBEX centre and the meteorological authorities of the States concerned.

8.3.5 A SPECI when received by an AMBEX centre should be sent as a SPECI bulletin to the same addresses, to which METAR from the issuing aerodrome are sent. Normally, a SPECI bulletin should contain a single SPECI.

8.3.6 The WMO heading of a SPECI bulletin should be constructed in the same way as the WMO heading of the METAR bulletin, which contains the aerodrome, for which the SPECI is issued, by using SP data type designator instead of SA.

8.3.7 A METAR message received by the AMBEX centre after the scheduled transmission of the corresponding bulletin is a delayed METAR. The AMBEX centre should send a delayed bulletin as soon as one or more delayed messages are received or at specified times after the scheduled bulletin time (e.g., the first delayed bulletin (RRA) issued 10 minutes after the regular time; the second delayed bulletin (RRB) issued 20 minutes after the regular time, etc.).

8.3.8 As soon as a corrected METAR or SPECI message is received from a station the AMBEX centre should transmit it as a corrected bulletin to all recipients.

8.4 Format and content of METAR Bulletins

8.4.1 Each METAR message in a METAR bulletin should start with the code word METAR followed by the ICAO location indicator (CCCC) of the aerodrome and the date/time group (YYGGggZ), indicating the official time of observation. Corrected METAR messages, should start with METAR COR.

8.4.2 The following is an example of the format to be applied in preparing a METAR bulletin by the AMBEX centre:

Parts of Message	**AMBEX SA Bulletin**
AFTN header	
Priority Indicator and Address Date and Time of filing and Originator	GG VTBBYPYX 271304 ZBBBYPYX
WMO Abbreviated Heading	SACI31 ZBBB 271300
METAR messages	METAR ZBAA 271300Z ..……. = METAR ZBTJ 271300Z ……….=
AFTN Normal Ending	NNNN

Note: The inclusion of the code name METAR in front of each message in the METAR bulletin is compulsory.

8.4.3 The rules related to the use of the BBB group in the WMO abbreviated heading, in regard to delayed or corrected bulletins, are given in **Appendix C**.

8.4.4 For METARs, which are not available at the time of compilation of the bulletin, the code word NIL should be inserted following the date/time group indicating the time of the observation.

Example: METAR ZBTJ 271200Z NIL=

8.5 Format and content of SPECI Bulletins

8.5.1 A SPECI message included in a SPECI bulletin should start with the code word SPECI followed by the ICAO location indicator (CCCC) of the aerodrome and a date/time group (YYGGggZ) indicating the time of the observation of the meteorological conditions for which the SPECI is issued. Corrected SPECI messages, should start with SPECI COR. The following is an example of the format to be applied in preparing a SPECI bulletin by the AMBEX centre:

Parts of Message	**AMBEX SP Bulletin**
AFTN header	
Priority Indicator and Address Date and Time of filing and Originator	GG VTBBYPYX 081647 ZBBBYPYX
WMO Abbreviated Heading	SPCI31 ZBBB 081645
SPECI message	SPECI ZBAA 081645Z ..……. =
AFTN Normal Ending	NNNN

9. EXCHANGE OF SIGMET AND ADVISORIES

9.*1* SIGMET should be prepared by the meteorological watch offices (MWO) designated by the State's meteorological authority. The MWOs and their areas of responsibility are given in the FASID Table MET 1B of AFI ANP.

9.2 SIGMET should be distributed to the two RODBs, either directly or through the responsible AMBEX centre. The RODBs should make SIGMET messages available on request. In order to facilitate that, the originating MWOs, should use fixed WMO headings for their SIGMET bulletins as given in **Appendix E**.

9.3 SIGMET messages should be distributed to other ICAO regions and made available for uplink through SADIS. This distribution should be carried out through the relevant Inter-regional OPMET Gateways (IROGs).

9.4 Detailed information on the format of the SIGMET messages is provided in the AFI Regional SIGMET Guide, 9th edition, Amendment 2, June 2011, at the Web page

http://www.icao.int/wacaf/edocs/WACAF_Regional_SIGMET_Guide_en.pdf

9.5 Tropical Cyclone Advisories (TCAs) and volcanic ash advisories (VAAs) should be issued by the designated tropical cyclone and volcanic ash advisory centres (TCAC and VAAC), as indicated in the FASID Table MET 3A and MET 3B.

9.6 The TCACs and VAACs should send the advisories to the RODBs. The RODBs should make TCAs and VAAs messages available as appropriate or on request. In order to facilitate that, the originating TCACs and VAACs should use fixed WMO headings for their TCA and VAA bulletins as given in **Appendix E**

9.7 VAA and TCA messages should be distributed to other ICAO regions and made available for uplink through SADIS. This distribution should be carried out either directly by the VAACs and TCACs or through the relevant Inter-regional OPMET Gateway (IROG) such as Toulouse, France.

10. REGIONAL OPMET DATA BANKS (RODB)

10.1 The AFI Regional OPMET Data Banks and the AFTN addresses to be used for direct access to the banks are shown below:

RODB	AFTN ADDRESS	AMBEX CENTRES AND AREA OF RESPONSIBILITY
Dakar	GOOYYZYZ	Alger/DAMM Brazzaville/FCBB Casablanca/GMMC Dakar/GOOO Niamey/DRNN
Pretoria	FAJSYMYX	Addis Ababa/HAAB Antananarivo/FMMI Cairo/HECA Johannesburg/FAJS Nairobi/HKNA

10.2 Responsibilities:

10.2.1 Collect OPMET bulletins from the AMBEX centres in the area of responsibility and store them in a data base.

10.2.2 Handle all type of OPMET bulletins, as described in p. 3.1.1.

10.2.3 Provide facilities for "request-reply" service to the authorized users.

10.2.4 Maintain a catalogue of bulletins and introduce changes to the bulletins when necessary according to the established procedures.

10.2.5 Quality control the incoming bulletins and inform the AMBEX centres of any discrepancies or shortfalls.

10.2.6 Monitor the OPMET traffic by carrying out regular tests on the availability and timeliness of the bulletins; report to the ICAO Regional Office on the results.

10.3 The interrogation procedures applicable to the designated RODBs and the OPMET information stored are presented in the AFI Regional Interface Control Document (ICD) - OPMET Data Bank Access Procedures.

10.4 Guidance on the management and quality control is provided in chapter 12 of this Handbook.

11. INTER-REGIONAL OPMET EXCHANGE - IROG FUNCTIONS

11.1 Inter-regional OPMET Gateways (IROGs) are designated in the AFI Region for the the purpose of exchanging OPMET data between the AFI and the other ICAO Regions, as shown in the table below.

AMBEX IROG	For Excchange of OPMET data between Regions
Dakar	AFI and EUR; SAM, NAM, CAR; MID, ASIA/PAC as backup to Pretoria
Pretoria	AFI and MID; ASIA/PAC, EUR; SAM, NAM, CAR as backup to Dakar

11.2 IROGs and their functions are described at **Appendix D.** IROGs arrange for relaying all AMBEX bulletins to a corresponding OPMET Gateway in the other ICAO regions concerned. In particular:

- *Dakar IROG* relays all AFI bulletins to ROC Toulouse in the EUR Region, which serves the EUR, SAM, NAM and CAR Regions, and should receive and store all required OPMET bulletins from these Regions;
- *Pretoria IROG* relays all AFI bulletins to ROC Toulouse in the EUR Region and IROG Bangkok in the the ASI/PAC Regions, and should receive and store all required OPMET bulletins from MID, ASIA/PAC, EUR, SAM Regions;

11.3 The following principles are applied to IROGs:

a) IROGs should have reliable and efficient AFTN connection to the regions, for which they have exchange responsibilities, with adequate capacity to handle the OPMET data flow between the regions;

b) IROGs should be associated with AFTN relay centres capable of handling efficiently the volume of traffic anticipated;

c) IROGs should be capable of handling all OPMET data types, as described in para.4.1.1.

11.4 In order to avoid duplication of the OPMET traffic and information, all inter-regional OPMET exchange should be directed through the IROGs. Inter-regional exchange via direct AFTN addressing from the originator or AMBEX centre to recipients in the other ICAO Regions should be avoided, except when bilateral or other agreements require such direct exchanges.

12. MANAGEMENT OF OPMET EXCHANGE UNDER THE AMBEX SCHEME

12.1 OPMET Bulletins Update Procedure

12.1.1 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.

12.1.2 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.

12.1.3 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.

12.2 Quality Management of OPMET Exchange under the AMBEX Scheme

12.2.1 Objectives and Scope

12.2.1.1 **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.

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

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

12.2.2 Quality Control – General Requirements

12.2.2.1 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.

12.2.2.2 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.

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

12.2.2.4 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.

12.2.2.5 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 RODB 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.

12.2.2.6 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 RODBs 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.

12.2.3 Quality Control Procedures

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

12.3 OPMET Monitoring

12.3.1 Monitoring of Scheduled OPMET Data

12.3.1.1 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 F**.

12.3.1.2 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.

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

12.3.2 Monitoring of Non-Scheduled OPMET data

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

12.3.2.2 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.

12.3.2.3 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.

12.4 AMBEX Focal Points

12.4.1 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 I**.

APPENDIX A

AMBEX COLLECTION AND DISSEMINATION OF METAR (SA) BULLETINS

Table A : METAR

Explanation of Table

Column

1: Name of the AMBEX Centre (BCC) compiling the bulletin.

2. ICAO location indicator of the AMBEX Centre compiling the bulletin.

3. Bulletin identifier- The identifier to be used in the WMO abbreviated heading of AMBEX METAR bulletins prepared by the BCC in Column 1.

4. ICAO location indicator of the aerodrome forming part of the collection area of the BCC in Column 1.

5. Name of the aerodrome forming part of the collection area of the BCC in Column 1.

6. Preparation - Times at which BCC in column 1 should prepare METAR bulletins for further dissemination.

7. Distribution of the bulletin to other AMBEX centres and RODBs – Name of the AMBEX/RODB Centre

8. Distribution of the bulletin to other AMBEX centres and RODBs – AFTN address of the AMBEX/RODB Centre.

*Note: The RODB responsible for storing the bulletin is in **bold***

<u>*Notes:*</u>

1 Aerodromes with shaded text are included in the HF VOLMET Broadcast
2 The RODB responsible for storing the bulletin is in bold
3 Non-AOP aerodeomes indicated in *italics*

AMBEX CENTRE		METAR BULLETIN				DISSEMINATION TO	
Name	**CCCC**	**Bul. Id.**	**CCCC**	**Aerodrome**	**Prepar.**	**RODB/AMBEX Centre**	**AFTN Adress**
1	2	3	4	5	6	7	8
ADDIS ABABA	HAAB	SAEA3 1	HAAB HAAY HADR HDAM	Addis Ababa Asmara Dire Dawa Djibouti	H+10	Addis Ababa Nairobi Dakar Brazzaville Niamey Antananarivo Cairo **Johannesburg**	HAABYMYX HKZZYPBX GOZZSNGX FCZZXLBX DRZZNAZX FMZZYPYY HEZZYPYX **FAJSYMYX**
ALGER	DAMM	SAAF31	DAMM DABB DAOO DAAT DTTA HLLT HLLB	Alger Annaba Oran Tamanrasset Tunis Tripoli Benghazi	H+10	Cairo Casablanca **Dakar** Niamey	HEZZYPYX GMZZYPYX **GOOYYZYZ** DRZZNAZX
ANTANA NARIVO	FMMI	SAI031	FMMI FMNM FIMP FMCH FMEE FMMT	Antananarivo Mahajanga Mauritius Moroni Saint-Denis Toamasina	H+10	Nairobi Addis Ababa **Johannesburg** Nairobi	HKZZYPBX HAZZYPYX **FAJSYMYX** HKZZYPBX
BRAZZA VILLE	FCBB	SAAM31	FCBB FCPP FEFF FKKD FKYS FZAA FOOL FOOG FNLU FGSL FPST	Brazzaville Pointe Noire Bangui Douala Yaounde Kinshasa Libreville Port Gentil Luanda Malabo Sao Tome	H+10	**Dakar** Niamey Addis Ababa Johannesburg Nairobi	**GOOYYZYZ** DRZZNAZX HAZZYPYX FAJSYMYX HKZZYPBX
CAIRO	HECA	SAAF32	HECA HEAX HELX HSSS	Cairo Alexandria Luxor Khartoum	H+10	Addis Ababa Nairobi Antananarivo Niamey **Johannesburg**	HAZZYPYX HKZZYPBX FMZZYPYX DRZZNAZX **FAJSYMYX**

AMBEX CENTRE		**METAR BULLETIN**				**DISSEMINATION TO**	
Name	**CCCC**	**Bul. Id.**	**CCCC**	**Aerodrome**	**Prepar.**	**RODB/AMBEX Centre**	**AFTN Adress**
1	2	3	4	5	6	7	8
CASA BLANCA	GMMC	SAMC31	GMMC GMAA GMMX GMME GMTT GCLP GCTS	Casablanca Agadir Marrakech Rabat Tanger Las Palmas Tenerife Sur	H+10	Alger **Dakar** Cairo	DAZZYPYP **GOOYYZYZ** HEZZYPYX
DAKAR	GOOY	SAA032	GOOY DIAP GBYD GABS GUCY GFLL GLRB GQPP GQNN GVAC GGOV	Dakar Abidjan Banjul Bamako Conakry Freetown Monrovia Nouadhibou Nouakchott Sal Bissau	H+10	Casablanca Alger Niamey Johannesburg Brazzaville Nairobi Addis Ababa Toulouse **Dakar** Rio de Janeiro	GMMCYPYX DAZZYPYP DRZZNAZX FAJSYMYX FCZZXLBX HKZZYPBX HAZZYPYX LFZZMAFI **GOOYYZYZ** SBGLYMYX
JOHANNE SBURG	FAJS	SAAP32	FAJS FABL FACT FALE FBSK FVHA FWKI FLLS FDMS FQBR FQMA FXMM FYWH	Johannesburg Bloemfontein Cape Town King Shaka Gaborone Harare Lilongwe Lusaka Manzini Beira Maputo Maseru Windhoek	H+10	Addis Ababa Antananarivo Brazzaville Cairo Dar Es Salaam Dakar Nairobi Toulouse **Johannesburg** Rio de Janeiro Bangkok Jeddah	HAZZYPYX FMZZYPYX FCZZXLBX HFZZYPYX HTDAYMYX GOOYYZYZ HKZZYPBX LFZZMAFI **FAJSYMYX** SBGLYMYX VTBDYMYX OEJDYPYX

AMBEX CENTRE		METAR BULLETIN				DISSEMINATION TO	
Name	**CCCC**	**Bul. Id.**	**CCCC**	**Aerodrome**	**Prepar.**	**RODB/AMBEX Centre**	**AFTN Adress**
1	2	3	4	5	6	7	8
NAIROBI	HKJK	SAEA32	HKJK HKMO HTDA HTKJ HBBA HUEN HRYR FSIA HCMM	Nairobi Mombasa Dar-Es-Salaam Kilimanjaro Bujumbura Entebbe Kigali Mahe Mogadishu	H+10	Addis Ababa Antananarivo **Johannesburg** Brazzaville Dakar Cairo Niamey	HAABYPYX FMZZYPYX **FAJSYMYX** FCZZXLBX GOZZSNGX HEZZYPYX DRZZNAZX
NIAMEY	DRRN	SAAO33	DRRN DGAA DBBB DNKN DNMM DXXX FTTJ DFFDY	Niamey Accra Cotonou Kano Lagos Lome N'djamena Ouagadougou	H+10	Addis Ababa Alger Cairo Brazzaville **Dakar** Johannesburg Nairobi	HAZZYPYX DAZZYPYP HEZZYPYX FCZZXLBX **GOOYYZYZ** FAJSYMYX HKZZYPBX

APPENDIX B

AMBEX COLLECTION AND DISSEMINATION OF LONG TAF (FT) BULLETINS

Table B : FT TAF

Explanation of the Table

Column

1: Name of the AMBEX Centre (BCC) compiling the bulletin.

2. ICAO location indicator of the AMBEX Centre compiling the bulletin.

3. Bulletin identifier- The identifier to be used in the WMO abbreviated heading of AMBEX TAF (FT) bulletins prepared by the BCC in Column 1.

4. ICAO location indicator of the aerodrome forming part of the collection area of the BCC in Column 1.

5. Name of the aerodrome forming part of the collection area of the BCC in Column 1.

6. Bulletin Filing Time -The latest filing times for AMBEX bulletins containing TAFs with the validities listed in Column 8.

7. Start of validity period

8. TAF validity

9. Distribution of the bulletin to other AMBEX centres and RODBs – Name of the AMBEX/RODB Centre

10. Distribution of the bulletin to other AMBEX centres and RODBs – AFTN address of the AMBEX/RODB Centre

Notes: 1 The RODB responsible for storing the bulletin is in bold

AMBEX CENTRE		**TAF BULLETIN**						**DISSEMINATION TO**	
Name	**CCCC**	**Bul. Id.**	**CCCC**	**Aerodrome**	**Filing Tiùme**	**Start of validity**	**TAF validit**	**RODB/ AMBEX Centre**	**AFTN Adress**
1	2	3	4	5	6	7	8	9	10
ADDIS ABABA	HAAB	FTEA31	HAAB	Addis Ababa	0400 1000 1600 2200	0600 1200 1800 0000	30h	Addis Ababa Nairobi Dakar Brazzaville Niamey Antananarivo Cairo **Johannesburg**	HAABYMYX HKZZYPBX GOZZSNGX FCZZXLBX DRZZNAZX FMZZYPYY HEZZYPYX **FAJSYMYX**
		FTEA39	HAAY HADR HDAM	Asmara Dire Dawa Djibouti	0400 1000 1600 2200	0600 1200 1800 0000	24h		
ALGER	DAMM	FTAF39	DAMM DABB DAOO DAAT DTTA HLLT HLLB	Alger Annaba Oran Tamanrasset Tunis Tripoli Benghazi	0400 1000 1600 2200	0600 1200 1800 0000	24h	Cairo Casablanca **Dakar** Niamey	HEZZYPYX GMZZYPYX **GOOYYZYZ** DRZZNAZX
ANTANA NARIVO	FMMI	FTI031	FMMI FIMP FMEE FMCH	Antananarivo Mauritius Saint-Denis Moroni	0400 1000 1600 2200	0600 1200 1800 0000	30h	Nairobi Addis Ababa **Johannesburg**	HKZZYPBX HAZZYPYX **FAJSYMYX**
		FTI039	FMNM FMMT	Mahajanga Toamasina	0400 1000 1600 2200	0600 1200 1800 0000	24h	Nairobi	HKZZYPBX
BRAZZA VILLE	FCBB	FTAM31	FCBB FEFF FKKD FZAA FOOL FPST FGSL	Brazzaville Bangui Douala Kinshasa Libreville Sao Tome Malabo	0400 1000 1600 2200	0600 1200 1800 0000	30h	**Dakar** Niamey Addis Ababa Johannesburg	**GOOYYZYZ** DRZZNAZX HAZZYPYX FAJSYMYX
		FTAM39	FCPP FKYS FOOG FNLU	Pointe Noire Yaounde Port Gentil Luanda	0400 1000 1600 2200	0600 1200 1800 0000	24h	Nairobi	HKZZYPBX

AMBEX CENTRE		**TAF BULLETIN**						**DISSEMINATION TO**	
Name	**CCCC**	**Bul. Id.**	**CCCC**	**Aerodrome**	**Filing Tiùme**	**Start of validity**	**TAF validit**	**RODB/ AMBEX Centre**	**AFTN Adress**
1	2	3	4	5	6	7	8	9	10
CAIRO	HECA	FTAF39	HECA HEAX HELX HSSS	Cairo Alexandria Luxor Khartoum	0400 1000 1600 2200	0600 1200 1800 0000	24h	Addis Ababa Nairobi Antananarivo Niamey **Johannesburg**	HAZZYPYX HKZZYPBX FMZZYPYX DRZZNAZX **FAJSYMYX**
CASA BLANCA	GMMC	FTMC31	GMMC GMAA GMMX GMME GMTT	Casablanca Agadir Marrakech Rabat Tanger	0400 1000 1600 2200	0600 1200 1800 0000	30h	Alger **Dakar** Cairo	DAZZYPYP **GOOYYZYZ** HEZZYPYX
		FTMC39	GCLP GCTS	Las Palmas Tenerife Sur	0400 1000 1600 2200	0600 1200 1800 0000	24h		
DAKAR	GOOY	FTA032	GOOY GBYD GABS GFLL GLRB GQNN DIAP	Dakar Banjul Bamako Freetown Monrovia Nouakchott Abidjan	0400 1000 1600 2200	0600 1200 1800 0000	30h	Casablanca Alger Niamey Johannesburg Brazzaville Nairobi Addis Ababa Toulouse **Dakar**	GMMCYPYX DAZZYPYP DRZZNAZX FAJSYMYX FCZZXLBX HKZZYPBX HAZZYPYX LFZZMAFI **GOOYYZYZ**
		FTA039	GUCY GQPP GVAC GGOV	Conakry Nouadhibou Sal Bissau	0400 1000 1600 2200	0600 1200 1800 0000	24h		
JOHANNE SBURG	FAJS	FTAP32	FAJS FACT FALE FBSK FVHA FWKI FLLS FQMA	Johannesburg Cape Town King Shaka Gaborone Harare Lilongwe Lusaka Maputo	0400 1000 1600 2200	0600 1200 1800 0000	30h	Addis Ababa Antananarivo Brazzaville Cairo Dar Es Salaam Dakar Nairobi Toulouse **Johannesburg** Rio de Janeiro Bangkok Jeddah	HAZZYPYX FMZZYPYX FCZZXLBX HFZZYPYX HTDAYMYX GOOYYZYZ HKZZYPBX LFZZMAFI **FAJSYMYX** SBGLYMYX VTBDYMYX OEJDYPYX
		FTAP39	FQBR FABL FDMS FXMM FYWH	Beira Bloemfontein Manzini Maseru Windhoek	0400 1000 1600 2200	0600 1200 1800 0000	24h		

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DBBB
DNKN
DNMM
DXXX
FTTJ
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Accra
Cotonou
Kano
Lagos
Lome
N'djamena
Ouagadougou</td><td>0400
1000
1600
2200</td><td>0600
1200
1800
0000</td><td>30h</td><td>Addis Ababa
Alger
Cairo
Brazzaville
Dakar
Johannesburg
Nairobi</td><td>HAZZYPYX
DAZZYPYP
HEZZYPYX
FCZZXLBX
GOOYYZYZ
FAJSYMYX
HKZZYPBX</td></tr>
</table>

APPENDIX C

WMO ABBREVIATED HEADINGS

(for use in AMBEX messages and bulletins)

1. Each AMBEX bulletin should have a WMO abbreviated heading in accordance with WMO No. 386, Manual on the Global Telecommunication System, Part II – Operational Procedures for the GTS. The symbolic form of the WMO abbreviated heading is as follows:

TTAAii CCCC YYGGgg (BBB)

2. Explanation of symbols

2.1. TTAAii - TT - This group is used in accordance with WMO No. 386, Manual on the Global Telecommunication System, Part II – Operational Procedures for the GTS, Attachment II-5.

2.1.1 **TT** - Data type designator, used for OPMET data as follows:

Data Type	Abbreviated Name	WMO data type designator TT
Aerodrome reports	METAR SPECI	SA SP
Aerodrome forecasts	TAF: 24 and 30 hour 9 and 12 hour	FT FC
SIGMET information	SIGMET SIGMET for TC SIGMET for VA	WS WC WV
Volcanic ash and tropical cyclone advisories	VAA TCA	FV FK
Air-reports	AIREP	UA
Administrative	ADMIN	NO

2.1.2 **AA** - Geographical designator, composed of two letters. according to WMO No. 386, Manual on the Global Telecommunication System, Part II – Operational Procedures for the GTS, Attachment II-5, Table C1. The following principles shall apply:

a) For AMBEX bulletins containing OPMET data from a single State or territory, the AA designator should be chosen from Table C1, Part I – Country or territory designators;

b) For AMBEX bulletins containing OPMET data from more than one State or territory, a suitable AA designator should be chosen from Table C1, Part II – Area Designators;

c) The part of the Table C1, Part II – Area Designators, which is relevant to the AMBEX scheme is reproduced bellow.

2.1.3 In AMBEX messages prepared by offices other than BCCs for transmission to BCCs, the following geographical designators should be used:

NOC	AA	NOC	AA
Abidjan	IV	Casablanca	MC
Accra	GH	Conakry	GN
Addis Ababa	ET	Cotonou	BJ
Aden	DY	Dakar	SG
Agadir	MC	Dar-es-Salaam	TN
Alger	AL	Djibouti	DJ
Alexandria	EG	Douala	CM
Annaba	AL	Durban	ZA
Antananarivo	MG	Entebbe	UG
Asmara	ET	Freetown	SL
Bamako	MI	Gaborone	BC
Bangui	CE	Harare	ZW
Banjul	GB	Jeddah	SD
Beira	MZ	Johannesburg	ZA
Beirut	LB	Kano	NI
Benghazi	LY	Khartoum	SU
Bissau	GW	Kigali	RW
Bloemfontein	ZA	Kilimanjaro	TN
Brazzaville	CG	Kinshasa	ZR
Bujumbura	BI	Lagos	NI
Cairo	EG	Las Palmas	CR
Cape Town	ZA	Libreville	GO
Lilongwe	MW	Niamey	NR
Lomé	TG	Nouadhibou	MT
Luanda	AN	Nouakchott	MT
Lusaka	ZB	Oran	AL
Luxor	EG	Ouagadougou	HV
Madinah	SD	Pointe Noire	CG
Mahajanga	MG	Port Gentil	GO
Mahé	SC	Rabat	MC
Malabo	GQ	Riyadh	SD
Manzini	SV	Saint-Denis	RE
Maputo	MZ	Sal	CV
Marrakech	MC	Sao Tomé	TP
Maseru	LS	Tamanrasset	AL
Mauritius	MA	Tanger	MC
Mogadishu	SI	Tenerife	CR
Mombasa	KN	Toamasina	MG
Monrovia	LI	Tunis	TS
Moroni	IC	Tripoli	LY
Nairobi	KN	Windhoek	NM
N'Djamena	CD	Yaounde	CM

2.1.4 In bulletins prepared by BCCs, the following geographical designators should be used:

BCC	AA	BCC	AA
Addis Ababa	EA	Casablanca	MC
Alger	AF	Dakar	AO
Antananarivo	IO	Johannesburg	AP
Brazzaville	AM	Nairobi	EA
Cairo	AF	Niamey	AO

2.1.5 **ii** Number used to differentiate two or more bulletins which contain data in the same code and which originate from the same geographical area and from the same originating centre. It shall be a number with a maximum of two digits. The IROGs may use numbers 36 to 38. The numbers 31 to 35, 39 shall be used in AMBEX bulletins for purposes other than those of IROGfunctions. .

2.2 **CCCC:** ICAO location indicator of location preparing the AMBEX bulletin (BCCs) or AMBEX messages (offices other than BCCs).

2.3. **YYGGgg**: Date-time group. To be used as follows:

2.3.1 YY - Day of the month

2.3.2 GGgg - hours and minutes.

- For METAR bulletins/messages: the standard time of observation in UTC.
- For TAF bulletins: the full hour in UTC (the last two digits shall be 00) preceding the transmission time.
- For all other bulletin/messages - the time of compilation in UTC.

2.4. BBB - Optional group indicating an amended, corrected or delayed bulletin.

2.4.1 An abbreviated heading defined by TTAAii CCCC YYGGgg shall be used only once. Consequently, if this abbreviated heading has to be used again for an addition, a correction or an amendment, it shall be mandatory to add an appropriate BBB indicator, which shall be added after the date-time group. The indicator BBB shall be used as defined below:

- RRx – for delayed routine meteorological messages/bulletins;

- CCx – for corrections to previously relayed messages/bulletins;

- AAx – for amendments to TAF messages/bulletins;

- Pxx – for segmenting a large set of information into several bulletins.

Note 1: *The "x" above is an alphabetic character of A through X, indicating the sequential number of the irregular bulletin of certain type. For instance, for amended TAFs, AAA is used for the first amendment, AAB for the second, AAC for the third, etc; for delayed METARs or TAFs, RRA is used for the first delayed message, RRB for the second, etc.; and, for corrections to any OPMET bulletin, CCA is used for the first correction, CCB for the second, etc.*

Note 2: *The use of the third letter A, B, C, etc. permits differentiation between bulletins/messages* *with the same type of information of the original bulletin/message. For example, assuming that a certain bulletin had the following abbreviated heading: "FTA031 DIAP 281000", a delayed bulletin containing TAF(s) which are missing from the original bulletin will bear the heading: "FTA033 DRRN 281000 RRA"; and a second delayed bulletin, containing additional missing TAF(s) will bear the heading: "FTA031 DIAP 281000 RRB".*

Note 3: *The following data designators should be used by BCCs*:

	TAF	**METAR**
Addis Ababa	FTEA31 HAAB FTEA39 HAAB	SAEA 31
Alger	FTAF31 DAMM	SAAF 31
Antananarivo	FTIO31 FMMI FTIO39 FMMI	SAIO 31
Brazzaville	FTAM31 FCBB FTAM39 FCBB	SAAM 31
Cairo	FTAF32 HECA	SAAF 32
Casablanca	FTMC31 GMMC FTMC39 GMMC	SAMC 31
Dakar	FTAO32 GOOY FTAO39 GOOY	SAAO 32
Johannesburg	FTAP32 FAJS FTAP39 FAJS	SAAP 32
Nairobi	FTEA32 HKJK FTEA39 HKJK	SAEA 32
Niamey	FTAO33 DRRN	SAAO 33

APPENDIX D

EXCHANGE OF OPMET DATA BETWEEN THE AFI, EUR, MID AND ASIA REGION

IROGsRESPONSIBILITIES

1. DAKAR IROG

1.1. **Outgoing responsibilities**

1.1.1 The whole set of METAR, TAF, AIREP SPECIAL and SIGMET bulletins, as described in appendices A, B, C and D of this Handbook, received by RODB DAKAR shall be distributed to Rio de Janeiro and ROC Toulouse, which shall send them to the EUR ROCs deserving other adjacent regions and to the SADIS.

1.2. **Incoming responsibilities**

1.2.1 The bulletins containing the required international OPMET data as indicated in the FASID Table MET 1A (or 2A) shall be sent by Rio de Janeiro, Jedda and ROC Toulouse to IROG DAKAR, that shall send the bulletins following the States requirements.

1.2.2 Regular contacts with the adjacent IROG (s) shall insure the efficiency of the data exchange. A list of exchanged bulletins should be agreed and updated, as necessary.

2. PRETORIA IROG

2.1. **Outgoing responsibilities**

2.1.1 The whole set of METAR, TAF, AIREP SPECIAL and SIGMET bulletins, as described in appendices A, B, C and D of this Handbook received by RODB Pretoria shall be distributed to Rio de Janeiro, Jeddah, Bangkok and ROC Toulouse, that shall send to the EUR ROCs deserving other adjacent regions and to the SADIS

2.2. **Incoming responsibilities**

2.2.1 The bulletins containing the required international OPMET data as indicated in the FASID table MET 1A (or 2A) shall be sent by Rio de Janeiro, Jedda, Bangkok and ROC Toulouse to IROG PRETORIA, that shall send the bulletins following the States requirements.

2.2.2 Regular contacts with the adjacent IROG(s) should insure the efficiency of the data exchange. A list of exchanged bulletins should be agreed and updated, as necessary

APPENDIX E

AFI REGIONAL OPMET DATA BANKS AND SIGMET REQUIREMENTS

The AFI Regional OPMET Data Banks (RODBs) and the AFTN address to be used for direct access to the banks are shown below:

RODB	AFTN Address	AMBEX Centres of Responsibility
Dakar	GOOYYZYZ	Alger/DAMM, Brazzaville/FCBB Casablanca/GMMC Dakar/GOOO Niamey/DRNN
Pretoria	FAJSYMYX	Addis Ababa/HAAB, Antananarivo/FMMI Cairo/HECA Johannesburg/ (FAJS)** Nairobi/HKNA ** BCC located at South African Weather Service HQ.

Responsibilities:

1. Collect OPMET bulletins from AMBEX centres in the area of responsibility and store them in the data base;
2. Handle all types of OPMET bulletins;
3. Provide facilities for “request-reply” service to authorized users;
4. Maintain a catalogue of bulletins and introduce changes to the bulletins when necessary according to established procedures;
5. Quality control the incoming bulletings and inform AMBEX centres on any deficiencies;
6. Monitor the OPMET traffic by carrying on regular test on the availability and timeliness of the bulletins; report to the ICAO Regional Office on the results.

APPENDIX E-1

WMO HEADINGS FOR SIGMET BULLETINS USED BY AFI METEOROLOGICAL WATCH OFFICES (MWOs)

EXPLANATION OF THE TABLE

Col 1: State and name of the MWO

Col 2: ICAO location indicator of the MWO

Col 3: $T_1T_2A_1A_2ii$ group of the WMO heading for the WS SIGMET bulletin

Col 4: $T_1T_2A_1A_2ii$ group of the WMO heading for the WC SIGMET bulletin (tropical cyclone)

Col 5: $T_1T_2A_1A_2ii$ group of the WMO heading for the WV SIGMET bulletin (volcanic ash)

Col 6: ICAO location indicator of the FIR/CTA served by the MWO

Col 7: Remarks

WMO HEADINGS FOR SIGMET BULLETINS
USED BY AFI METEOROLOGICAL WATCH OFFICES

MWO Location	ICAO location indicator	WMO SIGMET Headings			FIR/ACC served	Remarks
		WS	WC	WV	ICAO location indicator	
1	2	3	4	5	6	7
ALGERIA ALGER/Baraki	DAAL	WSAL31		WVAL31	DAAA	
ANGOLA LUANDA/4 de Fevereiro	FNLU	WSAN31		WVAN31	FNAN	
BOTSWANA GABORONE/Sir Seretse Khama	FBSK	WSBC31	WCBC31	WVBC31	FBGR	
BURUNDI BUJUMBURA/Bujumbura	HBBA	WSBI31		WVB131	HBBA	
CANARY ISLANDS (Spain) GRAN CANARIA/Gran Canary, Canary I	GCLP	WSCR31		WVCR31	GCCC	
CAPE VERDE SAL I/Amilcar Cabral	GVAC	WSCV31		WVCV31	GVSC	
CHAD N'DJAMENA/N'djamena	FTTJ	WSCD31		WVCD31	FTTT	
CONGO BRAZZAVILLE/Maya-Maya	FCBB	WSCG31		WVCG31	FCCC	
D.R. CONGO KINSHASA/N'Djili	FZAA	WSZR31	WCZR31	WVZR31	FZAA	
EGYPT CAIRO/Cairo International	HECA	WSEG31	WCEG31	WVEG31	HECC	
ETHIOPIA ADDIS ABABA/Bole Intl	HAAB	WSET31		WVET20	HAAA	
ERITREA ASMARA	HHAS	WSEI31		WVEI31	HHAA	
GHANA ACCRA/Kotoka Int'l	DGAA	WSGH31		WVGH31	DGAC	
KENYA KENYA/Jomo Kenyatta Int'l	HKJK	WSKN31	WCKN31	WVKN31	HKNA	
LIBERIA MONROVIA/Roberts Int'l	GLRB	WSLI31		WVSL31	GLRB	
LIBYAN ARAB JAMAHIRIYA TRIPOLI/Tripoli Int'l	HLLT	WSLY31		WVLY31	HLLL	
MADAGASCAR ANTANANARIVO/Ivato	FMMI	WSMG31	WCMG20	WVMG20	FMMM	
MALAWI LILONGWE/Lilongwe Int'l	FWKI	WSMW31	WCMW31	WVMW31	FWLL	

MWO Location	ICAO location indicator	WMO SIGMET Headings			FIR/ACC served	Remarks
		WS	WC	WV	ICAO location indicator	
1	2	3	4	5	6	7
MAURITIUS MAURITIUS/Sir Seewoosagur Ramgoolam Int'l	FIMP	WSMA31		WVMA31	FIMM	
MOROCCO CASABLANCA/Anfa	GMMC	WSMC31		WVMC31	GMMM	
MOZAMBIQUE MAPUTO/Maputo Int'l	FQMA	WSMZ31	WCMZ20	WVMZ31	FQBE	
NAMIBIA WINDHOEK/Hosea Kutako	FYWH	WSNM31		WVNM31	FYWH	
NIGER NIAMEY/Diori Hmani Int'l	DRRN	WSNR31		WVNR31	DRRR	
NIGERIA KANO/Mallam Aminu Kano Int'l	DNKN	WSNI31		WVNI31	DNKK	
RWANDA KIGALI/Gregoire Kayibanda	HRYR	WSRW31		WVRW31	HRYR	
SENEGAL Leopold Sedar Senghor	GOOY	WSSG31		WVSG31	GOOO	
SEYCHELLES MAYE/Seychelles Int'l	FSIA	WSSC31	WCSC20	WVSC31	FSSS	
SOMALIA MOGADISHU/Mogadishu	HCMM	WSSI31		WVSI31	HCSM	
SOUTH AFRICA JOHANNESBURG/Johannesburg	FAJS	WSZA31	WCZA31	WVZA31	FACA FAJA FAJO	
SUDAN KHARTOUM/Khartoum	HSSS	WSSU31		WVSU31	HSSS	
TUNISIA TUNIS/Carthage	DTTA	WSTS31		WVTS31	DTTC	
UGANDA ENTEBBE/Entebbe Int'l	HUEN	WSUG31		WVUG31	HUEC	
UNITED REPUBLIC OF TANZANIA DAR-ES-SALAAM/Dar-es-Salaam	HTDA	WSTN31	WCTN31	WVTN31	HTDC	
ZAMBIA LUSAKA/Lusaka Int'l	FLLS	WSZB31		WVZB31	FLFI	
ZIMBABWE HARARE/Harare	FVHA	WSZW31	WCZW31	WVZW31	FVHA	

APPENDIX F

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 $Y_1Y_1G_1G_1/Y_2Y_2G_2G_2$	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
TAF with issue time error (wrong date): FCID31 WIII 181630 TAF WIII **041630Z** 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=	 FCID31 WIII 181630 TAF WIII **181630Z** 0418/0503 00000KT 9000 FEW025 BECMG 0422/0424 16005KT=
TAF with mistyped Validity Period: FTPH31 RPLL 132200 TAF RPLC 132200Z **1400/1428** 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 –SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=	 FTPH31 RPLL 132200 TAF RPLC 132200Z **1400/1424** 04006KT 9999 SCT036 BKN300 TEMPO 1400/1406 02010KT 5000 –SHRA FEW020 BKN270 TX32/1405Z TN22/1421Z=
TAF with Validity error (wrong date): FCMS33 WMKK 170748 TAF WMKK 170700Z **3009/3018** 30005KT 9999 FEW017CB SCT140 BKN270=	 FCMS33 WMKK 170748 TAF WMKK 170700Z **1709/1718** 30005KT 9999 FEW017CB SCT140 BKN270=
TAF with 4-digit Validity period: FTXX31 WIDD 170121 TAF WIDD **0618** 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000=	 FTXX31 WIDD 170121 TAF WIDD **1706/1718** 06010G20KT 9999 SCT018 BECMG 1712/1714 00000KT 7000

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: • Missing VALID string • Incorrect SIGMET number format • Incorrectly formatted validity period	
Note: For SIGMET validation, please refer to the format described in the AFI (WACAF or ESAF) Regional SIGMET Guide		

Examples	After QC check
SIGMET without TTAAii: **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=	 **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=
SIGMET with incorrect number format WCPH30 RPLL 210445 SIGMET **NO 01** VALID 210000/210600 RPLL TC OBS N0830 E12900 ….=	 WCPH30 RPLL 210445 SIGMET **01** VALID 210000/210600 RPLL TC OBS N0830 E12900 … =
SIGMET with incorrect formatted validity period: WSIN90 VIDP 181800 VIDP SIGMET 06 VALID **18/1600** **TO 18/2000 UTC** VIDPDELHI FIR ISOL TS … = WSSD20 OEJD 220503 OEJD SIGMET 01 VALID **220500** **TO 220900** OEJN- JEDDAH FIR ….=	 WSIN90 VIDP 181800 VIDP SIGMET 06 VALID **181600/182000** VIDPDELHI FIR ISOL TS … = WSSD20 OEJD 220503 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)	• AHL • Code name • Observation date/time	Software verification Manual validate Periodic Quality Control & PI Monitoring
TAF TAF AMD TAF COR (FT,FC)	• 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)	• AHL • SIGMET Sequence No • Date/time groups indicating the period of validity Additional Checks (recommended): • 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	• Type of message • • Issue date and time Additional Checks (recommended): • • Location indicator or name of the VAAC centre originating the message	Software verification Manual validate Periodic VA Quality Control Monitoring
Tropical Cyclone Advisory FK	• Type of message • Issue date and time Additional Checks (recommended): • Location indicator or name of the TCAC centre originating the message	Software verification Manual validate Periodic TC Quality Control Monitoring

2 <u>OPMET Monitoring</u>

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:

$$\boldsymbol{\tau = \mu - \sigma}$$

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
.	.	.	.
.	.	.	.

APPENDIX G

AMBEX FOCAL POINTS *(December 2009….)*

	State/*Etat*/ Organisation	**Name/*Nom et Prénom***	**Address/*Adresse***	**E-mail**	**Fax**	**Telephone**
1	Algeria					
2	Cameroon	ABONDO Cyrille	Chef de Service de la Météorologie Aéronautique	abondocyrille@yahoo.com	+237 22 30 33 62	+ 237 22 30 30 90
3	Congo	**OLEMBE Alexis Laurence**	B.P. 218 Brazzaville Aéroport CONGO	aolembe@yahoo.fr	+242 282 00 51	+242 972 16 77 / +242 411 48 95
4	Egypt					
5	Ethiopia					
6	Kenya					
7	France					
8	Madagascar	RAKOTONDRIANA Jérôme **RABENASOLO Mamitiana Alain**	Direction Générale de la Météo, BP 1254 Antananarivo B.P. 46 Ivato Aéroport MADAGASCAR	madagascarmto@asecna.org; jerome@asecna.mg mamyalain6@yahoo.fr	+261 202 258 115 +261 20 22 581 15	+ 261 33 12 108 05 +261 3410 034 54
9	Morocco					
10	Niger	**YERIMA Ladan**	B.P. 1096 Niamey Aéroport NIGER	E-mail : yeriladan@yahoo.fr	+227 20 73 55 12	+227 94 85 22 27
11	Nigeria	IKEKHUA O. Felix Mrs. M. O. Iso	NIMET	felix_ikekhua@yahoo.com maryottuiso@yahoo.com	+234 9 4130710 +234 9 4130711	+234 1 477 16 62 +234 9 4130709 + 234 9 4130710
12	Senegal (Rapporteur)	DIEME Saïdou	ASECNA Sénégal	saidoudieme@yahoo.fr	+221 33 820 06 00 +221 33 820 02 72/	+221 33 869 22 03

			B.P. 8132 Dakar Aéroport Yoff SENEGAL	saidoudieme@yahoo.fr	+221 33 820 06 00	: +221 77 652 53 87
13	South Africa					
14	United Kingdom (RU)					
15	ASECNA	NGOUAKA Dieudonné	ASECNA DG BP 3144 Dakar, Sénégal	ngouakadie@asecna.org	+221 33 8234654	+221 33 8695714
16	IATA	ZOO-MINTO'O Prosper	Adjoint au Directeur régional de l'IATA	ZooMintooP@iata.org	+2711 523 2702	+2711 523 27 00
17	WMO/OMM					
18	EUR BMG					
19	IROG Toulouse					
20	ASIA/PAC/M TSF					

To be updated by Dakar and Pretoria RODB Managers

IMPLEMENTATION OF AFI OPMET DATA CATALOGUE

Catalogue Section 1 :

METAR/SPECI, FT TAF and FC TAF

Structure of the tables:

- ICAO region
- State
- name of the airport
- CCCC ICAO location indicator
- IATA code (when available, XXX if not)
- the required types of reports (Y when available, N if not).

The tables are sorted by ICAO regions:

- AFI
- ASIA/PAC
- CAR/SAM
- EUR
- MID
- NAM
- NAT

then by State and by CCCC location indicator for each State.

ANNEX 1 - AFI

Name of Aerodrome	CCCC	IATA	AOP	SA	SP	FC	FT
AFI - ALGERIA							
Adrar/Touat-Cheikh Sidi Mohamed Belkebir	DAUA	AZR	Y	Y	Y	N	N
Alger/Houari Boumediene	DAAG	ALG	Y	Y	Y	N	Y
Annaba/Rabah Bitat	DABB	AAE	Y	Y	Y	N	Y
Bechar/Boudghene Ben Ali Lotfi	DAOR	CBH		Y	Y	Y	N
Bejaia/Soummam-Abane Ramdane	DAAE	BJA		Y	Y	Y	N
Biskra	DAUB	BSK		Y	Y	Y	N
Bou Saada	DAAD	BUJ		Y	Y	N	N
Constantine/Med Boudiaf	DABC	CZL	Y	Y	Y	N	Y
Djanet/Tiska	DAAJ	DJG		Y	Y	Y	N
El Golea	DAUE	ELG		Y	Y	N	N
El Oued/Guemar	DAUO	ELU		Y	Y	Y	N
Ghardaia/Noumerat-Moufdi Zakaria	DAUG	GHA	Y	Y	Y	N	N
Ghriss	DAOV			Y	Y	Y	N
Hassi Messaoud/Oued Irara-Krim Belkacem	DAUH	HME	Y	Y	Y	N	N
Illizi/Takhamalt	DAAP	WZ		Y	Y	Y	N
In Guezzam	DATG	INF		Y	Y	Y	N
In Salah	DAUI	INZ	Y	Y	Y	N	N
Jijel/Ferhat Abbas	DAAV	GJL		Y	Y	Y	N
Oran/Es Senia Y T	DAOO	ORN	Y	Y	Y	N	Y
Tamanrasset/Aguenar	DAAT	TMR	Y	Y	Y	N	Y
Tebessa/Cheikh Larbi Tebessi	DABS	TEE	Y	Y	Y	N	N
Tiaret Abdelhafid Boussouf Ain Bou Chekif	DAOB	TID		Y	Y	Y	N
Timimoun	DAUT	TMX		Y	Y	Y	N
Tlemcen/Zenata-Messali El Hadj	DAON	TUM	Y	Y	Y	N	Y
Touggourt/Sidi Mahdi	DAUK	TGR		Y	Y	Y	N
Zarzaitine/In Amenas	DAUZ	IAM		Y	Y	N	N
AFI - ANGOLA							
Cabinda	FNCA	CAB		Y	Y	N	Y
Huambo	FNHU	NOV	Y	Y	Y	N	N
Luanda/4 De Fevereiro	FNLU	LAD	Y	Y	Y	N	Y
AFI - ASCENSION I. (United Kingdom)							
ASCENTION I	FHAW	ASC		N	N	N	Y
AFI - BENIN							
Cotonou/Cadjehoun	DBBB	COO	Y	Y	Y	N	Y
AFI - BOSTWANA							
Francistown	FBFT	FRW	Y	Y	Y	N	N
Gaborone/Sir Seretse Khama Int'l Y X F	FBSK	GBE	Y	Y	Y	N	Y
Ghanzi	FBGZ			Y	Y	N	N
Kasane	FBKE	BBK	Y	Y	Y	N	N
Maun	FBMN	MUB	Y	Y	Y	N	N
Selibe-Phikwe	FBSP		Y	Y	Y	N	N

AFI - BRITISH INDIAN OCEAN TERRITORY (United Kingdom)							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Diego Garcia (See/Voir/Ves "Kjdg")	FJDG			Y	Y	N	Y
AFI - BURKINA FASO							
Bobo Dioulasso	DFOO	BOY	Y	Y	Y	N	N
Ouagadougou/Aeroport	DFFD	OUA	Y	Y	Y	N	Y
AFI - BURUNDI							
Bujumbura	HBBA	BJM	Y	Y	Y	N	Y
AFI - CAMEROON							
Douala/Aeroport	FKKD	DLA	Y	Y	Y	N	Y
Garoua	FKKR	GOU	Y	Y	Y	N	N
Maroua/Salak	FKKL	MVR	Y	Y	Y	N	N
N'gaoundere	FKKN	NGE	Y	Y	Y	N	N
Yaounde/Nsimalen	FKYS	NSI	Y	Y	Y	N	Y
AFI - CANARY ISLANDS (Spain)							
Fuerteventura Y	GCFV		Y	Y	Y	N	Y
Gran Canaria Y	GCLP		Y	Y	Y	N	Y
Hierro	GCHI		Y	Y	Y	N	N
La Palma	GCLA		Y	Y	Y	N	N
Lanzarote	GCRR		Y	Y	Y	N	Y
Tenerife Norte (Ad Civil)	GCXO		Y	Y	Y	N	Y
Tenerife Sur/Reina Sofia	GCTS		Y	Y	Y	N	Y
AFI - CAPE VERDE							
Amilcar Cabral/Sal Island	GVAC	SID	Y	Y	Y	N	Y
Praia	GVNP		Y	Y	Y	N	N
Sao Pedro/Sao Vicente Island	GVSV		N	Y	Y	N	Y
AFI - CENTRAL AFRICAN REPUBLIC							
Bangassou	FEFG	BGU	N	Y	Y	N	N
Bangui/M'poko	FEFF	BGF	Y	Y	Y	N	Y
Berberati Y F	FEFT	BBT	Y	Y	Y	N	N
AFI - CHAD							
Moundou	FTTD	MQQ	N	Y	Y	N	N
N'djamena/Hassan Djamous	FTTJ	NDJ	Y	Y	Y	N	Y
Sarh	FTTA	SRH	N	Y	Y	N	N
AFI - COMOROS							
Dzaoudzi Pamandzi	FMCZ		Y	Y	Y	N	N
Moroni/Ihahaia	FMCH	HAH	Y	Y	Y	N	Y
AFI - CONGO							
Brazzaville/Maya-Maya	FCBB	BZV	Y	Y	Y	N	Y
Dolisie	FCPD		N	Y	Y	N	N
Impfondo	FCOI		N	Y	Y	N	N
Ouesso	FCOU		N	Y	Y	N	N
Pointe Noire	FCPP	PNR	Y	Y	Y	N	Y
AFI - COTE D'IVOIRE							
Abidjan/Felix Houphouet Boigny	DIAP	ABJ	Y	Y	Y	N	Y
Bouake	DIBK	BYK	Y	Y	Y	N	N
Korhogo	DIKO	HGO	N	Y	Y	N	N
Man	DIMN	MJC	N	Y	Y	N	N
San Pedro	DISP	SPY	N	Y	Y	N	N
Yamoussoukro	DIYO	ASK	N	Y	Y	N	Y

AFI - DEMOCRATIC REPUBLIC OF THE CONGO							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Goma	FZNA	GOM	Y	Y	Y	N	N
Kalemie	FZRF	FMI	N	Y	Y	N	N
Kamina-Base	FZSA	KMN	N	Y	Y	N	Y
Kasese	FZOS		N	Y	Y	N	Y
Kindu	FZOA	KND	N	Y	Y	N	Y
Kinshasa/N'djili	FZAA	FIH	Y	Y	Y	N	Y
Kinshasa/N'dolo	FZAB	NLO	N	Y	Y	N	Y
Kisangani-Bangoka	FZIC	FKI	Y	Y	Y	N	N
Lubumbashi-Luano	FZQA	FBM	Y	Y	Y	N	N
Malebo	FZBN		N	Y	Y	N	Y
Mbandaka	FZEA	MDK	N	Y	Y	N	Y
Mbuji-Mayi	FZWA		N	Y	Y	N	N
AFI - DJIBOUTI							
Djibouti/Ambouli	HDAM	JIB	Y	Y	Y	N	Y
AFI - EGYPT							
Abu Simbel	HEBL	ABS	N	Y	Y	N	Y
Alexandria / Intl	HEAX	ALY	Y	Y	Y	N	Y
Almaza Afb / Militar	HEAZ		Y	Y	Y	N	N
Aswan / Intl	HESN	ASW	Y	Y	Y	N	Y
Asyut / Intl	HEAT		Y	Y	Y	N	N
Borg El Arab / Intl	HEBA		N	Y	Y	N	Y
Cairo/Intl	HECA	CAI	Y	Y	Y	N	Y
El Arish / Intl	HEAR		N	Y	Y	N	Y
Hurghada / Intl	HEGN	HRG	Y	Y	Y	N	Y
Luxor / Intl	HELX	LXR	Y	Y	Y	N	Y
Marsa Alam / Intl	HEMA		N	Y	Y	N	N
Mersa Matruh	HEMM	MUH	N	Y	Y	N	Y
Port Said/ Intl	HEPS		N	Y	Y	N	Y
Shark El Oweinat / Intl	HEOW		Y	Y	Y	N	N
Sharm El Sheikh / Intl	HESH		Y	Y	Y	N	Y
St.Catherine / Intl	HESC		Y	Y	Y	N	Y
Taba / Intl	HETB	TCP	Y	Y	Y	N	Y
AFI - EQUATORIAL GUINEA							
Bata	FGBT		N	Y	Y	N	N
Malabo	FGSL	SSG	Y	Y	Y	N	Y
AFI - ERITREA							
Asmara Ais/App/Com/Met/Twr	HHAS	ASM	Y	Y	Y	N	Y
Assab	HHSB		N	Y	Y	N	N
AFI - ETHIOPIA							
Addis Ababa/Bole Com/Met/Nof	HAAB	ADD	Y	Y	Y	N	Y
Dire Dawa	HADR	DIR	N	Y	Y	N	N
AFI - GABON							
Franceville/Mvengue	FOON	HVB	Y	Y	Y	N	N
Libreville/Leon M'ba	FOOL	LBV	Y	Y	Y	N	Y
Moanda	FOOD	MFF	N	Y	Y	N	N
Port-Gentil	FOOG	POG	Y	Y	Y	N	N
AFI - GAMBIA							
Banjul International	GBYD	BJL	Y	Y	Y	N	Y

AFI - GHANA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Accra/Kotoka International	DGAA	ACC	Y	Y	Y	N	Y
Kumasi	DGSI	KMS	Y	Y	Y	N	N
Tamale	DGLE		Y	Y	Y	N	N
AFI - GUINEA							
Boke/Baralande	GUOK		N	Y	Y	N	Y
Conakry/Gbessia	GUCY	CKY	Y	Y	Y	N	Y
Faranah/Badala	GUFH	FAA	N	Y	Y	N	N
Kankan/Kankan	GUXN		Y	Y	Y	N	N
Labe/Tata	GULB		Y	Y	Y	N	N
N'zerekore/Konia	GUNZ		Y	Y	Y	N	N
AFI - GUINEA-BISSAU							
Bissau/Oswaldo Vieira Intl	GGOV	BXO	Y	Y	Y	N	Y
AFI - KENYA							
Eldoret/Intl	HKEL		Y	Y	Y	N	Y
Kisumu	HKKI	KIS	N	Y	Y	N	Y
Malindi	HKML	MYD	N	Y	Y	N	Y
Mombasa/Moi Intl.	HKMO	MBA	Y	Y	Y	N	Y
Nairobi/Jomo Kenyatta Airport	HKJK	NBO	Y	Y	Y	N	Y
Nairobi/Wilson	HKNW	WIL	N	Y	Y	N	Y
AFI - LESOTHO							
Maseru Moshoeshoe	FXMM	MSU	Y	Y	Y	N	Y
AFI - LIBERIA							
Monrovia/Roberts Intl	GLRB	ROB	Y	Y	Y	N	Y
Monrovia/Spriggs Payne	GLMR	MLW	N	Y	Y	N	Y
AFI - LIBYAN ARAB JAMAHIRIYA							
Benghazi/Benina	HLLB		Y	Y	Y	N	Y
Ghadames	HLTD		N	Y	Y	N	Y
Kufra	HLKF		N	Y	Y	N	N
Sebha	HLLS		Y	Y	Y	N	N
Tripoli/International	HLLT		Y	Y	Y	N	Y
AFI - MADAGASCAR							
Antananarivo/Ivato	FMMI	TNR	Y	Y	Y	N	Y
Antsiranana/Arrachart	FMNA		Y	Y	Y	N	N
Mahajanga/Ph. Tsiranana	FMNM	MJN	Y	Y	Y	N	Y
Nosy-Be	FMNN	NOS	Y	Y	Y	N	N
Sainte-Marie	FMMS		Y	Y	Y	N	N
Toamasina	FMMT		Y	Y	Y	N	Y
Tolagnaro	FMSD		Y	Y	Y	N	N
AFI - MALAWI							
Blantyre/Chileka	FWCL	BLZ	Y	Y	Y	N	N
Lilongwe/Kamuzu International	FWKI		Y	Y	Y	N	Y

AFI - MALI							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Bamako/Senou	GABS	BKO	Y	Y	Y	N	Y
Gao	GAGO	GAQ	Y	Y	Y	N	N
Kayes	GAKD	KLB	Y	Y	Y	N	N
Kidal	GAKL		Y	Y	Y	N	N
Mopti/Ambodedjo	GAMB	MZI	Y	Y	Y	N	N
Nioro	GANR	NIX	Y	Y	Y	N	N
Tombouctou	GATB	TOM	Y	Y	Y	N	N
AFI - MAURITANIA							
Atar	GQPA	ATR	Y	Y	Y	N	N
Kaedi	GQNK	KED	N	Y	Y	N	N
Nema	GQNI	EMN	Y	Y	Y	N	N
Nouadhibou	GQPP	NDB	Y	Y	Y	N	Y
Nouakchott/Aeroport	GQNN	NKC	Y	Y	Y	N	Y
Zoueratt/Tazadit	GQPZ		Y	Y	Y	N	N
AFI - MAURITIUS							
Rodrigues/Plaine Corail Airport	FIMR	RRG	N	Y	Y	N	N
Sir Seewoosagur Ramgoolam Intl Airport	FIMP	MRU	Y	Y	Y	N	Y
AFI - MOROCCO							
Agadir/Al Massira	GMAD	AGA	Y	Y	Y	N	Y
Al Hoceima/Cherif El Idrissi	GMTA		Y	Y	Y	N	N
Casablanca/Mohammed	GMMN	CMN	Y	Y	Y	N	Y
Errachidia/Moulay Ali Cherif	GMFK		Y	Y	Y	N	Y
Fes/Saiss	GMFF	FEZ	Y	Y	Y	N	Y
Laayoune/Hassan	GMML	EUN	N	Y	Y	N	Y
Marrakech/Menara	GMMX	RAK	Y	Y	Y	N	Y
Nador/El Aroui	GMMW	NDR	N	Y	Y	N	N
Ouarzazate	GMMZ	OZZ	Y	Y	Y	N	Y
Oujda/Angads	GMFO	OUD	Y	Y	Y	N	Y
Rabat/Sale	GMME	RBA	Y	Y	Y	N	Y
Tanger/Ibn Batouta	GMTT	TNG	Y	Y	Y	N	Y
Tan-Tan/Plage Blanche	GMAT		Y	Y	Y	N	N
Tetouan/Saniat R'mel	GMTN	TTU	Y	Y	Y	N	N
AFI - MOZAMBIQUE							
Beira	FQBR	BEW	Y	Y	Y	N	Y
Maputo	FQMA	MPM	Y	Y	Y	N	Y
Nampula	FQNP	APL	N	Y	Y	N	Y
Quelimane	FQQL	UEL	N	Y	Y	N	Y
Tete/Chingodzi	FQTT	TET	N	Y	Y	N	Y
AFI - NAMIBIA							
Hosea Kutako Intl Airport	FYWH	WDH	N	Y	Y	N	Y
Keetmanshoop	FYKT	KMP	Y	Y	Y	N	N
Walvis Bay	FYWB		Y	Y	Y	N	N

AFI - NIGER							
Agades Sud	DRZA	AJY	Y	Y	Y	N	N
Niamey	DRRN	NIM	Y	Y	Y	N	Y
Zinder	DRZR	ZND	Y	Y	Y	N	N
AFI - NIGERIA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Abuja	DNAA	ABV	Y	Y	Y	N	Y
Benin	DNBE	BNI	N	Y	Y	N	Y
Calabar	DNCA	CBQ	Y	Y	Y	N	N
Enugu	DNEN	ENU	N	Y	Y	N	Y
Ibadan (New)	DNIB	IBA	N	Y	Y	N	Y
Ilorin	DNIL	ILR	Y	Y	Y	N	N
Jos	DNJO	JOS	N	Y	Y	N	Y
Kaduna (New)	DNKA	KAD	Y	Y	Y	N	N
Kano/Mallam Aminu Kano	DNKN	KAN	Y	Y	Y	N	Y
Lagos/Murtala Muhammed	DNMM	LOS	Y	Y	Y	N	Y
Maiduguri	DNMA	MIV	Y	Y	Y	N	N
Port Harcourt	DNPO	PHC	Y	Y	Y	N	Y
Sokoto	DNSO	SKO	Y	Y	Y	N	N
AFI - REUNION (FRANCE)							
Saint Denis Gillo	FMEE	RUN	Y	Y	Y	N	Y
AFI - RWANDA							
Kigali/Gregoire Kayibanda	HRYR	KGL	Y	Y	Y	N	Y
AFI - SAO TOME AND PRINCIPE							
Sao Tome/International,Sao Tome Island	FPST	TMS	Y	Y	Y	N	Y
AFI - SENEGAL							
Cap Skiring	GOGS	CSK	Y	Y	Y	N	N
Dakar/Yoff	GOOY	DKR	Y	Y	Y	N	Y
Saint Louis	GOSS	XLS	Y	Y	Y	N	N
Tambacounda	GOTT	TUD	Y	Y	Y	N	N
Ziguinchor	GOGG	ZIG	Y	Y	Y	N	N
AFI - SEYCHELLES							
Seychelles International	FSIA	SEZ	Y	Y	Y	N	Y
AFI - SIERRA LEONE							
Freetown/Lungi	GFLL	FNA	Y	Y	Y	N	Y
AFI - SOMALIA							
Berbera	HCMI	BBO	Y	Y	Y	N	N
Burao	HCMV		Y	Y	Y	N	N
Egal International Airport	HCMH	HGA	Y	Y	Y	N	N
Kisimayu	HCMK	KMU	Y	Y	Y	N	Y
Mogadishu	HCMM	MGQ					

AFI - SOUTH AFRICA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Alexander Bay	FAAB	ALJ	N	Y	Y	N	N
Bloemfontein (Bloemfontein Airport)	FABL	BFN	Y	Y	Y	N	Y
Cape Town (Cape Town Internl Airport)	FACT	CPT	Y	Y	Y	N	Y
Durban (Durban International Airport)	FADN	DUR	Y	Y	Y	N	Y
East London	FAEL	ELS	N	Y	Y	N	N
George (George Airport)	FAGG	GJR	N	Y	Y	N	N
Kimberley (Kimberley Airport)	FAKM	KIM	N	Y	Y	N	N
Lanseria	FALA	HLA	Y	Y	Y	N	N
Mafikeng Intl. Ad	FAMM	MBD	Y	Y	Y	N	N
Nelspruit	FANS		Y	Y	Y	N	N
O.R Tambo International Airport	FAJS	JNB	Y	Y	Y	N	Y
Pietersburg (Civil)	FAPI		Y	Y	Y	N	N
Port Elizabeth (Port Elizabeth Airport)	FAPE	PLZ	Y	Y	Y	N	N
Rand	FAGM		Y	Y	Y	N	N
Upington	FAUP	UTN	Y	Y	Y	N	N
Waterkloof (Saaf)	FAWK		N	Y	Y	N	N
AFI - SPAIN							
Melilla	GEML		N	Y	Y	N	N
AFI - SUDAN							
Dongola/Dongola	HSDN	DOG	N	Y	Y	N	Y
El Obeid/El Obeid International	HSOB	EBD	N	Y	Y	N	Y
Juba/Juba	HSSJ	JUB	Y	Y	Y	N	N
Kassala/Kassala	HSKA	KSL	Y	Y	Y	N	N
Khartoum/Khartoum (Civil Aviation Dept.)	HSSS	KRT	Y	Y	Y	N	Y
Port Sudan/Port Sudan	HSPN	PZU	Y	Y	Y	N	N
AFI - SWAZILAND							
Manzini/Matsapha	FDMS	MTS	Y	Y	Y	N	Y
AFI - TOGO							
Aeroport International Gnassingbe Eyadema	DXXX	LFW	Y	Y	Y	N	Y
Niamtougou	DXNG	LRL	Y	Y	Y	N	N
Sokode	DXSK		N	Y	Y	N	N
AFI - TUNISIA							
Djerba/Zarzis	DTTJ	DJE	Y	Y	Y	N	Y
Gabes	DTTG		N	Y	Y	Y	Y
Gafsa/Ksar	DTTF		N	Y	Y	Y	Y
Monastir/Habib Bourguiba	DTMB	MIR	Y	Y	Y	N	Y
Sfax/Thyna	DTTX	SFA	Y	Y	Y	N	N
Tabarka/7 Novembre	DTKA		Y	Y	Y	N	N
Tozeur/Nefta	DTTZ	TOE	Y	Y	Y	N	Y
Tunis/Carthage	DTTA	TUN	Y	Y	Y	N	Y
AFI - UGANDA							
Entebbe (Intl)	HUEN	EBB	Y	Y	Y	N	Y
AFI - UNITED REPUBLIC OF TANZANIA							
Dar Es Salaam	HTDA	DAR	Y	Y	Y	N	Y
Kilimanjaro	HTKJ	JRO	Y	Y	Y	N	Y
Mwanza	HTMW	MWZ	N	Y	Y	N	Y
Tanga	HTTG	TGT	N	Y	Y	N	Y
Zanzibar – Kisauni	HTZA	ZNZ	Y	Y	Y	N	Y

AFI - WESTERN SAHARA							
El Aaiun	GSAI		Y	Y	Y	N	N
Villacisneros	GSVO		Y	Y	Y	N	N
AFI - ZAMBIA							
Livingstone	FLLI	LVI	Y	Y	Y	N	N
Lusaka/Intl	FLLS	LUN	Y	Y	Y	N	Y
Mfuwe	FLMF	NFU	Y	Y	Y	N	N
Ndola	FLND	NLA	Y	Y	Y	N	N
AFI - ZIMBABWE							
Harare International	FVHA	HRE	Y	Y	Y	N	Y
J.M. Nkomo	FVBU	BUQ	Y	Y	Y	N	N
Victoria Falls	FVFA	VFA	Y	Y	Y	N	N

ANNEX 1 – ASIA/PAC

ASIA/PAC - AMERICAN SAMOA (UNITED STATES)							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Pago Pago International,Tutuila I.	NSTU	PPG	Y	Y	Y	N	Y
ASIA/PAC - AUSTRALIA							
Adelaide/Adelaide Intl	YPAD	ADL	Y	Y	Y	N	Y
Alice Springs	YBAS	ASP	Y	Y	Y	N	Y
Avalon	YMAV		N	Y	Y	N	Y
Brisbane/Brisbane Intl	YBBN	BNE	Y	Y	Y	N	Y
Broome/Broome Intl	YBRM	BME	N	Y	Y	N	Y
Cairns/Cairns Intl	YBCS	CNS	Y	Y	Y	N	Y
Canberra	YSCB	CBR	N	Y	Y	N	Y
Christmas Island	YPXM		Y	Y	Y	N	Y
Cocos (Keeling) Island Intl	YPCC	CCK	Y	Y	Y	N	Y
Darwin/Darwin Intl	YPDN	DRW	Y	Y	Y	N	Y
Dubbo	YSDU		N	Y	Y	N	Y
Gold Coast	YBCG	OOL	N	Y	Y	N	Y
Gove	YPGV		N	Y	Y	N	Y
Hamilton Island	YBHM	HTI	N	Y	Y	N	Y
Hobart	YMHB	HBA	Y	Y	Y	N	Y
Kalgoorlie-Boulder	YPKG	KGI	N	Y	Y	N	Y
Kununurra	YPKU	KNX	N	Y	Y	N	Y
Learmonth	YPLM	LEA	N	Y	Y	N	Y
Melbourne/Melbourne Intl	YMML	MLB	Y	Y	Y	N	Y
Mount Isa	YBMA	ISA	N	Y	Y	N	Y
Norfolk Island Intl	YSNF	NLK	Y	Y	Y	N	Y
Pearce	YPEA		N	Y	Y	N	Y
Perth/Perth Intl	YPPH	PER	Y	Y	Y	N	Y
Port Hedland	YPPD	PHE	Y	Y	Y	N	Y
Richmond, Nsw	YSRI	RCM	N	Y	Y	N	Y
Rockhampton	YBRK	ROK	Y	Y	Y	N	Y
Sydney/Sydney (Kingsford Smith) Intl	YSSY	SYD	Y	Y	Y	N	Y
Tindal	YPTN		Y	Y	Y	N	Y
Townsville/Townsville Intl	YBTL	TSV	Y	Y	Y	N	Y
ASIA/PAC - BANGLADESH							
M.A. Hannan Intl. Chittagong	VGEG	CGP	Y	Y	Y	N	Y
Zia Intl.Airport,Dhaka	VGZR	DAC	Y	Y	Y	N	Y
ASIA/PAC - BHUTAN							
Paro/Intl	VQPR	PBH	Y	Y	Y	N	N
ASIA/PAC - BRUNEI DARUSSALAM							
Brunei/Intl	WBSB	BWN	Y	Y	Y	N	Y
ASIA/PAC - CAMBODIA							
Phnom Penh	VDPP	PNH	Y	Y	Y	N	Y
Siem Reap	VDSR		Y	Y	Y	N	N
ASIA/PAC - CHILE							
Isla De Pascua/Ad Mataveri	SCIP	IPC	Y	Y	Y	N	Y

ASIA/PAC - CHINA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Beijing/Capital	ZBAA	NAY	Y	Y	Y	N	Y
Changchun/Longjia	ZYCC		N	Y	Y	N	Y
Changsha/Huanghua	ZGHA		Y	Y	Y	N	Y
Chengdu/Shuangliu	ZUUU	CTU	Y	Y	Y	N	Y
Chongqing/Jiangbei	ZUCK		Y	Y	Y	N	Y
Dalian/Zhoushuizi	ZYTL	DLC	Y	Y	Y	N	Y
Fuzhou/Changle	ZSFZ		Y	Y	Y	N	Y
Gaoxiong	RCKH	KHH	Y	Y	Y	N	Y
Guangzhou/Baiyun	ZGGG	CAN	Y	Y	Y	N	Y
Guilin/Lianjiang	ZGKL	KWL	Y	Y	Y	N	Y
Haikou/Meilan	ZJHK	HAK	N	Y	Y	N	Y
Hangzhou/Xiaoshan	ZSHC	HGH	Y	Y	Y	N	Y
Harbin/Taiping	ZYHB	HRB	Y	Y	Y	N	Y
Hefei/Luogang	ZSOF	HFE	Y	Y	Y	N	Y
Huhhot/Baita	ZBHH		Y	Y	Y	N	Y
Jinan/Yaoqiang	ZSJN		Y	Y	Y	N	Y
Kashi/Kashi	ZWSH		Y	Y	Y	N	Y
Kunming/Wujiaba	ZPPP	KMG	Y	Y	Y	N	Y
Lanzhou/Zhongchuan	ZLLL	ZGC	Y	Y	Y	N	Y
Nanjing/Lukou	ZSNJ	NKG	Y	Y	Y	N	Y
Nanning/Wuxu	ZGNN	NNG	Y	Y	Y	N	Y
Qingdao/Liuting	ZSQD	TAO	Y	Y	Y	N	Y
Sanya/Phoenix	ZJSY		Y	N	N	N	N
Shanghai/Hongqiao	ZSSS	SHA	Y	Y	Y	N	Y
Shanghai/Pudong	ZSPD	PVG	Y	Y	Y	N	Y
Shantou/Waisha	ZGOW	SWA	N	Y	Y	N	Y
Shenyang/Taoxian	ZYTX	SHE	Y	Y	Y	N	Y
Shenzhen/Baoan	ZGSZ	SZX	Y	Y	Y	N	Y
Taibei City/Taibei Intl Ap	RCTP	TPE	Y	Y	Y	N	Y
Taibei/Songshan	RCSS	TSA	Y	Y	Y	N	Y
Taiyuan/Wusu	ZBYN	TYN	Y	Y	Y	N	Y
Tianjin/Binhai	ZBTJ	TSN	Y	Y	Y	N	Y
Urumqi/Diwopu	ZWWW	URC	Y	Y	Y	N	Y
Wuhan/Tianhe	ZHHH	WUH	Y	Y	Y	N	Y
Xiamen/Gaoqi	ZSAM	XMN	Y	Y	Y	N	Y
Xi'an/Xianyang	ZLXY	XIY	Y	Y	Y	N	N
Xichang/Quingshan	ZUXC		Y	Y	Y	N	N
ASIA/PAC - COOK ISLANDS							
Rarotonga Intl. Y T F	NCRG	RAR	Y	Y	Y	N	Y
ASIA/PAC - DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA							
Sunan	ZKPY	FNJ	Y	Y	Y	N	Y
ASIA/PAC - FIJI							
Nadi/Intl	NFFN	NAN	Y	Y	Y	N	Y
Nausori/Intl	NFNA		Y	Y	Y	N	N
ASIA/PAC - FRENCH POLYNESIA (FRANCE)							
Nengo-Nengo	NTGG		Y	Y	Y	N	N
Tahiti Faaa	NTAA		Y	Y	Y	N	Y

ASIA/PAC - HONG KONG, CHINA (CHINA)							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Hong Kong/International	VHHH	HKG	Y	Y	Y	N	Y
ASIA/PAC - INDIA							
Ahmedabad	VAAH	AMD	Y	Y	Y	N	Y
Amritsar	VIAR	ATQ	Y	Y	Y	N	Y
Bangalore (Military)	VOBG	BLR	N	Y	Y	N	Y
Bhubaneshwar	VEBS	BBI	N	Y	Y	N	Y
Calicut	VOCL	CCJ	Y	Y	Y	N	Y
Chennai	VOMM	MAA	Y	Y	Y	N	Y
Cochin International Airport	VOCI		N	Y	Y	N	Y
Delhi/Indira Gandhi Intl	VIDP	DEL	Y	Y	Y	N	Y
Hyderabad	VOHY	HYD	N	Y	Y	N	Y
Jaipur	VIJP	JAI	N	Y	Y	N	Y
Lucknow	VILK	LKO	N	Y	Y	N	Y
Mumbai/Chhatrapati Shivaji Intl.	VABB	BOM	Y	Y	Y	N	Y
Nagpur	VANP	NAG	Y	Y	Y	N	Y
Netaji Subhash Chandra Bose Intl Airpt, Kolkata	VECC	CCU	Y	Y	Y	N	Y
Pathankot (Iaf)	VIPK		N	Y	Y	N	Y
Patna	VEPT	PAT	Y	Y	Y	N	Y
Tiruchchirappalli	VOTR		Y	Y	Y	N	Y
Trivandrum	VOTV	TRV	Y	Y	Y	N	Y
Varanasi	VIBN	VNS	Y	Y	Y	N	Y
ASIA/PAC - INDONESIA							
Ambon/Pattimura	WAPP		Y	Y	Y	N	Y
Bali/Ngurah Rai	WADD		Y	Y	Y	N	Y
Balik Papan/Sepinggan	WALL	BPN	Y	Y	Y	N	Y
Banjarmasin/Syamsudin Noor	WAOO		Y	Y	Y	N	N
Batam/Hang Nadim	WIDD	BTH	Y	Y	Y	N	N
Biak/Frans Kaisiepo	WABB		Y	Y	Y	N	Y
Jakarta/Halimperdana Kusuma	WIHH		Y	Y	Y	N	Y
Jakarta/Soekarno Hatta	WIII	CGK	Y	Y	Y	N	N
Jayapura/Sentani	WAJJ	DJJ	Y	Y	Y	N	N
Jogyakarta/Adisucipto	WARJ		N	Y	Y	N	Y
Kupang/El Tari	WATT		Y	Y	Y	N	N
Manado/Sam Ratulangi	WAMM	MDC	Y	Y	Y	N	Y
Mataram/Selaparang	WADA	AMI	N	Y	Y	N	Y
Medan/Polonia	WIMM	MES	Y	Y	Y	N	Y
Merauke/Mopah	WAKK	KOE	Y	Y	Y	N	N
Padang/Tabing	WIMG	PDG	Y	Y	Y	N	N
Palembang/Sultan Mahmud Badaruddin Ii	WIPP	PLM	Y	Y	Y	N	N
Pekanbaru/Sultan Syarif Kasim Ii	WIBB		Y	Y	Y	N	N
Pontianak/Supadio	WIOO	PNK	Y	Y	Y	N	N
Solo/Adi Sumarmo	WARQ	SOL	N	Y	Y	N	Y
Sorong/Jefman	WASS	SOQ	N	Y	Y	N	Y
Surabaya/Juanda	WARR	SUB	Y	Y	Y	N	N
Tanjung Pinang/Kijang	WIDN		Y	Y	Y	N	N
Tarakan/Juwata	WALR		Y	Y	Y	N	N
Timika/Moses Kilangin	WABP		Y	Y	Y	N	N
Ujung Pandang/Hasanuddin	WAAA	UPG	Y	Y	Y	N	Y

ASIA/PAC - JAPAN

Name of Aerodrome	CCCC	IATA	AOP	SA	SP	FC	FT
Chubu Centrair Intl	RJGG		Y	Y	Y	N	Y
Fukuoka	RJFF	FUK	Y	Y	Y	N	Y
Hakodate	RJCH	HKD	Y	Y	Y	N	Y
Hiroshima	RJOA		Y	Y	Y	N	Y
Kagoshima	RJFK	KOJ	Y	Y	Y	N	Y
Kansai Intl	RJBB	KIX	Y	Y	Y	N	Y
Kumamoto	RJFT	KMJ	Y	Y	Y	N	Y
Nagasaki	RJFU	NGS	Y	Y	Y	N	Y
Naha	ROAH	NAH	Y	Y	Y	N	Y
Narita Intl	RJAA	NRT	Y	Y	Y	N	Y
Niigata	RJSN	KIJ	Y	Y	Y	N	Y
Oita	RJFO		Y	Y	Y	N	Y
Okayama	RJOB		Y	Y	Y	N	Y
Osaka Intl	RJOO	ITM	Y	Y	Y	N	Y
Sapporo/New Chitose	RJCC	CTS	Y	Y	Y	N	Y
Sendai	RJSS	SDJ	Y	Y	Y	N	Y
Takamatsu	RJOT		Y	Y	Y	N	Y
Tokyo Intl	RJTT	TYO	Y	Y	Y	N	Y
ASIA/PAC - JOHNSTON ISLAND (UNITED STATES)							
Johnston I./Johnston Atoll	PJON	PON	N	N	N	N	N
ASIA/PAC - KIRIBATI							
christmas island	PLCH		Y	Y	Y	N	Y
tarawa/bonriki intl	NGTA	TRW	Y	Y	Y	N	Y
ASIA/PAC - LAO PEOPLE'S DEMOCRATIC REPUBLIC							
Vientiane(Wattay)	VLVT	VTE	Y	Y	Y	N	Y
ASIA/PAC - MACAO, CHINA (CHINA)							
Macaou/Intl Airport	VMMC	QMP	Y	Y	Y	N	Y
ASIA/PAC - MALAYSIA							
Alor Star/Sultan Abdul Halim	WMKA	AOR	N	Y	Y	N	Y
Bintulu	WBGB	BTU	N	Y	Y	Y	N
Ipoh/Sultan Azlan Shah	WMKI	IPH	N	Y	Y	N	Y
Johor Bahru/Sultan Ismail	WMKJ	JHB	Y	Y	Y	N	Y
Kota Bharu/Sultan Ismail Petra	WMKC	KBR	N	Y	Y	N	N
Kota Kinabalu/Intl	WBKK	BKI	Y	Y	Y	N	Y
Kuala Terengganu/Sultan Mahmud	WMKN	TGG	N	Y	Y	N	Y
Kuantan (Rmaf)	WMKD	KUA	Y	Y	Y	N	N
Kuching/Intl	WBGG	KCH	Y	Y	Y	N	Y
Kuda	WBKT		N	Y	Y	N	N
Labuan (Rmaf)	WBKL	LBU	Y	Y	Y	N	Y
Malacca	WMKM	MKZ	Y	Y	Y	N	N
Mersing	WMAU		N	Y	Y	N	N
Miri Y	WBGR	MYY	Y	Y	Y	N	Y
Penang/Intl	WMKP	PEN	Y	Y	Y	N	Y
Pulau Langkawi/Intl	WMKL	LGK	Y	Y	Y	N	Y
Sandakan	WBKS	SDK	N	Y	Y	N	Y
Sepang/Kl International Airport	WMKK	KUL	Y	Y	Y	N	Y
Sibu	WBGS	SBW	Y	Y	Y	N	Y
Sitiawan	WMBA		N	Y	Y	N	N
Subang/Sultan Abdul Aziz Shah	WMSA	SZB	Y	Y	Y	N	Y
Tawau	WBKW	TWU	Y	Y	Y	N	Y

ASIA/PAC - MALDIVES

Name of Aerodrome	CCCC	IATA	AOP	SA	SP	FC	FT
Gan	VRMG	GAN	Y	Y	Y	N	Y
Male/Intl	VRMM	MLE	Y	Y	Y	N	Y
ASIA/PAC - MARSHALL ISLANDS							
Kwajalein Atoll/Bucholz Aaf, Kiribati	PKWA	KWA	Y	Y	Y	N	Y
Marshall Islands/Intl Majuro Atoll	PKMJ	MAJ	Y	Y	Y	N	Y
ASIA/PAC - MICRONESIA (FEDERATED STATES OF)							
Kosrae,Kosrae Island	PTSA	KSA	N	Y	Y	N	Y
Pohnpei Intl,Pohnpei Island	PTPN	PNI	Y	Y	Y	N	Y
Weno Island ,Fm Chuuk Intl.	PTKK	TKK	Y	Y	Y	N	N
Yap Intl,Yap Island	PTYA	YAP	Y	Y	Y	N	N
ASIA/PAC - MIDWAY (UNITED STATES)°							
Midway Naf (Henderson Field) ,Sand Island	PMDY	MDY	Y	Y	Y	N	Y
ASIA/PAC - MONGOLIA							
Ulaanbaatar	ZMUB	ULN	Y	Y	Y	N	Y
ASIA/PAC - MYANMAR							
Mandalay International	VYMD		N	Y	Y	N	Y
Sittwe	VYSW	AKY	N	Y	Y	N	Y
Yangon International	VYYY	RGN	Y	Y	Y	N	Y
ASIA/PAC - NAURU							
Nauru I.	AUUU		Y	Y	Y	N	Y
ASIA/PAC - NEPAL							
Kathmandu	VNKT	KTM	Y	Y	Y	N	Y
ASIA/PAC - NEW CALEDONIA (FRANCE)							
Noumea La Tontouta	NWWW	NOU	Y	Y	Y	N	Y
ASIA/PAC - New Zealand							
Auckland Intl	NZAA	AKL	Y	Y	Y	N	Y
Christchurch Intl	NZCH		Y	Y	Y	N	Y
Wellington Intl	NZWN	WLG	Y	Y	Y	N	Y
ASIA/PAC - NIUE (NEW ZEALAND)							
Niue Intl	NIUE	IUE	Y	Y	Y	N	Y
ASIA/PAC - NORTHERN MARIANA ISLANDS (UNITED STATES)							
Anderson Afb,Guam Island	PGUA		Y	Y	Y	N	N
Francisco C. Ada/Saipan International, Obyan	PGSN	SPN	Y	Y	Y	N	Y
Guam International, Guam Island	PGUM		Y	Y	Y	N	Y
Rota/Intl,Rota I.	PGRO		Y	Y	Y	N	Y
ASIA/PAC - PAKISTAN							
Faisalabad	OPFA	LYP	N	Y	Y	N	Y
Gwadar	OPGD	GWD	N	Y	Y	N	Y
Islamabad/Chaklala	OPRN	ISB	Y	Y	Y	N	Y
Karachi/Jinnah Int'l	OPKC	KHI	Y	Y	Y	N	Y
Lahore/Allama Iqbal Int'l	OPLA	LHE	Y	Y	Y	N	Y
Multan	OPMT	MUX	N	Y	Y	N	Y
Nawabshah	OPNH	WNS	Y	Y	Y	N	Y
Pasni	OPPI	PSI	Y	Y	Y	N	Y
Peshawar	OPPS	PEW	Y	Y	Y	N	Y
Quetta Y	OPQT	UET	N	Y	Y	N	Y

ASIA/PAC - PALAU							
Babelthuap/Koror, Babelthuap Island	PTRO	ROR	Y	Y	Y	N	Y
ASIA/PAC - PAPUA NEW GUINEA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Daru	AYDU		N	Y	Y	Y	N
Goroka	AYGA		N	Y	Y	Y	N
Madang	AYMD		N	Y	Y	Y	N
Momote	AYMO		N	Y	Y	Y	N
Mount Hagen	AYMH		N	Y	Y	Y	N
Nadzab	AYNZ		N	Y	Y	Y	N
Port Moresby Intl	AYPY	POM	Y	Y	Y	N	Y
Vanimo	AYVN		Y	Y	Y	N	N
Wewak	AYWK		Y	Y	Y	N	N
ASIA/PAC - PHILIPPINES							
Clark Ab, Pampanga	RPLC		N	N	Y	N	Y
Davao/Francisco Bangoy Intl, Davao Del Sur	RPMD	DVO	Y	Y	Y	N	N
General Santos/Buayan,South Cotabato	RPMB		N	N	Y	N	N
Laoag, Laoag Intl, Ilocos Norte	RPLI	LAO	Y	Y	Y	N	N
Lapu-Lapu/Mactan, Cebu	RPVM	MBT	Y	Y	Y	N	Y
Manila/Ninoy Aquino Intl, Pasay City, Metro Manila	RPLL	MNL	Y	Y	Y	N	Y
Puerto Princesa, Palawan	RPVP	PPS	N	Y	Y	N	Y
Subic Bay,Subic Bay Intl, Olongapo City, Zambales	RPLB		Y	Y	Y	N	N
Zamboanga, Zamboanga Intl, Zamboanga Del Norte	RPMZ	ZAM	Y	Y	Y	N	N
ASIA/PAC - REPUBLIC OF KOREA							
Cheongju	RKTU		Y	Y	Y	N	Y
Daegu	RKTN	TAE	Y	Y	Y	N	Y
Gimhae	RKPK	PUS	Y	Y	Y	N	Y
Gimpo	RKSS	SEL	Y	Y	Y	N	Y
Gunsan	RKJK	KUV	N	Y	Y	N	Y
Gwangju	RKJJ	KWJ	N	Y	Y	N	Y
Incheon	RKSI		Y	Y	Y	N	Y
Jeju	RKPC		Y	Y	Y	N	Y
Muan	RKJB		Y	Y	Y	N	N
Osan	RKSO	OSN	N	Y	Y	N	Y
Yangyang	RKNY		Y	Y	Y	N	Y
ASIA/PAC - SAMOA							
Apia	NSAP	APW	Y	Y	Y	N	Y
ASIA/PAC - SINGAPORE							
Paya Lebar (Rsaf)	WSAP	QPG	Y	Y	Y	N	Y
Seletar	WSSL	XSP	Y	Y	Y	N	Y
Singapore/Changi	WSSS	SIN	Y	Y	Y	N	Y
ASIA/PAC - SOLOMON ISLANDS							
Honiara (Henderson)	AGGH		Y	Y	Y	N	Y
ASIA/PAC - SRI LANKA							
Bandaranaike International Airport Colombo	VCBI	RML	Y	Y	Y	N	Y
Higurakgoda/Mineriya	VCCH		Y	Y	Y	N	N
Kankesanturai/Jaffna	VCCJ	JAF	N	Y	Y	N	Y
Ratmalana/Colombo	VCCC	CMB	N	Y	Y	N	Y

ASIA/PAC - THAILAND							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Bangkok/Don Mueang Intl Airport	VTBD	BKK	Y	Y	Y	N	Y
Bangkok/Suvarnabhumi Intl Airport	VTBS		Y	Y	Y	N	Y
Buri Ram	VTUO		N	Y	Y	N	Y
Chiang Mai/Chiang Mai Intl. Airport	VTCC	CNX	Y	Y	Y	N	Y
Chiang Rai/Chiang Rai Intl Airport	VTCT	CEI	Y	Y	Y	N	Y
Chumphon/Tab Gai	VTSE		N	Y	Y	N	Y
Khon Kaen	VTUK	KKL	Y	Y	Y	N	Y
Krabi	VTSG		Y	Y	Y	N	Y
Lampang	VTCL		N	Y	Y	N	Y
Loei	VTUL	LOE	N	Y	Y	N	Y
Mae Hong Son	VTCH	HGN	N	Y	Y	N	Y
Nakhon Phanom	VTUW	KOP	N	Y	Y	N	Y
Nakhon Ratchasima	VTUQ	NAK	N	Y	Y	N	Y
Nakhon Si Thammarat	VTSF		N	Y	Y	N	Y
Nan	VTCN	NNT	N	Y	Y	N	Y
Narathiwat	VTSC	NAW	N	Y	Y	N	Y
Pattani	VTSK		N	Y	Y	N	Y
Phetchabun	VTPB		N	Y	Y	N	Y
Phitsanulok	VTPP	PHS	Y	Y	Y	N	Y
Phrae	VTCP	PRH	N	Y	Y	N	Y
Phuket/Phuket Intl Airport	VTSP	HKT	Y	Y	Y	N	Y
Prachuap Khiri Khan/Hua Hin	VTPH		N	Y	Y	N	Y
Ranong	VTSR		N	Y	Y	N	Y
Rayong/U-Taphao Intl Airport	VTBU		Y	Y	Y	N	Y
Roi Et	VTUV		N	Y	Y	N	Y
Sakon Nakhon/Ban Khai	VTUI	SNO	N	Y	Y	N	Y
Songkhla/Hat Yai Intl Airport	VTSS	HDY	Y	Y	Y	N	Y
ASIA/PAC - THAILAND							
Sura Tahni/Samui	VTSM		N	Y	Y	N	Y
Surat Thani	VTSB	URT	Y	Y	Y	N	Y
Tak/Mae Sot	VTPM		N	Y	Y	N	Y
Trang	VTST	TST	N	Y	Y	N	Y
Ubon Ratchathani	VTUU	UBP	Y	Y	Y	N	Y
Udon Thani	VTUD	UTH	N	Y	Y	N	Y
ASIA/PAC - TONGA							
Fua'amotu Intl	NFTF		Y	Y	Y	N	Y
Vava'u	NFTV		Y	Y	Y	N	Y
ASIA/PAC - TUVALU							
Funafuti/Intl	NGFU		Y	Y	Y	N	Y
ASIA/PAC - UNITED STATES							
Adak Island/Adak Naf,Ak.	PADK		N	Y	Y	N	Y
Anchorage/Elmendorf Afb,Ak.	PAED		Y	Y	Y	N	Y
Annette Island,Ak.	PANT		N	Y	Y	N	Y
Barrow/Wiley Post-Will Rogers Mem,Ak.	PABR		N	Y	Y	N	Y
Barter Island Lrrs,Ak.	PABA		N	Y	Y	N	Y
Bethel,Ak.	PABE		N	Y	Y	N	Y
Bettles,Ak.	PABT		N	Y	Y	N	Y

ASIA/PAC - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Cape Lisburne Lrrs,Ak.	PALU		N	Y	Y	N	Y
Cape Newenham Lrrs,Ak	PAEH		N	Y	Y	N	Y
Cape Romanzof Lrrs,Ak.	PACZ		N	Y	Y	N	Y
Cold Bay,Ak.	PACD		Y	Y	Y	N	Y
Cordova/Merle K (Mudhole) Smith,Ak.	PACV		N	Y	Y	N	Y
Deadhorse,Ak	PASC		N	Y	Y	N	Y
Delta Junction/Allen Aaf,Ak.	PABI		N	Y	Y	N	Y
Dillingham Aprt,Ak.	PADL		N	Y	Y	N	Y
Fairbanks International, Ak.	PAFA		Y	Y	Y	N	Y
Fairbanks/Eielson Afb,Ak	PAEI		Y	Y	Y	N	Y
Fairbanks/Ft Wainwright	PAFB		N	Y	Y	N	Y
Galena,Ak.	PAGA		N	Y	Y	N	Y
Gulkana,Ak	PAGK		N	Y	Y	N	Y
Hilo International, Hilo Hi.	PHTO		Y	Y	Y	N	N
Homer,Ak.	PAHO		N	Y	Y	N	Y
Honolulu International, Oahu, Hi.	PHNL		Y	Y	Y	N	Y
Iliamna,Ak.	PAIL		N	Y	Y	N	Y
Juneau International, Ak.	PAJN		N	Y	Y	N	Y
Kahului, Hi.	PHOG		Y	Y	Y	N	Y
Kenai/Muni,Ak.	PAEN		N	Y	Y	N	Y
Ketchikan Intl,Ak.	PAKT		N	Y	Y	N	Y
King Salmon,Ak.	PAKN		Y	Y	Y	N	Y
Kodiak,Ak.	PADQ		N	Y	Y	N	Y
Kona/Keahole Kailua,Hi.	PHKO		N	Y	Y	N	Y
Kotzebue/Ralph Wien Memorial Ak.	PAOT		N	Y	Y	N	Y
Lahaina/Kapalua-West Maui, Hi.	PHJH		N	Y	Y	N	Y
Lanai City, Lanai,Hi.	PHNY		N	Y	Y	N	Y
Lihue, Kauai,Hi.	PHLI		N	Y	Y	N	Y
Mcgrath,Ak.	PAMC		N	Y	Y	N	Y
Molokai, Kaunakakai,Hi.	PHMK		N	Y	Y	N	Y
Nome,Ak.	PAOM		N	Y	Y	N	Y
Northway,Ak.	PAOR		N	Y	Y	N	Y
Sitka,Ak.	PASI		N	Y	Y	N	Y
Skagway,Ak.	PAGY		N	Y	Y	N	Y
St. Paul Island,Ak.	PASN		N	Y	Y	N	Y
Talkeetna,Ak	PATK		N	Y	Y	N	Y
Tanana/Ralph Calhoun Mem,Ak.	PATA		N	Y	Y	N	Y
Ted Stevens Anchorage International, Ak.	PANC		Y	Y	Y	N	Y
Tin City Lrrs,Ak.	PATC		N	Y	Y	N	Y
Unalakleet,Ak.	PAUN		N	Y	Y	N	Y
Unalaska,Ak.	PADU		N	Y	Y	N	Y
Valdez,Ak.	PAVD		N	Y	Y	N	Y
Yakutat,Ak.	PAYA		N	Y	Y	N	Y
ASIA/PAC - VANUATU							
Port Vila/Bauerfield	NVVV		Y	Y	Y	N	Y
Santo/Pekoa	NVSS		Y	Y	Y	N	Y

ASIA/PAC - VIET NAM							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Da Lat/Lien Khuong Y C P	VVDL		N	Y	Y	Y	N
Da Nang Y T F	VVDN		Y	Y	Y	N	Y
Dien Bien Phu Y C P	VVDB		N	Y	Y	Y	N
Ha Noi/Noi Bai	VVNB		Y	Y	Y	N	Y
Ho Chi Minh/Tan Son Nhat	VVTS		Y	Y	Y	N	Y
Hue/Phu Bai	VVPB		Y	Y	Y	N	Y
Nha Trang	VVNT		N	Y	Y	Y	N
ASIA/PAC - WAKE ISLAND (UNITED STATES)							
Wake Island Airfield,Wake I.	PWAK		N	Y	Y	N	Y
ASIA/PAC - WALLIS AND FUTUNA ISLANDS (FRANCE)							
Wallis Hihifo	NLWW		Y	Y	Y	N	N
Da Lat/Lien Khuong	VVDL		N	Y	Y	Y	N
Da Nang	VVDN		Y	Y	Y	N	Y
Dien Bien Phu	VVDB		N	Y	Y	Y	N
Ha Noi/Noi Bai	VVNB		Y	Y	Y	N	Y
Ho Chi Minh/Tan Son Nhat	VVTS		Y	Y	Y	N	Y
Hue/Phu Bai	VVPB		N	Y	Y	Y	N
Nha Trang	VVNT		N	Y	Y	Y	N

ANNEX 1 – CAR/SAM

CAR/SAM - ANGUILLA (UNITED KINGDOM)							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Wallblake,Anguilla	TQPF	AXA	Y	Y	Y	N	Y
CAR/SAM - ANTIGUA AND BARBUDA							
V.C.Bird,Antigua	TAPA		Y	Y	Y	N	Y
CAR/SAM - ARGENTINA							
Aeroparque J. Newbery, Caba	SABE	AEP	Y	Y	Y	N	Y
Comodoro Rivadavia/Gral Mosconi,Cht	SAVC		Y	Y	Y	N	Y
Cordoba/Ing. A.L.V. Taravella Cba	SACO	COR	Y	Y	Y	N	Y
Ezeiza Ministro Pistarini, Ba	SAEZ	EZE	Y	Y	Y	N	Y
Formosa,F	SARF	FMA	N	Y	Y	N	Y
Iguazu/Cataratas Del Iguazu, Ms	SARI	IGR	Y	Y	Y	N	Y
Jujuy,J.	SASJ	JUJ	Y	Y	Y	N	Y
Mar Del Plata,Ba	SAZM	MDX	Y	Y	Y	N	Y
Mendoza/El Plumerillo,Mza	SAME	MDZ	Y	Y	Y	N	Y
Neuquen,N	SAZN		Y	Y	Y	N	Y
Posadas,Ms	SARP		N	Y	Y	N	Y
Resistencia,Cho	SARE	RES	Y	Y	Y	N	Y
Rio Gallegos/Brig. Gral. D.A. Parodi (Sc)	SAWG	RGL	Y	Y	Y	N	Y
Rosario,Sf	SAAR	RSJ	Y	Y	Y	N	Y
Salta,S.	SASA		Y	Y	Y	N	Y
San Carlos De Bariloche,Rn	SAZS		Y	Y	Y	N	Y
San Fernando,Ba	SADF		Y	Y	Y	N	Y
Tucuman/Ten. Benjamin Matienzo,T	SANT		N	Y	Y	N	Y
Ushuaia/Malvinas Argentinas (Tais)	SAWH		N	Y	Y	N	Y
CAR/SAM - ARUBA (NETHERLANDS)							
Oranjestad/Beatrix	TNCA	AUA	Y	Y	Y	N	Y
CAR/SAM - BAHAMAS							
George Town	MYEG		Y	Y	Y	N	Y
Governor's Harbour	MYEM		Y	Y	Y	N	Y
Grand Bahama International	MYGF	FPO	Y	Y	Y	N	Y
Marsh Harbour	MYAM		Y	Y	Y	N	Y
Nassau International	MYNN	NAS	Y	Y	Y	N	Y
North Eleuthera	MYEH		Y	Y	Y	N	Y
Rock Sound	MYER	RSD	N	Y	Y	N	Y
San Salvador International	MYSM		Y	Y	Y	N	Y
South Bimini	MYBS		Y	Y	Y	N	Y
Stella Maris	MYLS		Y	Y	Y	N	Y
Treasure Cay	MYAT		Y	Y	Y	N	Y
CAR/SAM - BARBADOS							
Grantley Adams,Barbados	TBPB	BGI	Y	Y	Y	N	Y
CAR/SAM - BELIZE							
philip s.w. goldson international	MZBZ	BZE	Y	Y	Y	N	Y

CAR/SAM - BOLIVIA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Cobija	SLCO	CIJ	N	Y	Y	N	Y
Cochabamba	SLCB	CBB	Y	Y	Y	N	Y
El Trompillo	SLET		N	Y	Y	N	Y
La Paz Y	SLLP	LPB	Y	Y	Y	N	Y
Potosi	SLPO	POI	N	Y	Y	N	Y
Puerto Suarez	SLPS	PSZ	N	Y	Y	N	Y
Sucre	SLSU	SRE	N	Y	Y	N	Y
Tarija	SLTJ		Y	Y	Y	N	Y
Trinidad	SLTR	TOO	Y	Y	Y	N	Y
Viru Viru	SLVR	VVI	Y	Y	Y	N	Y
CAR/SAM - BRAZIL							
Belem/Val De Cans, Pa	SBBE	BEL	Y	Y	Y	N	Y
Belo Horizonte/Tancredo Neves,Mg	SBCF	CNF	Y	Y	Y	N	Y
Boa Vista/Boa Vista, Rr	SBBV	BVB	Y	Y	Y	N	Y
Brasilia/Pres. Juscelino Kubitschek, Df	SBBR	BSB	Y	Y	Y	N	Y
Campinas/Viracopos,Sp	SBKP	CPQ	Y	Y	Y	N	Y
Campo Grande/Campo Grande, Ms	SBCG	CGR	Y	Y	Y	N	Y
Corumba/Corumba, Ms	SBCR		Y	Y	Y	N	Y
Cruzeiro Do Sul/Cruzeiro Do Sul, Ac	SBCZ		Y	Y	Y	N	Y
Cuiaba/Marechal Rondon, Mt	SBCY		Y	Y	Y	N	Y
Curitiba/Afonso Pena, Pr	SBCT	CWB	Y	Y	Y	N	Y
Florianopolis/Hercilio Luz,Sc	SBFL	FLN	Y	Y	Y	N	Y
Fortaleza/ Pinto Martins, Ce	SBFZ	FOR	Y	Y	Y	N	Y
Foz Do Iguacu/Cataratas, Pr	SBFI	IGU	Y	Y	Y	N	Y
Macapa/Macapa, Ap	SBMQ	MCP	Y	Y	Y	N	Y
Maceio/Zumbi Dos Palmares, Al	SBMO	MCZ	Y	Y	Y	N	Y
Manaus/Eduardo Gomes, Am	SBEG	MAO	Y	Y	Y	N	Y
Natal/Augusto Severo, Rn	SBNT	NAT	Y	Y	Y	N	Y
Ponta Pora/Ponta Pora, Ms	SBPP		Y	Y	Y	N	Y
Porto Alegre/Salgado Filho, Rs	SBPA	PGP	Y	Y	Y	N	Y
Recife/Guararapes - Gilberto Freyre, Pe	SBRF	REC	Y	Y	Y	N	Y
Rio De Janeiro/Galeao-Antonio Carlos Jobim, Rj	SBGL	GIG	Y	Y	Y	N	Y
Salvador/Deputado Luis Eduardo Magalhaes, Ba	SBSV	SSA	Y	Y	Y	N	Y
Santarem/Santarem,Pa	SBSN		Y	Y	Y	N	Y
Sao Luis/Marechal Cunha Machado,Ma	SBSL	SLZ	Y	Y	Y	N	N
Sao Paulo/Guarulhos, Governador A. F. Montoro, Sp	SBGR	GRU	Y	Y	Y	N	N
Tabatinga/Tabatinga, Am	SBTT	TBT	Y	Y	Y	N	N
Uruguaiana/Rubem Berta, Rs	SBUG		Y	Y	Y	N	N
CAR/SAM - BRITISH VIRGIN ISLANDS (UNITED KINGDOM)							
Terrance B. Lettsome,Tortola	TUPJ		Y	Y	Y	N	Y
Virgin Gorda,B.V.	TUPW		Y	Y	Y	N	Y
CAR/SAM - CAYMAN ISLANDS (UNITED KINGDOM)							
Gerrard Smith Intl/Cayman Brac	MWCB	CYB	Y	Y	Y	N	Y
Owen Roberts Intl/Grand Cayman	MWCR	GCM	Y	Y	Y	N	Y

CAR/SAM - CHILE							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Antofagasta/Ad Cerro Moreno	SCFA	ANF	Y	Y	Y	N	Y
Arica/Ap Chacalluta	SCAR	ARI	Y	Y	Y	N	Y
Balmaceda/Ad Balmaceda	SCBA		N	Y	Y	N	Y
Calama/Ad El Loa	SCCF		N	Y	Y	N	Y
Concepcion/Ad Carriel Sur	SCIE	CCP	Y	Y	Y	N	Y
Copiapo/Ad Desierto De Atacama	SCAT		N	Y	Y	N	Y
Iquique/Ad Diego Aracena	SCDA	IQQ	Y	Y	Y	N	Y
La Serena/Ad La Florida	SCSE		N	Y	Y	N	Y
Osorno/Ad Canal Bajo-Carlos Hott Siebert	SCJO		N	Y	Y	N	Y
Pto. Natales/Ad Teniente Julio Gallardo	SCNT		N	Y	Y	N	Y
Puerto Montt/Ad El Tepual	SCTE	PMC	Y	Y	Y	N	Y
Punta Arenas/Ad Pdte. Carlos Ibanez	SCCI	PUQ	Y	Y	Y	N	Y
Santiago/Ap Arturo Merino B. Y T F	SCEL	SCL	Y	Y	Y	N	Y
Temuco/Ad Maquehue Y T F	SCTC		N	Y	Y	N	Y
CAR/SAM - COLOMBIA							
Barranquilla/Atlantico	SKBQ	BAQ	Y	Y	Y	N	Y
Bucaramanga/Santander	SKBG	BGA	N	Y	Y	N	Y
Cali/Valle	SKCL	CLO	Y	Y	Y	N	Y
Cartagena/Bolivar	SKCG	CTG	Y	Y	Y	N	Y
Cucuta/N.S/Der	SKCC		Y	Y	Y	N	Y
Leticia/Amazonas	SKLT	LET	Y	Y	Y	N	Y
Pereira/Risaralda	SKPE	PEI	N	Y	Y	N	Y
Rionegro/Antioquia	SKRG	MDE	Y	Y	Y	N	Y
S/Fe De Bogota/C/Marca	SKBO	BOG	Y	Y	Y	N	Y
San Andres/Ilsa	SKSP	ADZ	Y	Y	Y	N	Y
CAR/SAM - COSTA RICA							
Alajuela/Juan Santamaria Intl.	MROC	SJO	Y	Y	Y	N	Y
Liberia/Daniel Oduber Quiros Intl.	MRLB	LIR	Y	Y	Y	N	Y
Limon/Intl.	MRLM	LIO	Y	Y	Y	N	Y
Pavas/Tobias Bolanos Intl.	MRPV		Y	Y	Y	N	Y
CAR/SAM - Cuba							
Camaguey/Ignacio Agramonte Intl	MUCM	CMW	Y	Y	Y	N	Y
Cayo Coco/Jardines Del Rey	MUCC		N	Y	Y	N	Y
Cayo Largo Del Sur/Vilo Acuna Intl.	MUCL		Y	Y	Y	N	Y
Ciego De Avila/Maximo Gomez	MUCA		Y	Y	Y	N	Y
Habana/Jose Marti Intl.	MUHA	HAV	Y	Y	Y	N	Y
Holguin/Frank Pais Intl. - Civ/Mil	MUHG	HOG	Y	Y	Y	N	Y
Santiago De Cuba/Antonio Maceo Intl	MUCU	SCU	Y	Y	Y	N	Y
Varadero/Juan G. Gomez Intl	MUVR	VRA	Y	Y	Y	N	Y
CAR/SAM - DOMINICA							
Melville Hall,Dominica	TDPD	DOM	Y	Y	Y	N	Y
Roseau,Dominica	TDPR		Y	Y	Y	N	Y
CAR/SAM - DOMINICAN REPUBLIC							
Barahona	MDBH		Y	Y	Y	N	Y
La Romana/Intl	MDLR	LRM	Y	Y	Y	N	Y
Puerto Plata	MDPP	POP	Y	Y	Y	N	Y
Punta Cana	MDPC	PUJ	Y	Y	Y	N	Y
Santiago/Cibao	MDST	STI	Y	Y	Y	N	Y
Santo Domingo/Herrera	MDHE		Y	Y	Y	N	Y
Santo Domingo/Jose Francisco Pena Gomez	MDSD	SDX	Y	Y	Y	N	Y

CAR/SAM - ECUADOR							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Guayaquil	SEGU	GYE	Y	Y	Y	N	Y
Latacunga	SELT		Y	Y	Y	N	Y
Manta	SEMT	MEC	Y	Y	Y	N	Y
Quito	SEQU	UIO	Y	Y	Y	N	Y
CAR/SAM - EL SALVADOR							
Aeropuerto Internacional De Ilopango	MSSS		Y	Y	Y	N	Y
Aeropuerto Internacional El Savador	MSLP	SAL	Y	Y	Y	N	Y
CAR/SAM - FRENCH ANTILLES (FRANCE)							
Fort-De-France-Le Lamentin	TFFF	FDF	Y	Y	Y	N	Y
Pointe-A-Pitre-Le Raizet	TFFR	PTP	Y	Y	Y	N	Y
Saint-Barthelemy	TFFJ		Y	Y	Y	N	Y
Saint-Martin-Grand Case	TFFG		Y	Y	Y	N	Y
CAR/SAM - FRENCH GUIANA (FRANCE)							
Cayenne-Rochambeau	SOCA	CAY	Y	Y	Y	N	Y
CAR/SAM - GRENADA							
Lauriston, Carriacou, Grenada, Grenadines	TGPZ		Y	Y	Y	N	Y
Point Salines, Grenada	TGPY		Y	Y	Y	N	Y
CAR/SAM - GUATEMALA							
La Aurora	MGGT	GUA	Y	Y	Y	N	Y
Puerto Barrios	MGPB	PBR	Y	Y	Y	N	Y
Puerto De San Jose	MGSJ	SJS	Y	Y	Y	N	Y
Tikal	MGTK	TKM	Y	Y	Y	N	Y
CAR/SAM - GUYANA							
Cheddi Jagan International	SYCJ	GEO	Y	Y	Y	N	Y
CAR/SAM - HAITI							
Cap Haitien	MTCH		Y	Y	Y	N	Y
Port-Au-Prince/Intl	MTPP	PAP	Y	Y	Y	N	Y
CAR/SAM - HONDURAS							
La Ceiba/Goloson Intl	MHLC	LCE	Y	Y	Y	N	Y
Roatan Intl.	MHRO		Y	Y	Y	N	Y
San Pedro Sula/La Mesa	MHLM	SAP	Y	Y	Y	N	Y
Tegucigalpa/Toncontin	MHTG	TGU	Y	Y	Y	N	Y
CAR/SAM - JAMAICA							
Kingston/Norman Manley	MKJP	KIN	Y	Y	Y	N	Y
Montego Bay/Sangster	MKJS	MBJ	Y	Y	Y	N	Y
CAR/SAM - MEXICO							
Acapulco	MMAA	ACA	Y	Y	Y	N	Y
Aeropuerto Del Norte	MMAN	NTR	Y	Y	Y	N	Y
Aguascalientes	MMAS	AGU	N	Y	Y	N	Y
Bahias De Huatulco	MMBT	HUX	Y	Y	Y	N	Y
Campeche	MMCP		Y	Y	Y	N	Y
Cancun	MMUN	CUN	Y	Y	Y	N	Y
Cd. Juarez	MMCS	CJS	Y	Y	Y	N	Y
Cd. Victoria	MMCV	CVM	Y	Y	Y	N	Y
Chetumal	MMCM	CTM	Y	Y	Y	N	Y
Chihuahua	MMCU	CUU	Y	Y	Y	N	Y

CAR/SAM - MEXICO							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Ciudad Acuna	MMCC		Y	Y	Y	N	Y
Ciudad Del Carmen	MMCE	CME	N	Y	Y	N	Y
Ciudad Obregon	MMCN	CEN	N	Y	Y	N	Y
Colima	MMIA		N	Y	Y	N	Y
Cozumel	MMCZ		N	Y	Y	N	Y
Cuernavaca	MMCB		N	Y	Y	N	Y
Culiacan	MMCL		Y	Y	Y	N	Y
Durango	MMDO		Y	Y	Y	N	Y
Guadalajara	MMGL	GDL	Y	Y	Y	N	Y
Guaymas	MMGM	GYM	Y	Y	Y	N	Y
Hermosillo	MMHO	HMO	Y	Y	Y	N	Y
Ixtapa-Zihuatanejo	MMZH		Y	Y	Y	N	Y
La Paz	MMLP	LAP	Y	Y	Y	N	Y
Leon	MMLO		Y	Y	Y	N	Y
Loreto	MMLT	LTO	Y	Y	Y	N	Y
Los Mochis	MMLM		N	Y	Y	N	Y
Manzanillo	MMZO	ZLO	Y	Y	Y	N	Y
Matamoros	MMMA	MAM	Y	Y	Y	N	Y
Mazatlan	MMMZ		Y	Y	Y	N	Y
Merida	MMMD	MID	Y	Y	Y	N	Y
Mexicali	MMML	MXL	Y	Y	Y	N	Y
Mexico	MMMX	MEX	Y	Y	Y	N	Y
Minatitlan	MMMT		N	Y	Y	N	Y
Monterrey	MMMY	MTY	Y	Y	Y	N	Y
Morelia	MMMM		Y	Y	Y	N	Y
Nogales	MMNG		Y	Y	Y	N	Y
Nuevo Laredo	MMNL	NLD	Y	Y	Y	N	Y
Oaxaca	MMOX	OAX	N	Y	Y	N	Y
Piedras Negras	MMPG		Y	Y	Y	N	Y
Poza Rica	MMPA		N	Y	Y	N	Y
Puebla	MMPB		N	Y	Y	N	Y
Puerto Escondido	MMPS	PXM	N	Y	Y	N	Y
Puerto Vallarta	MMPR	PVR	Y	Y	Y	N	Y
Queretaro	MMQT		Y	Y	Y	N	Y
Reynosa	MMRX	REX	Y	Y	Y	N	Y
Saltillo	MMIO		N	Y	Y	N	Y
San Felipe	MMSF		Y	Y	Y	N	Y
San Jose Del Cabo	MMSD	SJD	Y	Y	Y	N	Y
San Luis Potosi	MMSP	SLP	N	Y	Y	N	Y
Tampico	MMTM	TAM	Y	Y	Y	N	Y
Tapachula	MMTP	TAP	Y	Y	Y	N	Y
Tepic	MMEP		N	Y	Y	N	Y
Tijuana	MMTJ	TIJ	Y	Y	Y	N	Y
Toluca	MMTO	TLC	Y	Y	Y	N	Y

CAR/SAM - MEXICO							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Torreon	MMTC	TRC	Y	Y	Y	N	Y
Tuxtla Gutierrez (Civ)	MMTG		N	Y	Y	N	Y
Uruapan	MMPN		N	Y	Y	N	Y
Veracruz	MMVR	VER	Y	Y	Y	N	Y
Villahermosa	MMVA	VSA	Y	Y	Y	N	Y
Zacatecas	MMZC		Y	Y	Y	N	Y
CAR/SAM - MONTSERRAT (UNITED KINGDOM)							
Gerald's Airport, Montserrat Trpg	TRPG	MNI	Y	Y	Y	N	Y
CAR/SAM - NETHERLANDS ANTILLES (NETHERLANDS)							
Bonaire/Flamingo	TNCB	BON	Y	Y	Y	N	Y
Curacao/Aeropuerto Hato	TNCC	CUR	Y	Y	Y	N	Y
St. Eustatius/F.D Roosevelt	TNCE		Y	Y	Y	N	Y
St. Maarten/Princess Juliana	TNCM	SXM	Y	Y	Y	N	Y
CAR/SAM - NICARAGUA							
Managua//Managua	MNMG	MGA	Y	Y	Y	N	Y
Puerto Cabezas/Zelaya	MNPC	PUZ	Y	Y	Y	N	Y
CAR/SAM - PANAMA							
Bocas Del Toro/Bocas Del Toro	MPBO		Y	Y	Y	N	Y
Changuinola/Manuel Nino	MPCH		Y	Y	Y	N	Y
David/Enrique Malek	MPDA		Y	Y	Y	N	Y
Panama/Marcos A. Gelabert	MPMG		Y	Y	Y	N	Y
Panama/Tocumen	MPTO	PTY	Y	Y	Y	N	Y
CAR/SAM - PARAGUAY							
Asuncion/S.Pettirossi	SGAS	ASU	Y	Y	Y	N	Y
Ciudad Del Este/Guarani	SGES	AGT	Y	Y	Y	N	Y
CAR/SAM - PERU							
Andahuaylas	SPHY		N	Y	Y	N	Y
Arequipa/Rodriguez Ballon	SPQU	AQP	Y	Y	Y	N	Y
Ayacucho/Coronel Fap Alfredo Mendivil Duarte	SPHO		N	Y	Y	N	Y
Cajamarca/Mayor General Fap Armando Revoredo I.	SPJR		N	Y	Y	N	Y
Chiclayo/Cap. Jose Abelardo Quinones Gonzalez	SPHI	CIX	Y	Y	Y	N	Y
Cusco/Velazco Astete	SPZO	CUZ	Y	Y	Y	N	Y
Ilo	SPLO		N	Y	Y	N	Y
Iquitos/Coronel Fap Francisco Secada Vignetta	SPQT	IQT	Y	Y	Y	N	Y
Juanjui	SPJI		N	Y	Y	N	Y
Juliaca	SPJL	JUL	N	Y	Y	N	Y
Lima-Callao/Intl Jorge Chavez	SPIM	LIM	Y	Y	Y	N	Y
Pisco	SPSO	PIO	Y	Y	Y	N	Y
Pto. Maldonado/Padre Aldamiz	SPTU		N	Y	Y	N	Y
Pucallpa/David Abensur R.	SPCL		N	Y	Y	N	Y
Tacna/Coronel Fap Carlos Ciriani Santa Rosa	SPTN		Y	Y	Y	N	Y
Talara/Capitan Montes	SPYL	TYL	N	Y	Y	N	Y
Tarapoto/Cdte. Guillermo Del Castillo Paredes	SPST		N	Y	Y	N	Y
Tingo Maria	SPGM		N	Y	Y	N	Y
Trujillo/Capitan Carlos Martinez De Pinillos	SPRU	TRU	Y	Y	Y	N	Y
Tumbes/Pedro Canga	SPME		N	Y	Y	N	Y
Yurimaguas/Moises Benzaquen Rengifo	SPMS		N	Y	Y	N	Y

CAR/SAM - PUERTO RICO (UNITED STATES)							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**

Aguadilla/Raphael Hernandez Pr	TJBQ	BQN	Y	Y	Y	N	Y
Fajardo/Diego Jimenez Torres Pr.	TJFA		Y	Y	Y	N	Y
Mayaguez/Eugenio Maria De Hostos, Pr.	TJMZ	MAZ	N	Y	Y	N	Y
Ponce/Mercedita,Pr.	TJPS	PSE	Y	Y	Y	N	Y
Roosevelt Roads Nas,Pr.	TJNR	NRR	N	Y	Y	N	Y
San Juan/Luis Munoz Marin International, Pr	TJSJ	SJU	Y	Y	Y	N	Y
Vieques,Isla De Viques,Pr. Y T	TJVQ		Y	Y	Y	N	Y
CAR/SAM - SAINT KITTS AND NEVIS							
Robert L. Bradshaw, St. Christopher And Nevis	TKPK	SKB	Y	Y	Y	N	Y
Vance Winkworth Amory, St. Christopher And Nevis	TKPN		Y	Y	Y	N	Y
CAR/SAM - SAINT LUCIA							
George Charles, Saint Lucia	TLPC	SLU	Y	Y	Y	N	Y
Hewanorra Saint Lucia	TLPL	UVF	Y	Y	Y	N	Y
CAR/SAM - SAINT VINCENT AND THE GRENADINES							
Canouan,St.Vincent And The Grenadines	TVSC		Y	Y	Y	N	Y
E.T.Joshua,St.Vincent, And The Grenadines	TVSV	SVD	Y	Y	Y	N	Y
J.F. Mitchell,Bequia St.Vincent And The Grenadines	TVSB		Y	Y	Y	N	N
Mustique,St.Vincent And The Grenadines	TVSM		Y	Y	Y	N	Y
Union Island,St.Vincent And The Grenadines	TVSU		Y	Y	Y	N	Y
CAR/SAM - SURINAME							
J.A. Pengel Intl.Airp	SMJP	PBM	Y	Y	Y	N	Y
Nickerie/Maj. Fernandes	SMNI		Y	Y	Y	N	Y
Zorg En Hoop	SMZO		Y	Y	Y	N	Y
CAR/SAM - TRINIDAD AND TOBAGO							
Crown Point,Togago	TTCP		Y	Y	Y	N	Y
Piarco,Trinidad	TTPP	POS	Y	Y	Y	N	Y
CAR/SAM - TURKS AND CAICOS ISLANDS (UNITED KINGDOM)							
Grand Turk	MBGT		Y	Y	Y	N	Y
Providenciales	MBPV		Y	Y	Y	N	Y
South Caicos	MBSC	XSC	Y	Y	Y	N	Y
CAR/SAM - UNITED KINGDOM							
Mount Pleasant	EGYP		N	Y	Y	Y	N
CAR/SAM - URUGUAY							
Colonia/Intl "Laguna De Los Patos"	SUCA	CYR	Y	Y	Y	N	Y
Durazno/Santa Bernardina Intl. De Alternativa	SUDU		N	Y	Y	N	Y
Maldonado/ Intl C/C Carlos A.Curbelo "Lag. D. S."	SULS		Y	Y	Y	N	Y
Montevideo/Ad Angel S. Adami	SUAA		Y	Y	Y	N	Y
Montevideo/Intl.Carrasco "Gral. Cesareo L. Berisso"	SUMU	MVD	Y	Y	Y	N	Y
Rivera/Intl. P. G. (Pil. A.M.) Don Oscar D. Gestido	SURV		Y	Y	Y	N	Y
Salto/Intl.Nueva Hesperides	SUSO		Y	Y	Y	N	Y
CAR/SAM - VENEZUELA							
Acarigua, Portuguesa	SVAC	AGV	N	Y	Y	N	Y
B.A. Generalisimo Francisco De M., Caracas, M.	SVFM		N	Y	Y	N	Y
Barcelona, Anzoategui	SVBC	BLA		Y	Y	N	Y
Barinas, Barinas	SVBI	BNS		Y	Y	N	Y
Barquisimeto, Lara	SVBM	BRM	N	Y	Y	N	Y
Calabozo, Guarico	SVCL	CLZ	N	Y	Y	N	Y
Ciudad Bolivar, Bolivar	SVCB	CBL	N	Y	Y	N	Y
Coro, Falcon	SVCR	CZE	N	Y	Y	N	Y

CAR/SAM - VENEZUELA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Cumana, Sucre	SVCU		N	Y	Y	N	Y
Guanare, Portuguesa	SVGU	GUQ	N	Y	Y	N	Y
Guiria, Sucre	SVGI		N	Y	Y	N	Y
Maiquetia, Internacional Simon Bolivar, M., Vargas	SVMI		N	Y	Y	N	Y
Maracaibo, Zulia	SVMC	MAR		Y	Y	N	Y
Margarita, Nueva Esparta	SVMG	MRX		Y	Y	N	Y
Maturin,Monagas	SVMT	MUN	N	Y	Y	N	Y
Merida, Merida	SVMD	MRD	N	Y	Y	N	Y
Paraguana, Josefa Camejo, Falcon	SVJC			Y	Y	N	Y
Puerto Ayacucho, Amazonas	SVPA		N	Y	Y	N	Y
San Antonio Del Tachira, Tachira	SVSA			Y	Y	N	Y
San Fernando De Apure,Apure	SVSR	SFD	N	Y	Y	N	Y
San Juan De Los Morros, Guarico	SVJM		N	Y	Y	N	Y
Santo Domingo, B.A.M. Buenaventura Vivas,Tachira	SVSO	STD	N	Y	Y	N	Y
Tumeremo, Bolivar	SVTM		N	Y	Y	N	Y
Valencia, Carabobo	SVVA	VLN	N	Y	Y	N	Y
Valle De La Pascua, Guarico	SVVP		N	Y	Y	N	Y
CAR/SAM - VIRGIN ISLANDS (UNITED STATES)							
Charlotte Amalie St. Thomas/Cyril E. King, Vi.	TIST		Y	Y	Y	N	Y
Henry.E.Rohlsen	TISX	STX	Y	Y	Y	N	Y

ANNEX 1 – EUR

EUR - ALBANIA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Tirana	LATI	TIA	Y	Y	Y	N	Y
EUR - ARMENIA							
Gyumri	UDSG		Y	Y	Y	N	Y
Stepanavan	UDLS		Y	Y	Y	N	Y
Yerevan	UDYZ	EVN	Y	Y	Y	N	Y
EUR - AUSTRIA							
Graz	LOWG	GRZ	Y	Y	Y	Y	N
Hohenems-Dornbirn	LOIH	HOH	Y	Y	Y	Y	N
Innsbruck	LOWI		Y	Y	Y	N	Y
Klagenfurt	LOWK	KLU	Y	Y	Y	N	Y
Linz	LOWL	LNZ	Y	Y	Y	N	Y
Salzburg	LOWS	SZG	Y	Y	Y	N	Y
St. Johann/Tirol	LOIJ		Y	N	N	N	N
Voslau	LOAV		Y	Y	Y	Y	N
Wels	LOLW		Y	N	N	N	N
Wien-Schwechat	LOWW	VIE	Y	Y	Y	N	Y
Wr. Neustadt/Ost	LOAN		N	Y	Y	Y	N
Zell Am See	LOWZ		Y	Y	Y	N	N
Zeltweg Mil	LOXZ		N	Y	Y	N	N
EUR - AZERBAIJAN							
Ganja	UBBG		Y	Y	Y	Y	N
Heydar Aliyev International Airport	UBBB	BAK	Y	Y	Y	N	Y
Nakhchivan	UBBN		Y	Y	Y	Y	N
EUR - BELARUS							
Brest	UMBB	BQT	Y	Y	Y	Y	N
Gomel	UMGG	GME	Y	Y	Y	Y	N
Grodno	UMMG	GNA	Y	Y	Y	Y	N
Lipki	UMMI		N	Y	Y	Y	N
Minsk-1	UMMM	MSQ	Y	Y	Y	Y	N
Minsk-2	UMMS		Y	Y	Y	Y	N
Mogilev	UMOO		Y	N	N	N	N
Vitebsk	UMII		Y	N	N	N	N
EUR - BELGIUM							
Antwerpen/Deurne	EBAW	ANR	Y	Y	Y	Y	N
Balen/Keiheuvel	EBKH		Y	N	N	N	N
Brussels/Brussels-National	EBBR	BRU	Y	Y	Y	N	Y
Charleroi/Brussels South	EBCI	CRL	Y	Y	Y	Y	N
Genk/Zwartberg	EBZW		Y	N	N	N	N
Grimbergen/Lint	EBGB		Y	N	N	N	N
Kortrijk/Wevelgem	EBKT		Y	N	N	N	N
Liege/Liege (Civ)	EBLG	LGG	Y	Y	Y	Y	N
Oostende-Brugge/Oostende	EBOS	OST	Y	Y	Y	N	Y
Saint-Hubert/Saint-Hubert	EBSH		Y	N	N	N	N
Spa/La Sauveniere	EBSP		Y	N	N	N	N
Tournai/Maubray	EBTY		Y	N	N	N	N

EUR - BOSNIA AND HERZEGOVINA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Banja Luka	LQBK		Y	Y	Y	Y	N
Mostar	LQMO		Y	Y	Y	N	N
Sarajevo	LQSA	SJJ	Y	Y	Y	Y	N
Tuzla	LQTZ		Y	Y	Y	N	N
EUR - BULGARIA							
Burgas	LBBG	BOJ	Y	Y	Y	Y	N
Gorna Oryahovitsa	LBGO		N	Y	Y	Y	N
Plovdiv	LBPD	PDV	N	Y	Y	Y	N
Sofia	LBSF	SOF	Y	Y	Y	N	Y
Varna	LBWN	VAR	Y	Y	Y	N	Y
EUR - CROATIA							
Brac/Brac I	LDSB		Y	Y	Y	N	N
Dubrovnik/Cilipi	LDDU	DBV	Y	Y	Y	N	Y
Losinj/Losinj I.	LDLO						
Osijek/Klisa	LDOS		Y	Y	Y	Y	N
Pula/Pula	LDPL	PUY	Y	Y	Y	N	Y
Rijeka/Krk I.	LDRI	RJK	Y	Y	Y	Y	N
Split/Kastela	LDSP	SPU	Y	Y	Y	N	Y
Vrsar/Crljenka	LDPV		Y	N	N	N	N
Zadar/Zemunik	LDZD	ZAD	Y	Y	Y	Y	N
Zagreb/Pleso	LDZA	ZAG	Y	Y	Y	N	Y
EUR - CYPRUS							
Larnaka/Intl	LCLK	LCA	Y	Y	Y	N	Y
Nicosia/Intl (Dca)	LCNC		Y	Y	Y	N	Y
Pafos/Intl	LCPH	PFO	Y	Y	Y	N	Y
EUR - CZECH REPUBLIC							
Brno/Turany	LKTB	BRQ	Y	Y	Y	N	Y
Holesov	LKHO	GTW	N	Y	Y	N	N
Karlovy Vary	LKKV	KLV	Y	Y	Y	Y	N
Kunovice	LKKU		N	Y	Y	Y	N
Ostrava/Mosnov	LKMT	OSR	Y	Y	Y	N	Y
Pardubice	LKPD		Y	Y	Y	N	N
Praha/Ruzyne	LKPR		Y	Y	Y	N	Y
EUR - DENMARK							
Aalborg (Civ/Mil)	EKYT	AAL	Y	Y	Y	N	Y
Aarhus	EKAH	AAR	Y	Y	Y	Y	N
Billund	EKBI		Y	Y	Y	N	Y
Bornholm/Ronne	EKRN	RNN	Y	Y	Y	Y	N
Esbjerg	EKEB	EBJ	Y	Y	Y	Y	N
Karup (Mil)	EKKA		Y	Y	Y	Y	N
Kobenhavn/Kastrup	EKCH	CPH	Y	Y	Y	N	Y
Kobenhavn/Roskilde	EKRK	RKE	Y	Y	Y	Y	N
Kolding/Vamdrup	EKVD		Y	Y	Y	Y	N
Lolland Falster/Maribo	EKMB	MRW	Y	Y	Y	Y	N
Odense	EKOD	ODE	Y	Y	Y	Y	N
Sindal	EKSN	CNL	Y	Y	Y	Y	N
Skive	EKSV		Y	Y	Y	Y	N
Sonderborg	EKSB	SGD	Y	Y	Y	Y	N

EUR - DENMARK							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Stauning	EKVJ	STA	Y	Y	Y	Y	N
Thisted	EKTS	TED	Y	Y	Y	Y	N
Vojens/Skrydstrup (Mil)	EKSP		Y	Y	Y	Y	N
EUR - ESTONIA							
Kardla	EEKA		Y	Y	Y	N	N
Kuressaare	EEKE		Y	Y	Y	N	N
Parnu	EEPU		Y	Y	Y	N	N
Tallinn	EETN	TLL	Y	Y	Y	Y	N
Tartu/Ulenurme	EETU	TAY	Y	Y	Y	N	N
EUR - FINLAND							
Enontekio	EFET	ENF	N	Y	Y	Y	N
Halli Y	EFHA	KEV	N	Y	Y	Y	N
Helsinki-Malmi	EFHF	HEM	Y	Y	Y	N	N
Helsinki-Vantaa (Finavia)	EFHK	HEL	Y	Y	Y	N	Y
Ivalo	EFIV	IVL	Y	Y	Y	Y	N
Joensuu	EFJO	JOE	N	Y	Y	Y	N
Jyvaskyla	EFJY	JYV	N	Y	Y	Y	N
Kajaani	EFKI	KAJ	N	Y	Y	Y	N
Kauhava	EFKA	KAU	N	Y	Y	Y	N
Kemi-Tornio	EFKE	KEM	N	Y	Y	Y	N
Kittila	EFKT	KTT	N	Y	Y	Y	N
Kruunupyy	EFKK	KOK	N	Y	Y	Y	N
Kuopio	EFKU	KUO	N	Y	Y	N	Y
Kuusamo	EFKS	KAO	N	Y	Y	Y	N
Lappeenranta	EFLP	LPP	Y	Y	Y	Y	N
Mariehamn	EFMA	MHQ	Y	Y	Y	Y	N
Mikkeli	EFMI	MIK	N	Y	Y	Y	N
Oulu	EFOU	OUL	Y	Y	Y	Y	N
Pori	EFPO	POR	N	Y	Y	Y	N
Rovaniemi	EFRO	RVN	Y	Y	Y	Y	N
Savonlinna	EFSA	SVL	N	Y	Y	Y	N
Seinajoki	EFSI	SJY	N	Y	Y	Y	N
Tampere-Pirkkala	EFTP	TMP	Y	Y	Y	N	Y
Turku	EFTU	TKU	Y	Y	Y	N	Y
Utti	EFUT	UTI	N	Y	Y	Y	N
Vaasa	EFVA	VAA	Y	Y	Y	Y	N
Varkaus	EFVR	VRK	N	Y	Y	Y	N
EUR - FRANCE							
Agen-La Garenne	LFBA		N	Y	Y	Y	N
Aix-Les-Milles	LFMA		N	Y	Y	N	N
Ajaccio-Campo Dell'oro	LFKJ		Y	Y	Y	Y	N
Annecy-Meythet	LFLP		N	Y	Y	Y	N
Bale-Mulhouse	LFSB		N	Y	Y	N	Y
Bastia-Poretta	LFKB		Y	Y	Y	N	Y

EUR - FRANCE							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Beauvais-Tille	LFOB		Y	Y	Y	Y	N
Bergerac-Roumaniere	LFBE		N	Y	Y	Y	N
Beziers-Vias	LFMU		N	Y	Y	Y	N
Biarritz-Bayonne-Anglet	LFBZ		Y	Y	Y	Y	N
Bordeaux-Merignac	LFBD		Y	Y	Y	N	Y
Bourges	LFLD		N	Y	Y	Y	N
Brest-Guipavas	LFRB	BES	Y	Y	Y	N	Y
Caen-Carpiquet	LFRK	CFR	Y	Y	Y	Y	N
Calais-Dunkerque	LFAC		N	N	N	N	N
Calvi-Sainte-Catherine	LFKC	CLY	Y	Y	Y	N	Y
Cannes-Mandelieu	LFMD	CEQ	Y	Y	Y	Y	N
Carcassonne-Salvaza	LFMK	CCF	N	Y	Y	Y	N
Castelnaudary-Villeneuve	LFMW		N	Y	Y	Y	N
Chalons-Vatry	LFOK		N	Y	Y	N	Y
Chambery-Aix-Les-Bains	LFLB	CMF	Y	Y	Y	Y	N
Cherbourg-Maupertus	LFRC	CER	Y	Y	Y	Y	N
Clermont-Ferrand-Auvergne Clermont Ccer	LFLC	CFE	Y	Y	Y	Y	N
Cognac-Chateaubernard	LFBG		N	Y	Y	Y	N
Deauville-Saint-Gatien	LFRG		Y	Y	Y	Y	N
Dijon-Longvic	LFSD		N	Y	Y	Y	N
Dinard-Pleurtuit-St-Malo	LFRD	DNR	Y	Y	Y	N	Y
Dole-Tavaux	LFGJ	DLE	Y	Y	Y	Y	N
Evreux-Fauville	LFOE		N	Y	Y	Y	N
Figari-Sud-Corse	LFKF		N	Y	Y	Y	N
Grenoble-Saint-Geoirs	LFLS	GNB	Y	Y	Y	N	Y
Hyeres-Le Palyvestre	LFTH	XHE	Y	Y	Y	Y	N
Istres-Le Tube ; Istres Ccer	LFMI		N	Y	Y	Y	N
La Rochelle-Ile De Re	LFBH		Y	Y	Y	Y	N
Lannion	LFRO	LAI	Y	Y	Y	Y	N
Le Havre-Octeville	LFOH		Y	Y	Y	Y	N
Le Mans-Arnage	LFRM		N	Y	Y	N	Y
Le Touquet-Paris-Plage	LFAT		Y	N	N	N	N
Lille-Lesquin	LFQQ	LIL	Y	Y	Y	N	Y
Limoges-Bellegarde	LFBL		N	Y	Y	Y	N
Lorient-Lann-Bihoue	LFRH		N	Y	Y	Y	N
Lyon Saint-Exupery	LFLL	LYS	Y	Y	Y	N	Y
Lyon-Bron	LFLY	LYN	Y	Y	Y	Y	N
Marseille-Provence	LFML	MRS	Y	Y	Y	N	Y
Melun-Villaroche	LFPM		N	Y	Y	Y	N
Metz Nancy-Lorraine	LFJL		N	Y	Y	Y	N
Montpellier-Mediterrannee	LFMT	MPL	Y	Y	Y	Y	N
Nantes Atlantique	LFRS	NTE	Y	Y	Y	N	Y
Nice-Cote D'azur	LFMN	NCE	Y	Y	Y	N	Y
Nimes-Garons	LFTW	FNI	Y	Y	Y	Y	N
Paris-Charles De Gaulle	LFPG	CDG	Y	Y	Y	N	Y
Paris-Le Bourget	LFPB	LBG	Y	Y	Y	N	Y
Paris-Orly	LFPO	ORY	Y	Y	Y	N	Y
Pau-Pyrenees	LFBP	PUF	Y	Y	Y	Y	N
Perpignan-Rivesaltes	LFMP	PGF	Y	Y	Y	Y	N
Poitiers-Biard	LFBI	PIS	Y	Y	Y	N	Y

EUR - FRANCE							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Quimper-Pluguffan	LFRQ	UIP	Y	Y	Y	Y	N
Reims-Champagne	LFSR	RHE	Y	Y	Y	Y	N
Rennes-St-Jacques	LFRN	RNS	Y	Y	Y	Y	N
Rodez-Marcillac	LFCR		N	Y	Y	Y	N
Rouen-Vallee De Seine	LFOP		N	Y	Y	Y	N
Saint-Brieuc-Armor	LFRT	SBK	Y	Y	Y	Y	N
Saint-Etienne-Boutheon	LFMH	EBU	Y	Y	Y	Y	N
Saint-Nazaire-Montoir	LFRZ	SNR	Y	Y	Y	Y	N
Strasbourg-Entzheim	LFST	SXB	Y	Y	Y	Y	N
Tarbes Lourdes Pyrenees	LFBT	XTB	Y	Y	Y	Y	N
Toulouse-Blagnac ; Toulouse/Ccer	LFBO	TLS	Y	Y	Y	N	Y
Tours Val De Loire	LFOT	TUF	Y	Y	Y	N	Y
Toussus-Le-Noble	LFPN	TNF	Y	Y	Y	Y	N
Troyes-Barberey	LFQB		N	Y	Y	Y	N
Vichy-Charmeil	LFLV		N	Y	Y	Y	N
EUR - GEORGIA							
Kutaisi/Kopitnari	UGKO		Y	Y	Y	N	N
Tbilisi/Tbilisi	UGTB	TBS	Y	Y	Y	N	Y
EUR - GERMANY							
Altenburg-Nobitz	EDAC	AOC	Y	Y	Y	Y	N
Augsburg	EDMA	AGB	Y	Y	Y	Y	N
Barth	EDBH		Y	Y	Y	Y	N
Bautzen	EDAB		Y	N	N	N	N
Bayreuth Y	EDQD	BYU	Y	Y	Y	Y	N
Berlin-Schonefeld	EDDB	SXF	Y	Y	Y	N	Y
Berlin-Tegel	EDDT	TXL	Y	Y	Y	N	Y
Berlin-Tempelhof	EDDI	THF	Y	Y	Y	N	Y
Bielefeld	EDLI		Y	Y	Y	Y	N
Bonn-Hangelar	EDKB		Y	N	N	N	N
Braunschweig-Wolfsburg	EDVE	BWE	Y	Y	Y	Y	N
Bremen	EDDW	BRE	Y	Y	Y	Y	N
Bremerhaven	EDWB		Y	N	N	N	N
Coburg-Brandensteinsebene	EDQC		Y	N	N	N	N
Cottbus-Drewitz	EDCD		Y	N	N	N	N
Donaueschingen-Villingen	EDTD		Y	Y	Y	Y	N
Dortmund-Wickede	EDLW	DTM	Y	Y	Y	Y	N
Dresden	EDDC	DRS	Y	Y	Y	Y	N
Dusseldorf	EDDL	QDU	Y	Y	Y	N	Y
Eggenfelden	EDME		Y	N	N	N	N
Emden	EDWE		Y	Y	Y	Y	N
Erfurt	EDDE	ERF	Y	Y	Y	N	Y
Essen/Mulheim	EDLE		Y	N	N	N	N
Flensburg-Schaferhaus	EDXF		Y	Y	Y	Y	N
Frankfurt/Main	EDDF	FRA	Y	Y	Y	N	Y
Frankfurt-Egelsbach	EDFE		Y	N	N	N	N
Frankfurt-Hah	EDFH	HHN	Y	Y	Y	N	Y
Freiburg Im Breisgau	EDTF		Y	N	N	N	N

EUR - GERMANY							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Friedrichshafen	EDNY	FDH	Y	Y	Y	Y	N
Hamburg	EDDH	HAM	Y	Y	Y	N	Y
Hamburg-Finkenwerder	EDHI	XFW	Y	Y	Y	Y	N
Hannover	EDDV	HAJ	Y	Y	Y	N	Y
Heringsdorf	EDAH		Y	Y	Y	Y	N
Hof-Plauen	EDQM	HOQ	Y	Y	Y	Y	N
Ingolstadt/Manching	ETSI		Y	Y	Y	Y	N
Karlsruhe/Baden-Baden	EDSB	FKB	Y	Y	Y	Y	N
Kassel-Calden	EDVK	KSF	Y	Y	Y	Y	N
Kiel-Holtenau	EDHK	KEL	Y	Y	Y	Y	N
Koln/Bonn	EDDK	CGN	Y	Y	Y	N	Y
Konstanz	EDTZ		Y	N	N	N	N
Laage	ETNL		Y	Y	Y	Y	N
Lahr	EDTL	LHA	Y	Y	Y	Y	N
Landshut	EDML		Y	Y	Y	Y	N
Leipzig/Halle	EDDP	LEJ	Y	Y	Y	N	Y
Lemwerder	EDWD	XLW	Y	N	N	N	N
Lubeck-Blankensee	EDHL	LBC	Y	Y	Y	Y	N
Magdeburg	EDBM	ZMG	Y	Y	Y	Y	N
Mannheim City	EDFM	MHG	Y	Y	Y	Y	N
Monchengladbach	EDLN	MGL	Y	Y	Y	N	Y
Munchen	EDDM	MUC	Y	Y	Y	N	Y
Munster/Osnabruck	EDDG	FMO	Y	Y	Y	Y	N
Neubrandenburg	ETNU		Y	Y	Y	Y	N
Niederrhein	EDLV		Y	Y	Y	Y	N
Nurnberg	EDDN	NUE	Y	Y	Y	N	Y
Oberpfaffenhofen	EDMO	OBF	Y	Y	Y	Y	N
Offenburg	EDTO		Y	N	N	N	N
Paderborn/Lippstad	EDLP	PAD	Y	Y	Y	Y	N
Saarbrucken	EDDR	SCN	Y	Y	Y	N	Y
Schwabish Hall-Hessental Nc	EDTY		Y	N	N	N	N
Schwerin-Parchim	EDOP		Y	Y	Y	Y	N
Siegerland	EDGS		Y	Y	Y	Y	N
Stadtlohn-Vreden	EDLS		Y	N	N	N	N
Straubing-Wallmuhle	EDMS		Y	Y	Y	Y	N
Stuttgart	EDDS	STR	Y	Y	Y	N	Y
Trier-Fohren	EDRT		Y	N	N	N	N
Westerland/Sylt	EDXW	GWT	Y	Y	Y	Y	N
Worms	EDFV		Y	N	N	N	N
Zweibrucken	EDRZ		Y	Y	Y	Y	N
Gibraltar (United Kingdom)							
EUR - GIBRALTAR (UNITED KINGDOM)							
Gibraltar (North Front)	LXGB	GIB	Y	Y	Y	Y	N
EUR - GREECE							
Alexandroupolis/Dimokritos	LGAL	AXD	Y	Y	Y	N	Y
Almiros/Nea Anchialos (Mil)	LGBL		Y	N	N	N	N
Andravida (Mil)	LGAD	PYR	Y	Y	Y	N	Y
Araxos (Mil)	LGRX	GPA	Y	N	N	N	N

EUR - GREECE							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Athinai/Eleftherios Venizelos	LGAV		Y	Y	Y	N	Y
Chania/Ioannis Daskalogiannis (Mil)	LGSA	CHQ	Y	N	N	N	N
Chios/Omiros	LGHI	JKH	Y	N	N	N	N
Elefsis (Mil)	LGEL		Y	Y	Y	N	Y
Ioannina/King Pyrros	LGIO						
Iraklion/Nikos Kazantzakis	LGIR	HER	Y	Y	Y	N	Y
Kalamata (Mil)	LGKL	KLX	Y	Y	Y	N	Y
Karpathos	LGKP	AOK	Y	N	N	N	N
Kavala/Megas Alexandros	LGKV	KVA	Y	Y	Y	Y	N
Kefallinia	LGKF	EFL	Y	Y	Y	N	Y
Kerkira/Ioannis Kapodistrias	LGKR	CFU	Y	Y	Y	N	Y
Kithira	LGKC	KIT	N	Y	Y	Y	N
Kos/Ippokratis	LGKO	KGS	Y	Y	Y	N	Y
Limnos/Ifaistos	LGLM	LXS	Y	Y	Y	Y	N
Mikonos	LGMK	JMK	Y	N	N	N	N
Mitilini/Odysseas Elytis	LGMT	MJT	Y	Y	Y	Y	N
Preveza/Aktion (Mil)	LGPZ	PVK	Y	N	N	N	N
Rodos/Diagoras	LGRP	RHO	Y	Y	Y	N	Y
Samos/Aristarchos Of Samos	LGSM	SMI	Y	Y	Y	Y	N
Santorini	LGSR	JTR	Y	Y	Y	N	Y
Skiathos/Alexandros Papadiamandis	LGSK	JSI	Y	N	N	N	N
Thessaloniki/Makedonia	LGTS	SKG	Y	Y	Y	N	Y
Zakinthos/Dionisios Solomos	LGZA	ZTH	Y	Y	Y	Y	Y
EUR - HUNGARY							
Budapest/Ferihegy	LHBP	BUD	Y	Y	Y	N	Y
Debrecen Y	LHDC	DEB	N	Y	Y	Y	N
Pecs/Pogany	LHPP	QPJ	N	Y	Y	N	N
Szeged Y	LHUD	QZD	N	Y	Y	N	N
Szombathely	LHSY		N	Y	Y	N	N
EUR - IRELAND							
Connaught	EIKN		Y	Y	Y	Y	N
Cork	EICK	ORK	Y	Y	Y	Y	N
Dublin	EIDW	DUB	Y	Y	Y	N	Y
Kerry (Farranfore)	EIKY		Y	N	N	N	N
Shannon	EINN	SNN	Y	Y	Y	N	Y
EUR - ITALY							
Albenga	LIMG	ALL	Y	Y	Y	Y	N
Alghero/Fertilia	LIEA	AHO	Y	Y	Y	Y	N
Amendola (Mil)	LIBA		N	Y	Y	Y	N
Ancona/Falconara	LIPY	AOI	Y	Y	Y	Y	N
Aosta	LIMW		Y	N	N	N	N
Aviano (Mil)	LIPA		N	Y	Y	Y	N
Bari/Palese	LIBD	BRI	Y	Y	Y	Y	N
Bergamo/Orio Al Serio	LIME	BGY	Y	Y	Y	Y	N
Bologna/Borgo Panigale	LIPE	BLQ	Y	Y	Y	Y	N
Bolzano	LIPB	BZO	Y	Y	Y	N	N
Brindisi/Casale	LIBR	BDS	Y	Y	Y	N	Y
Cagliari/Elmas (Mil)	LIEE	CAG	Y	Y	Y	Y	N

EUR - ITALY							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Cameri (Mil)	LIMN		N	Y	Y	Y	N
Catania/Fontanarossa	LICC	CTA	Y	Y	Y	Y	N
Cervia (Mil)	LIPC		N	Y	Y	Y	N
Como (Idroscalo)	LILY		Y	Y	Y	N	N
Crotone	LIBC	CRV	N	Y	Y	Y	N
Cuneo/Levaldigi	LIMZ	CUF	Y	Y	Y	Y	N
Decimomannu (Mil)	LIED	DCI	N	Y	Y	Y	N
Dobbiaco Y F	LIVD		N	Y	Y	Y	N
Ferrara Y C F	LIPF		N	Y	Y	Y	N
Firenze/Peretola	LIRQ	FLR	Y	Y	Y	Y	N
Foggia/Gino Lisa	LIBF	FOG	N	Y	Y	Y	N
Forli’	LIPK	FRL	Y	Y	Y	Y	N
Frontone	LIVF		N	Y	Y	Y	N
Frosinone (Mil)	LIRH		N	Y	Y	Y	N
Genova/Sestri	LIMJ	GOA	Y	Y	Y	N	Y
Ghedi (Mil)	LIPL	QBS	N	Y	Y	Y	N
Gioia Del Colle (Mil)	LIBV		N	Y	Y	Y	N
Grazzanise (Mil)	LIRM		N	Y	Y	Y	N
Grosseto (Mil)	LIRS	GRS	N	Y	Y	Y	N
Guidonia (Mil)	LIRG		N	Y	Y	Y	N
Lamezia/Terme	LICA	SUF	Y	Y	Y	Y	N
Lampedusa	LICD	LMP	N	Y	Y	Y	N
Latina (Mil)	LIRL	QLT	N	Y	Y	Y	N
Lecce/Galatina (Mil)	LIBN	LCC	N	Y	Y	Y	N
Marina Di Campo	LIRJ	EBA	N	N	N	N	N
Marina Di Ravenna	LIVM		N	Y	Y	N	N
Milano/Bresso	LIMB		N	Y	Y	Y	N
Milano/Linate	LIML	LIN	Y	Y	Y	N	Y
Milano/Malpensa	LIMC	MXP	Y	Y	Y	N	Y
Napoli/Capodichino	LIRN	NAP	Y	Y	Y	N	Y
Novi Ligure	LIMR		N	Y	Y	Y	N
Olbia/Costa Smeralda	LIEO	OLB	Y	Y	Y	Y	N
Padova	LIPU	QPA	Y	N	N	N	N
Palermo/Punta Raisi	LICJ	PMO	Y	Y	Y	N	Y
Pantelleria	LICG	PNL	Y	Y	Y	Y	N
Parma	LIMP	PMF	Y	Y	Y	N	N
Perugia/S. Egidio	LIRZ	PEG	Y	Y	Y	N	N
Pescara	LIBP	PSR	Y	Y	Y	Y	N
Piacenza/S.Damiano (Mil)	LIMS	QPZ	N	Y	Y	Y	N
Pisa/S. Giusto (Mil)	LIRP	PSA	Y	Y	Y	N	Y
Pratica Di Mare (Mil)	LIRE		N	Y	Y	Y	N
Reggio Calabria	LICR	REG	Y	Y	Y	Y	N
Rieti	LIQN		Y	Y	Y	Y	N
Rimini/Miramare (Mil.)	LIPR	RMI	Y	Y	Y	Y	N
Rivolto (Mil)	LIPI		N	Y	Y	Y	N

EUR - ITALY							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Roma/Ciampino (Mil.)	LIRA	CIA	Y	Y	Y	N	Y
Roma/Fiumicino	LIRF	FCO	Y	Y	Y	N	Y
Roma/Urbe	LIRU		Y	Y	Y	N	N
Sarzana/Luni (Mil.)	LIQW		N	Y	Y	Y	N
Taranto/Grottaglie	LIBG	TAR	N	Y	Y	Y	N
Torino/Caselle	LIMF	TRN	Y	Y	Y	N	Y
Trapani/Birgi (Mil)	LICT	TPS	Y	Y	Y	Y	N
Trevico	LIRT		N	Y	Y	N	N
Treviso/S.Angelo (Mil)	LIPH	TSF	Y	Y	Y	Y	N
Trieste/Ronchi Dei Legionari	LIPQ	TRS	Y	Y	Y	Y	N
Venezia/S. Nicolo	LIPV		Y	N	N	N	N
Venezia/Tessera	LIPZ	VCE	Y	Y	Y	N	Y
Verona/Villafranca (Mil.)	LIPX	VRN	Y	Y	Y	Y	N
Vicenza (Mil.)	LIPT	VIC	N	N	N	N	N
Viterbo (Mil)	LIRV		N	Y	Y	Y	N
EUR - KAZAKHSTAN							
Aktau	UATE		Y	Y	Y	Y	N
Aktyubinsk	UATT	AKX	Y	Y	Y	N	Y
Almaty	UAAA	ALA	Y	Y	Y	N	Y
Astana	UACC	TSE	Y	Y	Y	N	Y
Atyrau	UATG	GUW	Y	Y	Y	Y	N
Karaganda	UAKK	KGF	Y	Y	Y	Y	N
Kokshetau	UACK		Y	Y	Y	Y	N
Kostanay	UAUU	KSN	Y	Y	Y	Y	N
Kyzylorda	UAOO		Y	Y	Y	Y	N
Pavlodar	UASP	PWQ	Y	Y	Y	Y	N
Petropavlovsk	UACP	PPK	N	Y	Y	Y	N
Semipalatinsk	UASS	PLX	Y	Y	Y	Y	N
Shymkent	UAII		Y	Y	Y	Y	N
Taraz	UADD		Y	Y	Y	Y	N
Uralsk	UARR	URA	N	Y	Y	Y	N
Ust-Kamenogorsk	UASK		Y	Y	Y	Y	N
Zhezkazgan Y	UAKD		Y	Y	Y	Y	N
EUR - KYRGYZSTAN							
BISHKEK/MANAS	UAFM	FRU	Y	Y	Y	N	Y
OSH	UAFO	OSS	Y	Y	Y	N	N
EUR - LATVIA							
Daugavpils	EVDA		Y	N	N	N	N
Jekabpils	EVKA		Y	N	N	N	N
Jelgava	EVEA		Y	N	N	N	N
Liepaja Y	EVLA	LPX	Y	Y	Y	Y	N
Riga (Airport)	EVRA	RIX	Y	Y	Y	N	Y
Ventspils	EVVA		N	Y	Y	N	N
EUR - LITHUANIA							
Kaunas Intl	EYKA	KUN	Y	Y	Y	Y	N
Palanga Intl	EYPA	PLQ	Y	Y	Y	Y	N
Siauliai Intl/Civ/Mil	EYSA	SQQ	Y	Y	Y	N	N
Vilnius Intl	EYVI	VNO	Y	Y	Y	Y	N

EUR - LUXEMBOURG							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Luxembourg/Luxembourg	ELLX	LUX	Y	Y	Y	N	Y
EUR - MALTA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Luqa Airport	LMML	MLA	Y	Y	Y	N	Y
EUR - MONACO							
Monaco	LNMC		Y	Y	Y	N	N
EUR - MONTENEGRO							
Podgorica/Cemovsko Polje	LYPO		Y	Y	Y	N	Y
Tivat	LYTV		Y	Y	Y	N	Y
EUR - NETHERLANDS							
Amsterdam/Schiphol	EHAM	AMS	Y	Y	Y	N	Y
Den Helder/De Kooy	EHKD	DHR	N	Y	Y	Y	N
Deventer/Teuge	EHTE		Y	N	N	N	N
Eindhoven/Eindhoven Y	EHEH	EIN	N	Y	Y	Y	N
Enschede/Twenthe Y	EHTW	ENS	N	Y	Y	Y	N
Groningen/Eelde Y	EHGG	GRQ	Y	Y	Y	Y	N
Hilversum/Hilversum	EHHV		Y	N	N	N	N
Hoogeveen/Hoogeveen	EHHO		Y	N	N	N	N
Leiden/Valkenburg	EHVB	LID	N	Y	Y	Y	N
Lelystad/Lelystad	EHLE		Y	Y	Y	Y	N
Maastricht/Maastricht Aachen	EHBK	MST	Y	Y	Y	Y	N
Middelburg/Midden –Zeeland	EHMZ		Y	N	N	N	N
Rotterdam/Rotterdam	EHRD	RTM	Y	Y	Y	N	Y
Texel/Texel	EHTX		Y	N	N	N	N
Weert/Budel	EHBD		Y	N	N	N	N
EUR - NORWAY							
Alesund/Vigra	ENAL	AES	Y	Y	Y	Y	N
Alta	ENAT	ALF	Y	Y	Y	Y	N
Andenes/Andoya	ENAN		N	Y	Y	N	Y
Bardufoss	ENDU		N	Y	Y	Y	N
Bergen/Flesland	ENBR		Y	Y	Y	N	Y
Berlevag	ENBV		N	Y	Y	N	N
Bodo	ENBO	BOO	Y	Y	Y	N	Y
Bronnoysund/Bronnoy	ENBN	BNN	N	Y	Y	Y	N
Ekofisk	ENEK		N	Y	Y	Y	N
Fagernes/Leirin	ENFG	VDB	N	Y	Y	Y	N
Farsund/Lista	ENLI		N	Y	Y	Y	N
Floro	ENFL	FRO	N	Y	Y	Y	N
Geilo/Dagali	ENDI	DLD	N	Y	Y	Y	N
Hammerfest	ENHF	HFT	N	Y	Y	Y	N
Harstad/Narvik/Evenes	ENEV	EVE	Y	Y	Y	Y	N
Haugesund/Karmoy	ENHD	HAU	N	Y	Y	Y	N
Kirkenes/Hoybuktmoen	ENKR	KKN	Y	Y	Y	Y	N
Kristiansand/Kjevik	ENCN	KRS	Y	Y	Y	Y	N

EUR - NORWAY							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Kristiansund/Kvernberget	ENKB		N	Y	Y	Y	N
Lakselv/Banak	ENNA	LKL	Y	Y	Y	Y	N
Orland	ENOL	OLA	N	Y	Y	Y	N
Oslo/Gardermoen	ENGM		Y	Y	Y	Y	N
Roros	ENRO	RRS	N	Y	Y	Y	N
Rygge	ENRY		N	Y	Y	Y	N
Sandefjord/Torp	ENTO	TRF	Y	Y	Y	Y	N
Stavanger/Sola	ENZV	SVG	Y	Y	Y	N	Y
Svalbard/Longyear	ENSB	LYR	Y	Y	Y	N	Y
Svolvaer/Helle	ENSH	SVJ	N	Y	Y	Y	N
Tromso/Langnes	ENTC	TOS	Y	Y	Y	Y	N
Trondheim/Vaernes	ENVA	TRD	Y	Y	Y	N	Y
EUR - POLAND							
Bydgoszcz/Szweredowo	EPBY		Y	Y	Y	N	Y
Gdansk/Lech Walesa	EPGD	GDN	Y	Y	Y	N	Y
Katowice/Pyrzowice	EPKT	KTW	Y	Y	Y	Y	N
Krakow/Balice	EPKK	KRK	Y	Y	Y	N	Y
Lodz/Lublinek	EPLL		Y	Y	Y	Y	N
Poznan/Lawica	EPPO	POZ	Y	Y	Y	Y	N
Rzeszow/Jasionka	EPRZ	RZE	Y	Y	Y	Y	N
Szczecin/Goleniow	EPSC	SZZ	Y	Y	Y	Y	N
Szczytno/Szymany	EPSY		Y	N	N	N	N
Warszawa/Okecie	EPWA	WAW	Y	Y	Y	N	Y
Wroclaw/Strachowice	EPWR	WRO	Y	Y	Y	Y	N
Zielona Gora/Babimost	EPZG		Y	Y	Y	Y	N
EUR - Portugal							
Madeira and Azores) (Portugal) FARO	LPFR	FAO	Y	Y	Y	N	Y
FLORES	LPFL		N	Y	Y	Y	N
HORTA	LPHR		N	Y	Y	N	Y
LAJES	LPLA		N	Y	Y	N	Y
LISBOA	LPPT	LIS	Y	Y	Y	N	Y
MADEIRA	LPMA		Y	Y	Y	N	Y
PORTO	LPPR	OPO	Y	Y	Y	N	Y
PORTO SANTO	LPPS	PXO	Y	Y	Y	N	Y
EUR - REPUBLIC OF MOLDOVA							
Balti/International	LUBL		Y	Y	Y	Y	N
Cahul/International	LUCH		Y	Y	Y	Y	N
Chisinau/International	LUKK	KIV	Y	Y	Y	N	Y
EUR - ROMANIA							
Arad/Arad	LRAR	ARW	Y	Y	Y	Y	N
Bacau/Bacau	LRBC	BCM	Y	Y	Y	Y	N
Baia Mare/Tautii Magheraus	LRBM	BAY	Y	Y	Y	Y	N
Bucuresti/Baneasa-Aurel Vlaicu	LRBS	BBU	Y	Y	Y	Y	N
Bucuresti/Henri Coanda	LROP	OTP	Y	Y	Y	N	Y
Caransebes/Caransebes	LRCS	CSB	Y	Y	Y	Y	N
Cluj Napoca/Cluj Napoca	LRCL	CLJ	Y	Y	Y	Y	N

EUR - ROMANIA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Constanta/Constanta	LRCK	CND	Y	Y	Y	Y	N
Craiova/Craiova	LRCV	CRA	Y	Y	Y	Y	N
Iasi/Iasi	LRIA	IAS	Y	Y	Y	Y	N
Oradea/Oradea	LROD	OMR	Y	Y	Y	Y	N
Satu Mare/Satu Mare	LRSM	SUJ	Y	Y	Y	Y	N
Sibiu/Sibiu	LRSB	SBZ	Y	Y	Y	Y	N
Suceava/Stefan Cel Mare-Suceava	LRSV	SCV	Y	Y	Y	Y	N
Targu Mures/Vidrasau	LRTM	TGM	Y	Y	Y	Y	N
Timisoara/Traian Vuia	LRTR	TSR	Y	Y	Y	N	Y
Tulcea/Cataloi	LRTC	TCE	Y	Y	Y	N	N
EUR - RUSSIAN FEDERATION							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Abakan	UNAA	HTA	Y	Y	Y	Y	N
Anadyr/Ugolny	UHMA	DYR	Y	Y	Y	N	Y
Anapa/Vityazevo	URKA		Y	Y	Y	Y	N
Arkhangelsk/Talagi	ULAA		Y	Y	Y	Y	N
Astrakhan	URWA		Y	Y	Y	Y	N
Barnaul	UNBB	ABA	Y	Y	Y	Y	N
Begishevo	UWKE		Y	Y	Y	Y	N
Belgorod	UUOB		Y	Y	Y	Y	N
Blagoveshchensk/Ignatyevo	UHBB		Y	Y	Y	Y	N
Bratsk	UIBB	BQS	Y	Y	Y	Y	N
Bryansk	UUBP		Y	Y	Y	Y	N
Cheboksary	UWKS		Y	Y	Y	Y	N
Chelyabinsk/Balandino	USCC	CEK	Y	Y	Y	Y	N
Chita/Kadala	UIAA		Y	Y	Y	N	Y
Elista	URWI		Y	Y	Y	N	N
Irkutsk	UIII	IKT	Y	Y	Y	N	Y
Kaliningrad/Khrabrovo	UMKK	KGD	Y	Y	Y	Y	N
Kazan	UWKD	KZN	Y	Y	Y	Y	N
Kemerovo	UNEE		Y	Y	Y	Y	N
Khabarovsk/Novy	UHHH	KHV	Y	Y	Y	N	Y
Kogalym	USRK		Y	Y	Y	Y	N
Krasnodar/Pashkovskiy	URKK	KRR	Y	Y	Y	Y	N
Krasnoyarsk/Yemelyanovo	UNKL	KJA	Y	Y	Y	Y	N
Kursk/Vostochny	UUOK		Y	Y	Y	Y	N
Magadan/Sokol	UHMM	GDX	Y	Y	Y	N	Y
Magnitogorsk	USCM		Y	Y	Y	N	Y
Makhachkala/Uytash	URML	MCX	Y	Y	Y	Y	N
Maykop	URKM		Y	Y	Y	Y	N
Mineralnyye Vody	URMM	MRV	Y	Y	Y	N	Y
Mirny	UERR		N	Y	Y	N	Y
Moscow/Domodedovo	UUDD	DME	Y	Y	Y	N	Y
Moscow/Sheremetyevo	UUEE	SVO	Y	Y	Y	N	Y
Moscow/Vnukovo	UUWW	VKO	Y	Y	Y	N	Y
Murmansk	ULMM	MMK	Y	Y	Y	Y	N
Nadym	USMM		N	Y	Y	N	Y

EUR - RUSSIAN FEDERATION							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Nalchik	URMN		Y	Y	Y	Y	N
Naryan-Mar	ULAM		N	Y	Y	N	Y
Nerungri/Chulma	UELL		N	Y	Y	N	Y
Nikolaevsk-Na-Amure	UHNN		N	Y	Y	N	Y
Nizhnevartovsk	USNN		N	Y	Y	N	Y
Nizhny Novgorod/Strigino	UWGG	GOJ	Y	Y	Y	Y	N
Novokuznetsk/Spichenkovo	UNWW	NOZ	N	Y	Y	N	Y
Novosibirsk/Tolmachevo	UNNT	OVB	Y	Y	Y	N	Y
Omsk/Tsentralny	UNOO	OMS	Y	Y	Y	Y	N
Orenburg	UWOO	REN	Y	Y	Y	Y	N
Orsk	UWOR		Y	Y	Y	Y	N
Pechora	UUYP		N	Y	Y	N	Y
Perm/Bolshoe Savino	USPP	PEE	Y	Y	Y	Y	N
Petropavlovsk-Kamchatsky/Yelizovo	UHPP	PKC	Y	Y	Y	N	Y
Petrozavodsk/Besovets	ULPB		Y	Y	Y	Y	N
Pevek	UHMP		N	Y	Y	N	Y
Poliarny	UERP		N	Y	Y	N	Y
Provideniya Bay	UHMD		Y	Y	Y	N	Y
Pskov	ULOO		Y	Y	Y	N	Y
Raduzhny	USNR		Y	Y	Y	Y	N
Rostov-Na-Donu	URRR		Y	Y	Y	Y	N
Salekhard	USDD		N	Y	Y	N	Y
Samara/Kurumoch	UWWW	KUF	Y	Y	Y	Y	N
Sankt-Peterburg/Pulkovo	ULLI	LED	Y	Y	Y	Y	N
Saratov/Tsentralny	UWSS	RTW	Y	Y	Y	Y	N
Sochi	URSS	AER	Y	Y	Y	Y	N
Stavropol/Shpakovskoye	URMT	STW	Y	Y	Y	Y	N
Surgut	USRR	SGC	Y	Y	Y	Y	N
Syktyvkar	UUYY	SCW	Y	Y	Y	Y	N
Tiksi	UEST		N	Y	Y	N	N
Tura	UNIT		N	Y	Y	N	Y
Tver/Migalovo	UUEM		Y	Y	Y	Y	N
Tyumen/Roschino	USTR		Y	Y	Y	Y	N
Ufa	UWUU	UFA	Y	Y	Y	Y	N
Ulan-Ude/Mukhino	UIUU	UUD	Y	Y	Y	N	Y
Ulyanovsk/Vostochny	UWLW		Y	Y	Y	N	Y
Vladikavkaz/Beslan	URMO		Y	Y	Y	N	Y
Vladivostok/Knevichi	UHWW	VVO	Y	Y	Y	N	Y
Volgograd/Gumrak	URWW	VOG	Y	Y	Y	N	Y
Vorkuta	UUYW	VKT	N	Y	Y	N	Y
Voronezh/Chertovitskoye	UUOO		Y	Y	Y	N	Y
Yakutsk	UEEE	YKS	Y	Y	Y	N	Y
Yaroslavl/Tunoshna	UUDL		Y	Y	Y	N	Y
Yekaterinburg/Koltsovo	USSS	SVX	Y	Y	Y	N	Y
Yuzhno-Sakhalinsk/Khomutovo	UHSS		Y	Y	Y	N	Y

EUR - SERBIA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Beograd/Nikola Tesla	LYBE		Y	Y	Y	N	Y
Nis	LYNI		N	Y	Y	N	Y
Pristina	LYPR		N	Y	Y	Y	N
EUR - SLOVAKIA							
Bratislava/M.R.Stefanik	LZIB	BTS	Y	Y	Y	N	Y
Kosice	LZKZ	KSC	Y	Y	Y	Y	N
Nitra	LZNI		N	Y	Y	N	N
Piestany	LZPP	PZY	Y	Y	Y	Y	N
Poprad-Tatry	LZTT	TAT	Y	Y	Y	Y	N
Prievidza	LZPE		N	Y	Y	Y	N
Sliac	LZSL	SLD	Y	Y	Y	Y	N
Zilina	LZZI	ILZ	Y	Y	Y	Y	N
EUR - SPAIN							
A Coruna	LECO	LCG	Y	Y	Y	Y	N
Alicante	LEAL	ALC	Y	Y	Y	N	Y
Almeria	LEAM	LEI	Y	Y	Y	Y	N
Asturias	LEAS	OVD	Y	Y	Y	Y	N
Badajoz	LEBZ		N	Y	Y	Y	N
Barcelona	LEBL	BCN	Y	Y	Y	N	Y
Bilbao	LEBB	BIO	Y	Y	Y	Y	N
Cordoba	LEBA		N	Y	Y	Y	N
Girona	LEGE	GRO	Y	Y	Y	N	Y
Granada/Federico Lorca Granada-Jaen	LEGR	GRX	Y	Y	Y	Y	N
Ibiza	LEIB	IBZ	Y	Y	Y	N	Y
Jerez	LEJR	XRY	Y	Y	Y	Y	N
Leon	LELN		Y	Y	Y	N	N
Madrid/Barajas	LEMD	MAD	Y	Y	Y	N	Y
Madrid/Cuatro Vientos (Civ)	LECU		Y	Y	Y	Y	N
Madrid/Cuatro Vientos (Mil)	LEVS		N	Y	Y	Y	N
Madrid/Torrejon	LETO		N	Y	Y	Y	N
Malaga	LEMG	AGP	Y	Y	Y	N	Y
Menorca	LEMH	MAH	Y	Y	Y	Y	N
Murcia/San Javier	LELC	MJV	Y	Y	Y	Y	N
Palma De Mallorca	LEPA	PMI	Y	Y	Y	N	Y
Pamplona	LEPP		N	Y	Y	Y	N
Reus	LERS	REU	Y	Y	Y	Y	N
Sabadell	LELL	QSA	Y	Y	Y	N	Y
Salamanca	LESA		Y	Y	Y	Y	N
San Sebastian	LESO	EAS	Y	Y	Y	Y	N
Santander	LEXJ	SDR	Y	Y	Y	Y	N
Santiago	LEST	SCQ	Y	Y	Y	N	Y
Sevilla	LEZL	SVQ	Y	Y	Y	N	Y
Valencia	LEVC	VLC	Y	Y	Y	N	Y
Valladolid	LEVD	VLL	Y	Y	Y	Y	N
Vigo	LEVX	VGO	Y	Y	Y	Y	N
Vitoria	LEVT	VIT	Y	Y	Y	N	Y
Zaragoza	LEZG	ZAZ	Y	Y	Y	N	Y

EUR - SWEDEN							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Angelholm	ESTA		Y	Y	Y	Y	N
Are Ostersund	ESNZ		Y	N	N	N	N
Arvidsjaur	ESNX		Y	N	N	N	N
Borlange	ESSD	BLE	Y	Y	Y	Y	N
Gallivare	ESNG		N	Y	Y	Y	N
Goteborg/Landvetter	ESGG	GOT	Y	Y	Y	N	Y
Goteborg/Save	ESGP	GSE	Y	Y	Y	Y	N
Halmstad	ESMT	HAD	N	Y	Y	Y	N
Jonkoping	ESGJ	JKG	Y	Y	Y	Y	N
Kalmar	ESMQ	KLR	Y	Y	Y	Y	N
Karlstad	ESOK		Y	Y	Y	Y	N
Kiruna	ESNQ	KRN	Y	Y	Y	Y	N
Kramfors-Solleftea	ESNK	KRF	N	Y	Y	Y	N
Kristianstad	ESMK	KID	Y	Y	Y	Y	N
Linkoping/Saab	ESSL	LPI	Y	Y	Y	Y	N
Ljungbyhed	ESTL		N	Y	Y	Y	N
Lulea/Kallax	ESPA	LLA	Y	Y	Y	Y	N
Lycksele	ESNL	LYL	N	Y	Y	N	N
Malmo/Sturup	ESMS	MMX	Y	Y	Y	N	Y
Norrkoping/KungsangenP	ESSP	NRK	Y	Y	Y	Y	N
Orebro	ESOE	ORB	Y	Y	Y	Y	N
Ornskoldsvik Y C P	ESNO	OER	N	Y	Y	Y	N
Ronneby	ESDF	RNB	Y	Y	Y	Y	N
Skelleftea	ESNS	SFT	Y	Y	Y	Y	N
Stockholm/Arlanda	ESSA	ARN	Y	Y	Y	N	Y
Stockholm/Bromma	ESSB	BMA	Y	Y	Y	Y	N
Stockholm/Skavsta	ESKN	NYO	Y	Y	Y	N	Y
Stockholm/Vasteras	ESOW	VST	Y	Y	Y	Y	N
Storumam	ESUD		N	Y	Y	N	N
Sundsvall-Harnosand	ESNN	SDL	Y	Y	Y	Y	N
Trollhattan-Vanersborg	ESGT	THN	Y	Y	Y	Y	N
Umea	ESNU	UME	Y	Y	Y	Y	N
Vaxjo/Kronoberg	ESMX	VXO	Y	Y	Y	Y	N
Visby	ESSV	VBY	Y	Y	Y	Y	N
EUR - SWITZERLAND							
Bern-Belp	LSZB	BRN	Y	Y	Y	Y	N
Buochs	LSZC		Y	Y	Y	Y	N
Geneve	LSGG	GVA	Y	Y	Y	N	Y
Grenchen	LSZG	ZHI	Y	Y	Y	N	Y
Lausanne-La Blecherette	LSGL		N	Y	Y	N	N
Les Eplatures	LSGC		Y	Y	Y	N	N
Locarno	LSZL	ZJI	Y	Y	Y	N	N
Lugano	LSZA	LUG	Y	Y	Y	Y	N
Samedan	LSZS	SMV	Y	Y	Y	Y	N
Sion	LSGS	SIR	Y	Y	Y	N	Y
St. Gallen-Altenrhein	LSZR	QGL	Y	Y	Y	N	Y
Zurich Flughafen	LSZH	ZRH	Y	Y	Y	N	Y

EUR - TAJIKISTAN							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Dushanbe	UTDD	DYU	Y	Y	Y	N	Y
Khudzhand	UTDL		N	Y	Y	Y	N
EUR - THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA							
Ohrid	LWOH		Y	Y	Y	Y	N
Skopje	LWSK		Y	Y	Y	Y	N
EUR - TURKEY							
Adana	LTAF	ADA	Y	Y	Y	N	Y
Ankara/Esenboga	LTAC	ESB	Y	Y	Y	N	Y
Antalya (Civ/Mil)	LTAI	AYT	Y	Y	Y	N	Y
Batman (Mil-Civ)	LTCJ		N	Y	Y	N	Y
Bursa/Yenisehir (Mil-Civ)	LTBR		Y	Y	Y	N	Y
Elazig (Mil-Civ)	LTCA		N	Y	Y	N	Y
Erzurum (Civ/Mil)	LTCE	ERZ	Y	Y	Y	N	Y
Gaziantep	LTAJ	GZT	Y	Y	Y	N	Y
Isparta/S.Demirel	LTFC		Y	Y	Y	N	Y
Istanbul/Ataturk	LTBA	IST	Y	Y	Y	N	Y
Istanbul/Sabiha Gokcen	LTFJ		Y	Y	Y	N	Y
Izmir/Adnan Menderes	LTBJ	ADB	Y	Y	Y	N	Y
EUR - TURKEY							
Kars	LTCF		Y	Y	Y	N	N
Kayseri/Erkilet (Mil-Civ)	LTAU		Y	Y	Y	N	Y
Konya (Mil-Civ)	LTAN	KYA	Y	Y	Y	N	Y
Mugla/Dalaman (Mil.Civ.)	LTBS	DLM	Y	Y	Y	N	Y
Mugla/Milas-Bodrum	LTFE		Y	Y	Y	N	Y
Nevsehir/Kapadokya	LTAZ		Y	Y	Y	N	Y
Samsun/Carsamba	LTFH		Y	Y	Y	N	Y
Tekirdag/Corlu (Mil)	LTBU		Y	Y	Y	N	Y
Trabzon	LTCG	TZX	Y	Y	Y	N	Y
Van/ Ferit Melen	LTCI	VAN	Y	Y	Y	N	Y
EUR - TURKMENISTAN							
Ashgabat	UTAA	ASB	Y	Y	Y	N	Y
Dashoguz	UTAT		Y	Y	Y	Y	N
Turkmenabat	UTAV	CRZ	N	Y	Y	Y	N
Turkmenbashi	UTAK		Y	Y	Y	Y	N
EUR - UKRAINE							
Cherkasy	UKKE		Y	Y	Y	Y	N
Chernivtsi	UKLN		Y	Y	Y	N	Y
Dnipropetrovs'k	UKDD	DNK	Y	Y	Y	N	Y
Donets'k	UKCC		Y	Y	Y	N	Y
Hostomel	UKKM		Y	Y	Y	N	Y
Ivano-Frankivs'k	UKLI	IFO	Y	Y	Y	N	Y
Kharkiv	UKHH		Y	Y	Y	N	Y
Kryvyi Rih	UKDR	KWG	Y	Y	Y	N	Y
Kyiv/Boryspil	UKBB	KBP	Y	Y	Y	N	Y
Kyiv/Zhulyany	UKKK	IEV	Y	Y	Y	N	Y

EUR - UKRAINE							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Luhans'k	UKCW		Y	Y	Y	N	Y
L'viv	UKLL	LWO	Y	Y	Y	N	Y
Mykolaiv	UKON		Y	Y	Y	N	Y
Odesa	UKOO	ODS	Y	Y	Y	N	Y
Rivne	UKLR	RWN	Y	Y	Y	N	Y
Simferopol	UKFF	SIP	Y	Y	Y	N	Y
Uzhhorod	UKLU	UDL	Y	Y	Y	Y	N
Zaporizhzhia	UKDE		Y	Y	Y	Y	N
EUR - UNITED KINGDOM							
Aberdeen	EGPD	ABZ	Y	Y	Y	N	Y
Alderney	EGJA	ACI	N	Y	Y	Y	N
Belfast/Aldergrove	EGAA	BFS	Y	Y	Y	N	Y
Belfast/City	EGAC	BHD	Y	Y	Y	N	Y
Benbecula	EGPL	BEB	N	Y	Y	Y	N
Biggin Hill	EGKB	BHQ	Y	Y	Y	Y	N
Birmingham	EGBB	BHX	Y	Y	Y	Y	N
Blackpool	EGNH	BLK	Y	Y	Y	Y	N
Bournemouth	EGHH	BOH	Y	Y	Y	Y	N
Bristol	EGGD	BRS	Y	Y	Y	Y	N
Bristol Filton	EGTG	FZO	N	Y	Y	Y	N
Brize Norton	EGVN	BZZ	Y	Y	Y	N	Y
Cambridge	EGSC	CBG	N	Y	Y	Y	N
Campbeltown	EGEC		N	Y	Y	Y	N
Cardiff	EGFF	CWL	Y	Y	Y	N	Y
Carlisle	EGNC	CAX	Y	Y	Y	Y	N
Coventry	EGBE	CVT	N	Y	Y	N	Y
Cranfield	EGTC		Y	Y	Y	Y	N
Doncaster Sheffield	EGCN		N	Y	Y	Y	N
Dundee	EGPN	PND	N	Y	Y	Y	N
Durham Tees Valley	EGNV		Y	Y	Y	Y	N
Edinburgh	EGPH	EDI	Y	Y	Y	N	Y
Exeter	EGTE	EXT	Y	N	N	N	N
Farnborough	EGLF	FAB	N	Y	Y	Y	N
Glasgow	EGPF	GLA	Y	Y	Y	N	Y
Glasgow Prestwick	EGPK	PIK	Y	Y	Y	N	Y
Gloucestershire	EGBJ	GLO	Y	Y	Y	Y	N
Guernsey	EGJB	GCI	Y	Y	Y	Y	N
Hawarden	EGNR		Y	Y	Y	Y	N
Humberside	EGNJ	HUY	Y	Y	Y	Y	N
Inverness	EGPE	ZIV	N	Y	Y	Y	N
Islay	EGPI		N	Y	Y	Y	N
Isle Of Man	EGNS	IOM	Y	Y	Y	N	N
Jersey	EGJJ	JER	Y	Y	Y	Y	N
Kirkwall	EGPA	KOI	Y	Y	Y	Y	N
Leeds Bradford	EGNM	LBA	Y	Y	Y	N	Y
Liverpool	EGGP	LPL	Y	Y	Y	N	Y
London Gatwick	EGKK	LGW	Y	Y	Y	N	Y

EUR - UNITED KINGDOM							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
London Heathrow	EGLL	LHR	Y	Y	Y	N	Y
London Luton	EGGW	LTN	Y	Y	Y	N	Y
London Stansted	EGSS	STN	Y	Y	Y	N	Y
London/City	EGLC	LCY	Y	Y	Y	Y	N
Londonderry/Eglinton	EGAE	LDY	N	Y	Y	N	N
Lydd	EGMD	LYX	Y	Y	Y	Y	N
Lyneham	EGDL	LYE	N	Y	Y	N	Y
Manchester	EGCC	MAN	Y	Y	Y	Y	N
Manston	EGMH	MSE	N	Y	Y	Y	N
Mildenhall	EGUN		N	Y	Y	N	N
Newcastle	EGNT	NCL	Y	Y	Y	N	Y
Northolt	EGWU	NHT	N	Y	Y	N	Y
Norwich	EGSH	NWI	Y	Y	Y	Y	N
Nottingham East Midlands	EGNX	EMA	Y	Y	Y	N	Y
Penzance Heliport	EGHK		Y	Y	Y	N	N
Plymouth	EGHD	PLH	Y	Y	Y	Y	N
Scatsta	EGPM	SCS	N	Y	Y	Y	N
Scilly Isles/St Mary's	EGHE	ISC	Y	Y	Y	Y	N
Shoreham	EGKA	ESH	Y	Y	Y	Y	N
Southampton	EGHI	SOU	Y	Y	Y	Y	N
Southend	EGMC	SEN	Y	Y	Y	Y	N
St. Mawgan	EGDG		N	Y	Y	N	Y
Stornoway	EGPO	SYY	N	Y	Y	N	Y
Sumburgh	EGPB	LSI	Y	Y	Y	Y	N
Tiree	EGPU	TRE	N	Y	Y	Y	N
Wick	EGPC	WIC	N	Y	Y	Y	N
Wickenby	EGNW		N	Y	Y	N	Y
EUR - UZBEKISTAN							
Bukhara	UTSB		Y	Y	Y	N	Y
Fergana	UTFF		N	Y	Y	N	Y
Karshi	UTSK		N	Y	Y	N	Y
Nukus	UTNN	NCU	N	Y	Y	N	Y
Samarkand	UTSS	SKD	Y	Y	Y	N	Y
Tashkent/Yuzhny	UTTT	TAS	Y	Y	Y	N	Y
Termez	UTST		Y	Y	Y	N	Y
Urgench	UTNU	UGC	Y	Y	Y	N	Y

ANNEX 1 – MID

MID - AFGHANISTAN							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Kabul International Airport	OAKB	KBL	Y	Y	Y	N	Y
Kandahar	OAKN	KDH	Y	Y	Y	N	Y
MID - BAHRAIN							
Bahrain International	OBBI	BAH	Y	Y	Y	N	Y
MID - IRAN (ISLAMIC REPUBLIC OF)							
Abadan	OIAA	ABD	N	Y	Y	N	Y
Bandar Abbass/Intl	OIKB	BND	Y	Y	Y	N	Y
Esfahan / Shahid Beheshti Intl	OIFM	EFN	Y	Y	Y	N	Y
Mashhad/Shahid Hashemi Nejad Intl	OIMM	MHD	Y	Y	Y	N	Y
Shiraz/Shahid Dastghaib Intl	OISS	SYZ	Y	Y	Y	N	Y
Tabriz/Intl	OITT	TBZ	Y	Y	Y	N	Y
Tehran/Imam Khomaini Intl	OIIE		Y	Y	Y	N	Y
Tehran/Mehrabad Intl	OIII	THR	Y	Y	Y	N	Y
Uromiyeh	OITR		N	Y	Y	N	Y
Zahedan/Intl	OIZH	ZAH	Y	Y	Y	N	Y
MID - IRAQ							
Baghdad International Airport	ORBI	SDA	Y	Y	Y	N	Y
Basrah Intl Airport	ORMM	BSR	Y	Y	Y	N	Y
Erbil Intl Airport	ORER		Y	Y	Y	N	Y
Sulaymaniyah International Airport	ORSU		Y	Y	Y	N	Y
MID - ISRAEL							
Beer-Sheba/Teyman Airstrip	LLBS	BEV	N	Y	Y	Y	N
Eilat/J. Hozman Airport	LLET	ETH	Y	Y	Y	Y	N
Haifa/U. Michaeli Airport	LLHA		Y	Y	Y	N	Y
Ovda Airport	LLOV	VDA	Y	Y	Y	Y	N
Tel-Aviv/Ben Gurion Airport	LLBG	TLV	Y	Y	Y	N	Y
Tel-Aviv/Sde-Dov Airport	LLSD						
MID - JORDAN							
Amman/Marka	OJAM	ADJ	Y	Y	Y	N	Y
Amman/Queen Alia	OJAI	AMM	Y	Y	Y	N	Y
Aqaba/King Hussein International Airport	OJAQ	AQJ	Y	Y	Y	N	N
Jerusalem/Jerusalem	OJJR		Y	N	N	N	N
MID - KUWAIT							
Kuwait/Intl Airport	OKBK	KWI	Y	Y	Y	N	Y
MID - LEBANON							
Beirut/Beirut Intl	OLBA	BEY	Y	Y	Y	N	Y
MID - OMAN							
Masirah Y	OOMA	MSH	N	Y	Y	N	Y
Muscat/Seeb Intl	OOMS	MCT	Y	Y	Y	N	Y
Salalah	OOSA	SLL					
MID - QATAR							
Doha Internationa	OTBD	DOH	Y	Y	Y	N	Y
MID - SAUDI ARABIA							
Abha	OEAB	AHB	N	Y	Y	N	Y
Al-Baha	OEBA	ABT	N	Y	Y	N	Y
Al-Jouf	OESK	AJF	N	Y	Y	N	Y
Arar	OERR	RAE	N	Y	Y	N	Y

MID - SAUDI ARABIA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Bisha	OEBH	BHH	N	Y	Y	N	Y
Dammam/King Fahd International	OEDF		Y	Y	Y	N	Y
Gassim	OEGS	ELQ	N	Y	Y	N	Y
Guriat	OEGT		N	Y	Y	N	Y
Hail	OEHL	HAS	N	Y	Y	N	Y
Jazan/King Abdullah Bin Abdulaziz	OEGN		N	Y	Y	N	Y
Jeddah/King Abdulaziz Intl	OEJN	JED	Y	Y	Y	N	Y
Jubail	OEJB	QJB	N	Y	Y	N	Y
Madinah/Prince Mohammad Bin Abdulaziz Intl	OEMA	MED	Y	Y	Y	N	Y
Nejran	OENG		N	Y	Y	N	Y
Qaisumah/Hafr Al-Batin	OEPA		N	Y	Y	N	Y
Rafha	OERF		N	Y	Y	N	Y
Riyadh/King Khaled Intl	OERK	RUH	Y	Y	Y	N	Y
Sharurah	OESH	SHW	N	Y	Y	N	Y
Tabuk	OETB		N	Y	Y	N	Y
Taif	OETF	TIF	N	Y	Y	N	Y
Turaif	OETR		N	Y	Y	N	Y
Wadi Al-Dawasir	OEWD		N	Y	Y	N	Y
Wejh	OEWJ		N	Y	Y	N	Y
Yenbo	OEYN		N	Y	Y	N	Y
MID - SYRIAN ARAB REPUBLIC							
Aleppo/Intl	OSAP	ALP	Y	Y	Y	N	Y
Bassel Al-Assad/Intl. Lattakia	OSLK	LTK	Y	Y	Y	N	Y
Damascus/Intl	OSDI	DAM	Y	Y	Y	N	Y
MID - UNITED ARAB EMIRATES							
Abu Dhabi International	OMAA	AUH	Y	Y	Y	N	Y
Al Ain	OMAL	AAN	Y	Y	Y	N	Y
Dubai International	OMDB	DXB	Y	Y	Y	N	Y
Fujairah International	OMFJ		Y	Y	Y	N	Y
Jebel Ali International	OMJA		Y	N	N	N	N
Ras Al Khaimah International	OMRK	RKT	Y	Y	Y	N	Y
Sharjah International	OMSJ	SHJ	Y	Y	Y	N	Y
MID - YEMEN							
Aden/Intl	OYAA	ADE	Y	Y	Y	N	Y
Hodeidah	OYHD	HOD	Y	Y	Y	N	Y
Mukalla/Intl	OYRN		Y	Y	Y	N	Y
Sanaa/Intl	OYSN	SAH	N	Y	Y	N	Y
Sayun/Intl	OYSY		N	Y	Y	N	Y
Taiz/Intl	OYTZ	TAI	Y	Y	Y	N	Y

ANNEX 1 – NAM

NAM - CANADA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Abbotsford, B.C.	CYXX	YXX	Y	Y	Y	N	Y
Alert, N.W.T.	CYLT	YLT	N	Y	Y	N	Y
Arviat, N.W.T.	CYEK	YEK	N	Y	Y	N	Y
Aupaluk, Que.	CYLA	YLA	N	Y	Y	N	Y
Bagotville, Que.	CYBG	YBG	N	Y	Y	N	Y
Baie Comeau, Que.	CYBC	YBC	N	Y	Y	N	Y
Baker Lake, N.W.T.	CYBK	YBK	N	Y	Y	N	Y
Bella Coola, B.C.	CYBD	YBD	N	Y	Y	N	Y
Berens River, Man.	CYBV	YBV	N	Y	Y	N	Y
Big Trout Lake, Ont.	CYTL	YTL	N	Y	Y	N	Y
Brandon, Man.	CYBR	YBR	N	Y	Y	N	Y
Broughton Island, N.W.T.	CYVM	YVM	N	Y	Y	N	Y
Buffalo Narrows, Sask.	CYVT	YVT	N	Y	Y	N	Y
Burwash, Y.T.	CYDB	YDB	N	Y	Y	N	Y
Calgary Intl, Alta.	CYYC	YYC	Y	Y	Y	N	Y
Calgary/Springbank, Alta.	CYBW	YBW	N	Y	Y	N	Y
Cambridge Bay, N.W.T	CYCB	YCB	N	Y	Y	N	Y
Campbell River, B.C.	CYBL	YBL	N	Y	Y	N	Y
Cape Dorset, N.W.T.	CYTE	YTE	N	Y	Y	N	Y
Castlegar, B.C.	CYCG	YCG	N	Y	Y	N	Y
Charlo, N.B.	CYCL	YCL	N	Y	Y	N	Y
Charlottetown, P.E.I.	CYYG	YYG	N	Y	Y	N	Y
Chibougamou/Chapais, Que.	CYMT	YMT	N	Y	Y	N	Y
Churchill, Man.	CYYQ	YYQ	N	Y	Y	N	Y
Clyde River, N.W.T.	CYCY	YCY	N	Y	Y	N	Y
Cold Lake, Alta	CYOD	YOD	N	Y	Y	N	Y
Comox, B.C.	CYQQ	YQQ	Y	Y	Y	N	Y
Coral Harbour, N.W.T.	CYZS	YZS	N	Y	Y	N	Y
Cranbrook, B.C.	CYXC	YXC	N	Y	Y	N	Y
Dauphin, Man.	CYDN	YDN	N	Y	Y	N	Y
Dawson Creek, B.C.	CYDQ	YDQ	N	Y	Y	N	Y
Dawson, Y.T.	CYDA	YDA	N	Y	Y	N	Y
Deer Lake, Nfld.	CYDF	YDF	N	Y	Y	N	Y
Dryden Regional, Ont.	CYHD	YHD	N	Y	Y	N	Y
Edmonton Intl, Alta.	CYEG	YEG	Y	Y	Y	N	Y
Edmonton Muni, Alta.	CYXD	YXD	N	Y	Y	N	Y
Elliot Lake Muni, Ont.	CYEL	YEL	N	Y	Y	N	Y
Eureka, N.W.T.	CYEU	YEU	N	Y	Y	N	Y
Flin Flon, Man.	CYFO	YFO	N	Y	Y	N	Y
Fort Chipewyan, Alta.	CYPY	YPY	N	Y	Y	N	Y
Fort Mcmurray, Alta.	CYMM	YMM	N	Y	Y	N	Y
Fort Nelson, B.C.	CYYE	YYE	N	Y	Y	N	Y

NAM - CANADA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Fort Simpsion, N.W.T.	CYFS	YFS	N	Y	Y	N	Y
Fort Smith, N.W.T.	CYSM	YSM	N	Y	Y	N	Y
Fort St John, B.C.	CYXJ	YXJ	N	Y	Y	N	Y
Fredericton, N.B.	CYFC	YFC	N	Y	Y	N	Y
Gander Intl, Nfld.	CYQX	YQX	Y	Y	Y	N	Y
Gaspe, Que.	CYGP	YGP	N	Y	Y	N	Y
Geraldton, Ont.	CYGQ	YGQ	N	Y	Y	N	Y
Gillam, Man.	CYGX	YGX	N	Y	Y	N	Y
Gjoa Haven, N.W.T.	CYHK	YHK	N	Y	Y	N	Y
Goose Bay/Goose, Nfld.	CYYR	YYR	Y	Y	Y	N	Y
Gore Bay-Manitoulin, Ont.	CYZE	YZE	N	Y	Y	N	Y
Grande Prairie, Alta.	CYQU	YQU	N	Y	Y	N	Y
Greenwood, N.S.	CYZX	YZX	N	Y	Y	N	Y
Halifax Intl, N.S.	CYHZ	YHZ	Y	Y	Y	N	Y
Halifax/Shearwater, N.S.	CYAW	YAW	N	Y	Y	N	Y
Hall Beach, N.W.T.	CYUX	YUX	N	Y	Y	N	Y
Hamilton, Ont.	CYHM	YHM	N	Y	Y	N	Y
Havre St-Pierre, Que.	CYGV	YGV	N	Y	Y	N	Y
Hay River, Y.T.	CYHY	YHY	N	Y	Y	N	Y
High Level, Alta.	CYOJ	YOJ	N	Y	Y	N	Y
Holman, N.W.T.	CYHI	YHI	N	Y	Y	N	Y
Hope, B.C.	CYHE	YHE	N	Y	Y	N	Y
Igloolik, N.W.T.	CYGT	YGT	N	Y	Y	N	Y
Iles-De-La-Madeleine, Que.	CYGR	YGR	N	Y	Y	N	Y
Inuvik (Mike Zubko) N.W.T.	CYEV	YEV	N	Y	Y	N	Y
Iqaluit, N.W.T.	CYFB	YFB	Y	Y	Y	N	Y
Island Lake, Man.	CYIV	YIV	N	Y	Y	N	Y
Kamloops, B.C.	CYKA	YKA	N	Y	Y	N	Y
Kangirsuk, Que.	CYAS	YAS	N	Y	Y	N	Y
Kapuskasing, Ont.	CYYU	YYU	N	Y	Y	N	Y
Kelowna, B.C.	CYLW	YLW	N	Y	Y	N	Y
Kenora, Ont.	CYQK	YQK	N	Y	Y	N	Y
Kitchener/Waterloo Regional, Ont.	CYKF	YKF	N	Y	Y	N	Y
Koala Nwt	CYOA	YOA	N	Y	Y	N	Y
Kugluktuk, N.W.T.	CYCO	YCO	N	Y	Y	N	Y
Kuujjuaq, Que.	CYVP	YVP	N	Y	Y	N	Y
Kuujjuarapik, Que.	CYGW	YGW	N	Y	Y	N	Y
La Grande Riviere, Que.	CYGL	YGL	N	Y	Y	N	Y
La Grande-3, Que.	CYAD	YAD	N	Y	Y	N	Y
La Grande-4, Que.	CYAH	YAH	N	Y	Y	N	Y
La Ronge, Sask.	CYVC	YVC	N	Y	Y	N	Y
Lethbridge, Alta.	CYQL	YQL	N	Y	Y	N	Y
Lloydminster, Alta.	CYLL	YLL	N	Y	Y	N	Y
London, Ont.	CYXU	YXU	N	Y	Y	N	Y

NAM - CANADA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Lourdes-De-Blanc-Sablon, Que	CYBX	YBX	N	Y	Y	N	Y
Lupin, N.W.T.	CYWO	YWO	N	Y	Y	N	Y
Lynn Lake, Man.	CYYL	YYL	N	Y	Y	N	Y
Mackenzie, B.C.	CYZY	YZY	N	Y	Y	N	Y
Matagami, Que.	CYNM	YNM	N	Y	Y	N	Y
Meadow Lake, Sask.	CYLJ	YLJ	N	Y	Y	N	Y
Medicine Hat, Alta.	CYXH	YXH	N	Y	Y	N	Y
Miramichi Airport	CYCH	YCH	N	Y	Y	N	Y
Moncton, N.B.	CYQM	YQM	N	Y	Y	N	Y
Mont-Joli, Que.	CYYY	YYY	N	Y	Y	N	Y
Montreal Intl (Mirabel), Que.	CYMX	YMX	Y	Y	Y	N	Y
Montreal/Pierre Elliot Trudeau International Airport	CYUL	YUL	Y	Y	Y	N	Y
Montreal/St-Hubert, Que	CYHU	YHU	N	Y	Y	N	Y
Moose Jaw, Sask.	CYMJ	YMJ	N	Y	Y	N	Y
Moosonee, Ont.	CYMO	YMO	N	Y	Y	N	Y
Muskoka, Ont.	CYQA	YQA	N	Y	Y	N	Y
Nanaimo, B.C.	CYCD	YCD	N	Y	Y	N	Y
Nanisivik, N.W.T.	CYSR	YSR	N	Y	Y	N	Y
Natashquan, Que.	CYNA	YNA	N	Y	Y	N	Y
Norman Wells, N.W.T.	CYVQ	YVQ	N	Y	Y	N	Y
North Battleford(Cameron Mcintosh),Sask.	CYQW	YQW	N	Y	Y	N	Y
North Bay, Ont.	CYYB	YYB	N	Y	Y	N	Y
Norway House, Man.	CYNE	YNE	N	Y	Y	N	Y
Ottawa/Gatineau, Que.	CYND	YND	N	Y	Y	N	Y
Ottawa/Macdonald-Cartier Intl, Ont.	CYOW	YOW	Y	Y	Y	N	Y
Paulatuk, N.W.T.	CYPC	YPC	N	Y	Y	N	Y
Peace River, Alta.	CYPE	YPE	N	Y	Y	N	Y
Pelly Bay (Town Site), N.W.T.	CYBB	YBB	N	Y	Y	N	Y
Penticton, B.C.	CYYF	YYF	N	Y	Y	N	Y
Peterborough, Ont.	CYPQ	YPQ	N	Y	Y	N	Y
Pickle Lake, Ont.	CYPL	YPL	N	Y	Y	N	Y
Pond Inlet, N.W.T.	CYIO	YIO	N	Y	Y	N	Y
Port Hardy, B.C.	CYZT	YZT	N	Y	Y	N	Y
Portage La Prairie/Southport, Man.	CYPG	YPG	N	Y	Y	N	Y
Powell River, B.C.	CYPW	YPW	N	Y	Y	N	Y
Prince Albert, Sask.	CYPA	YPA	N	Y	Y	N	Y
Prince George, B.C.	CYXS	YXS	N	Y	Y	N	Y
Prince Rupert, B.C.	CYPR	YPR	N	Y	Y	N	Y
Puvirnituq, Que.	CYPX	YPX	N	Y	Y	N	Y
Quebec/Jean Lesage Intl, Que.	CYQB	YQB	N	Y	Y	N	Y
Riviere-Du-Loup, Que.	CYRI	YRI	N	Y	Y	N	Y
Saint John, N.B.	CYSJ	YSJ	N	Y	Y	N	Y
Saskatoon/John G. Diefenbaker, Sask.	CYXE	YXE	N	Y	Y	N	Y

NAM - CANADA							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Schefferville, Que.	CYKL	YKL	N	Y	Y	N	Y
Sept-Iles, Que.	CYZV	YZV	N	Y	Y	N	Y
St. John's Intl, Nfld.	CYYT	YYT	Y	Y	Y	N	Y
Stephenville, Nfld.	CYJT	YJT	N	Y	Y	N	Y
Sydney, N.S.	CYQY	YQY	N	Y	Y	N	Y
Thunder Bay, Ont.	CYQT	YQT	N	Y	Y	N	Y
Toronto/Lester B. Pearson Intl, Ont.	CYYZ	YYZ	Y	Y	Y	N	Y
Trenton, Ns	CYTN	YTN	N	Y	Y	N	Y
Val-D'or, Que.	CYVO	YVO	N	Y	Y	N	Y
Vancouver Intl, B.C.	CYVR	YVR	Y	Y	Y	N	Y
Victoria Intl, B.C.	CYYJ	YYJ	Y	Y	Y	N	Y
Wabush, Nfld.	CYWK	YWK	N	Y	Y	N	Y
Whitehorse,	CYXY	YXY	N	Y	Y	N	Y
Windsor, Ont.	CYQG	YQG	Y	Y	Y	N	Y
Winnipeg Intl, Man.	CYWG	YWG	Y	Y	Y	N	Y
Yellowknife, N.W.T.	CYZF	YZF	N	Y	Y	N	Y
NAM - FRANCE							
Saint Pierre	LFVP		N	Y	Y	Y	N
NAM - NORTHERN MARIANA ISLANDS (UNITED STATES)							
West Tinian,Tinian Island	PGWT		N	Y	Y	N	Y
NAM - UNITED STATES							
Aberdeen Regional,Sd.	KABR	ABR	N	Y	Y	N	Y
Aberdeen/Phillips Aaf Proving Ground,Md.	KAPG	APG	N	Y	Y	N	Y
Abilene/Regional, Tx.	KABI	ABI	N	Y	Y	N	Y
Akron, Oh.	KAKR	AKR	N	Y	Y	N	Y
Akron-Canton Regional,Oh.	KCAK	CAK	N	Y	Y	N	Y
Albany Country, Ny.	KALB	ALB	N	Y	Y	N	Y
Albuquerque/Intl, Nm.	KABQ	ABQ	N	Y	Y	N	Y
Alexandria/Chandler Field, Mn.	KAXN	AXN	N	Y	Y	N	Y
Alexandria/England Afb, La	KAEX	AEX	N	Y	Y	N	Y
Alexandria/Esler Regional La	KESF	ESF	N	Y	Y	N	Y
Alice/Intl, Tx.	KALI	ALI	N	Y	Y	N	Y
Allentown-Bethlehem-Easton, Pa.	KABE	ABE	N	Y	Y	N	Y
Alpena County Regional,Mi.	KAPN	APN	N	Y	Y	N	Y
Alton/St Louis Regional,Il.	KALN	ALN	N	Y	Y	N	Y
Altoona-Blair County,Pa.	KAOO	AOO	N	Y	Y	N	Y
Amarillo Intl,Tx.	KAMA	AMA	N	Y	Y	N	Y
Anderson County,Sc.	KAND	AND	N	Y	Y	N	Y
Anniston Metropolitain,Al.	KANB	ANB	N	Y	Y	N	Y
Arcata/Eureka,Ca.	KACV	ACV	N	Y	Y	N	Y
Asheville Regional,Nc.	KAVL	AVL	N	Y	Y	N	Y
Aspen-Pitkin Co/Sardy Field, Co.	KASE	ASE	N	Y	Y	N	Y
Athens/Ben Epps, Ga.	KAHN	AHN	N	Y	Y	N	Y
Atlanta/De Kalb-Peachtree, Ga.	KPDK	PDK	N	Y	Y	N	N
Atlanta/Fulton County-Brown, Ga.	KFTY	FTY	N	Y	Y	N	Y
Atlantic City/Intl, Nj.	KACY	ACY	N	Y	Y	N	Y
Augusta/Bush Field, Ga.	KAGS	AGS	N	Y	Y	N	Y
Aurora/Buckley Angb,Co	KBKF	BKF	N	Y	Y	N	Y

NAM - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Austin/Robert Mueller Municipal,Tx.	KAUS	BSM	N	Y	Y	N	Y
Baker/Muni,Or.	KBKE	BKE	N	Y	Y	N	Y
Bakersfield/Meadows Field, Ca.	KBFL	BFL	N	Y	Y	N	Y
Baltimore/Martin State,Md.	KMTN	MTN	N	Y	Y	N	Y
Baltimore-Washington I. Thurgood Marshall, Md.	KBWI	BWI	Y	Y	Y	N	Y
Bangor International, Me.	KBGR	BGR	Y	Y	Y	N	Y
Baton Rouge Metropolitan/Ryan Field,La.	KBTR	BTR	N	Y	Y	N	Y
Battle Creek/W.K.Kellogg,Mi.	KBTL	BTL	N	Y	Y	N	Y
Baudette Intl, Mn.	KBDE	BDE	N				
Beaumont Port-Arthur/Jefferson County, Tx.	KBPT	BPT	N	Y	Y	N	Y
Beckley/Raleigh County Memorial, Wv.	KBKW	BKW	N	Y	Y	N	Y
Bedford/Laurence G.Hanscom Field,Ma.	KBED	BED	N	Y	Y	N	Y
Bellingham/Intl, Wa.	KBLI	BLI	N	Y	Y	N	Y
Beverly/Muni,Ma.	KBVY	BVY	N	Y	Y	N	Y
Billings Logan Intl,Mt.	KBIL	BIL	N	Y	Y	N	Y
Binghamton Regional/Edwin A Linkfield,Ny.	KBGM	BGM	N	Y	Y	N	Y
Birmingham, Al.	KBHM	BHM	N	Y	Y	N	Y
Bismarck Muni,Nd.	KBIS	BIS	N	Y	Y	N	Y
Boise Air Terminal/Gowen Fld ,Id.	KBOI	BOI	N	Y	Y	N	Y
Boston/General Edward Lawrence Logan Intl, Ma.	KBOS	BOS	Y	Y	Y	N	Y
Bozeman Mt.Gallatin Fld.	KBZN	BZN	N	Y	Y	N	Y
Bradford Regional,Pa.	KBFD	BFD	N	Y	Y	N	Y
Bradley International, Ct.	KBDL	BDL	Y	Y	Y	N	Y
Bridgeport/Igor I Sikorsky Memorial,Ct.	KBDR	BDR	N	Y	Y	N	Y
Bristol-Kingsport-Johnson City/Tri City Rgnal,Tn.	KTRI	TRI	N	Y	Y	N	Y
Brownsville/South Padre Is. Intl, Tx.	KBRO	BRO	Y	Y	Y	N	Y
Brunswick/Glynco Jetport,Ga.	KBQK	BQK	N	Y	Y	N	Y
Brunswick/Malcom-Mckinnon,Mo	KSSI	SSI	N	Y	Y	N	Y
Buffalo/Greater Buffalo Intl, Ny.	KBUF	BUF	N	Y	Y	N	Y
Burbank/Glendale-Passadena, Ca.	KBUR	BUR	N	Y	Y	N	Y
Burley Muni,Id.	KBYI	BYI	N	Y	Y	N	Y
Burlington Muni,Ia.	KBRL	BRL	N	Y	Y	N	Y
Burlington/Intl, Vt.	KBTV	BTV	N	Y	Y	N	Y
Butte/Bert Mooney,Mt.	KBTM	BTM	N	Y	Y	N	Y
Calexico/Intl, Ca.	KCXL	CXL	Y	Y	Y	N	Y
Cape Girardeau Muni,Mo.	KCGI	CGI	N	Y	Y	N	Y
Caribou Muni, Me.	KCAR	CAR	N	Y	Y	N	Y
Carlsbad/Cavern City Air Terminal,Nm.	KCNM	CNM	N	Y	Y	N	Y
Casper/Natrona County Intl, Wy.	KCPR	CPR	N	Y	Y	N	Y
Cedar City Muni,Ut.	KCDC	CDC	N	Y	Y	N	Y
Cedar Rapids Muni,Ia.	KCID	CID	N	Y	Y	N	Y
Champaign-Urbana/University Of Il.Willard,Il.	KCMI	CMI	N	Y	Y	N	Y
Chandler/Williams Afb,Az.	KIWA	IWA	N	Y	Y	N	Y
Charleston/Afb Intl,Sc.	KCHS	CHS	N	Y	Y	N	Y
Charleston/Yeager,Wv.	KCRW	CRW	N	Y	Y	N	Y
Charlotte/Douglas International, Nc.	KCLT	CLT	N	Y	Y	N	Y
Charlottesville-Albemarle,Va	KCHO	CHO	N	Y	Y	N	Y
Chattanooga/Lovell, Tn.	KCHA	CHA	N	Y	Y	N	Y
Cherry Point Mcas/Cunningham Field,Nc.	KNKT	NKT	N	Y	Y	N	Y

NAM - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Cheyenne/Cheyenne,Wy.	KCYS	CYS	N	Y	Y	N	Y
Chicago - O'hare International, Il.	KORD	ORD	Y	Y	Y	N	Y
Chicago/Chicago Midway,Il.	KMDW	MDW	Y	Y	Y	N	Y
Cincinnati/Muni Lunken Field Oh.	KLUK	LUK	N	Y	Y	N	Y
Clarksburg/Benedum,Wv.	KCKB	CKB	N	Y	Y	N	Y
Cleveland/Burke Lakefront, Oh.	KBKL	BKL	N	Y	Y	N	Y
Cleveland-Hopkins International, Oh.	KCLE	CLE		Y	Y	N	Y
College Station/ Easterwood Field, Tx.	KCLL	CLL	N	Y	Y	N	Y
Colorado Springs Municipal	KCOS	COS	N	Y	Y	N	Y
Columbia Mtropolitan,Sc.	KCAE	CAE	N	Y	Y	N	Y
Columbia Regional.Mo.	KCOU	COU	N	Y	Y	N	Y
Columbus Metropolitan,Ga.	KCSG	CSG	N	Y	Y	N	Y
Columbus/Port Columbus International, Oh.	KCMH	CMH	N	Y	Y	N	Y
Columbus/Rickenbacker,Oh.	KLCK	LCK	N	Y	Y	N	Y
Corpus Christi/Corpus Christi Nas	KNGP	NGP	N	Y	Y	N	Y
Corpus Christi/Intl,Tx.	KCRP	CRP	Y	Y	Y	N	Y
Covington-Cincinnati/Northern Kentucky Intl, Ky.	KCVG	CVG	N	Y	Y	N	Y
Crescent City/Jack Mcnamara Field Arpt,Ca.	KCEC	CEC	N	Y	Y	N	Y
Crestview/Bob Sikes, Fl.	KCEW	CEW	N	Y	Y	N	Y
Crossville Memorial,Tn.	KCSV	CSV	N	Y	Y	N	Y
Cut Bank Muni, Mt.	KCTB	CTB	N	Y	Y	N	Y
Dallas/Dallas-Love Field,Tx.	KDAL	DAL	N	Y	Y	N	Y
Dallas-Fort Worth International, Tx.	KDFW	DFW	Y	Y	Y	N	Y
Danville Regional,Va.	KDAN	DAN	N	Y	Y	N	Y
Dayton/James M. Cox Dayton Intl, Oh.	KDAY	DAY	N	Y	Y	N	Y
Daytona Beach Regional,Fl.	KDAB	DAB	N	Y	Y	N	Y
Decatur/Decatur,Il.	KDEC	DEC	N	Y	Y	N	Y
Del Rio/Laughlin Afb, Tx.	KDLF	DLF	Y	Y	Y	N	Y
Deming Muni,Nm.	KDMN	DMN	N	Y	Y	N	Y
Denver International	KDEN	DEN	Y	Y	Y	N	Y
Denver Jeffco Airpor	KBJC	BJC	N	Y	Y	N	Y
Des Moines Intl,Ia.	KDSM	DSM	N	Y	Y	N	Y
Detroit Metropolitan Wayne County, Mi.	KDTW	DTW	Y	Y	Y	N	Y
Detroit/Detroit City, Mi.	KDET	DET	N	Y	Y	N	Y
Detroit/Willow Run, Mi.	KYIP	YIP	N	Y	Y	N	Y
Dodge City Regional,Ks.	KDDC	DDC	N	Y	Y	N	Y
Dothan, Al.	KDHN	DHN	N	Y	Y	N	Y
Du Bois/Jefferson County,Pa.	KDUJ	DUJ	N	Y	Y	N	Y
Duluth/Intl, Mn.	KDLH	DLH	N	Y	Y	N	Y
Eagle County,Co.	KEGE	EGE	N	Y	Y	N	Y
Eau Claire County,Wi.	KEAU	EAU	N	Y	Y	N	Y
El Paso International, Tx.	KELP	ELP	N	Y	Y	N	Y
Elizabeth City Coast Guard, Nc.	KECG	ECG	N	Y	Y	N	Y
Elkins/Jennings Randolph Fld ,Wv.	KEKN	EKN	N	Y	Y	N	Y
Elko Muni-J.C. Harris Field, Nv	KEKO	EKO	N	Y	Y	N	Y
Elmira/Corning Regional,Ny.	KELM	ELM	N	Y	Y	N	Y
Ely/Muni,Mn.	KELO	ELO	N	Y	Y	N	Y
Erie Intl,Pa.	KERI	ERI	N	Y	Y	N	Y

NAM - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Eugene/Mahlon Sweet Field,Or	KEUG	EUG	N	Y	Y	N	Y
Evansville Regional,In.	KEVV	EVV	N	Y	Y	N	Y
Everett/Snohomish County (Paine Field), Wa.	KPAE	PAE	Y	Y	Y	N	Y
Fargo/Hector Intl,Nd.	KFAR	FAR	N	Y	Y	N	Y
Farmingdale/Republic,Ny.	KFRG	FRG	N	Y	Y	N	Y
Fayetteville/Regional Grannis Field,Nc.	KFAY	FAY	N	Y	Y	N	Y
Flagstaff/Pulliam,Az.	KFLG	FLG	N	Y	Y	N	Y
Flint/Bishop Intl,Mi.	KFNT	FNT	N	Y	Y	N	Y
Florence Regional, Sc.	KFLO	FLO	N	Y	Y	N	Y
Fort Lauderdale/Hollywood International, Fl.	KFLL	FLL	Y	Y	Y	N	Y
Fort Myers/Southwest Florida International,	KRSW	RSW	N	Y	Y	N	Y
Fort Smith/Regional,Ar.	KFSM	FSM	N	Y	Y	N	Y
Fort Wayne International,In.	KFWA	FWA	N	Y	Y	N	Y
Fort Worth Alliance, Tx.	KAFW	AFW	N	Y	Y	N	Y
Fort Worth/Meacham,	KFTW	FTW	N	Y	Y	N	Y
Frenchville/Northern Aroostook Rgnl,Me.	KFVE	FVE	N	Y	Y	N	Y
Fresno Yosemite International, Ca.	KFAT	FAT	N	Y	Y	N	Y
Gainesville Regional, Fl.	KGNV	GNV	N	Y	Y	N	Y
Gallup,Nm.	KGUP	GUP	N	Y	Y	N	Y
Galveston,Tx,Scholes Fld.	KGLS	GLS	N	Y	Y	N	Y
Galveston/Walker Field,Co,	KGJT	GJT	N	Y	Y	N	Y
Garden City, Ks.	KGCK	GCK	N	Y	Y	N	Y
Gary,In.	KGYY	GYY	N	Y	Y	N	Y
George Bush Intercontinental/Houston,	KIAH	IAH	Y	Y	Y	N	Y
Glasgow/Intl,Mt.	KGGW	GGW	N	Y	Y	N	Y
Glens Falls/Warren County, Ny.	KGFL	GFL	N	Y	Y	N	Y
Grand Canyon/National Park, Az.	KGCN	GCN	N	Y	Y	N	Y
Grand Forks/Intl, Nd.	KGFK	GFK	N	Y	Y	N	Y
Grand Rapids/Kent County Intl,Mi.	KGRR	GRR	N	Y	Y	N	Y
Grande Island/Central Nebraska Regional,Ne.	KGRI	GRI	N	Y	Y	N	Y
Great Falls/Intl, Mt.	KGTF	GTF	N	Y	Y	N	Y
Greenbay/Austin Straubel,Wi.	KGRB	GRB	N	Y	Y	N	Y
Greensboro,N.C,Piedmont Triad Intl.	KGSO	GSO	N	Y	Y	N	Y
Greenwood/Le Flore Arpt,Ms.	KGWO	GWO	N	Y	Y	N	Y
Greer/Greenville-Spartanburg ,Sc.	KGSP	GSP	N	Y	Y	N	Y
Groton-New London,Ct.	KGON	GON	N				
Gulfport/Biloxi Regional,Ms	KGPT	GPT	N	Y	Y	N	Y
Gwinn/K.I. Sawyer Afb,Mi.	KSAW	SAW	N	Y	Y	N	Y
Hancock, Mi Houghton County Memorial	KCMX	CMX	N	Y	Y	N	Y
Harlingen/Rio Grande Valley Intl,Tx.	KHRL	HRL	Y	Y	Y	N	Y
Harrisburg/Intl,Pa.	KMDT	DT	N	Y	Y	N	Y
Harrison/Boone County, Ar.	KHRO	HRO	N	Y	Y	N	Y
Hartford/Brainard ,Ct.	KHFD	HFD	N	Y	Y	N	Y
Hartsfield - Jackson Atlanta International, Ga.	KATL	ATL	N	Y	Y	N	Y
Helena Regional,Mt.	KHLN	HLN	N	Y	Y	N	Y
Hibbing/Chisholm-Hibbing, Mn.	KHIB	HIB	N	Y	Y	N	Y
Hickory/Regional, Nc	KHKY	HKY	N	Y	Y	N	Y
Hoqiam/Bowerman Fld,Wa.	KHQM	HQM	N	Y	Y	N	Y
Hot Springs/Memorial Field, Ar.	KHOT	HOT	N	Y	Y	N	Y

NAM - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Houston/William P. Hobby,Tx.	KHOU	HOU	N	Y	Y	N	Y
Huntington/Tri-State Milton J.Ferguson Field,W	KHTS	HTS	N	Y	Y	N	Y
Huntsville/Intl Carl T.Jones Field,Al.	KHSV	HSV	N	Y	Y	N	Y
Huron Regional,Sd.	KHON	HON	N	Y	Y	N	Y
Hutchinson, Ks.	KHUT	HUT	N	Y	Y	N	Y
Hyannis/Barnstable Muni-Boardman P. Field,Ma.	KHYA	HYA	N	Y	Y	N	Y
Idaho Falls/Fanning Field,Id .	KIDA	IDA	N	Y	Y	N	Y
Indianapolis International,	KIND	IND	Y	Y	Y	N	Y
International Falls, Mn Y	KINL	INL	N	Y	Y	N	Y
Islip/Long Island Macarthur, Ny.	KISP	ISP	N	Y	Y	N	Y
Jackson County/Reynolds Field,Mi.	KJXN	JXN	N	Y	Y	N	Y
Jackson Hole,Wy	KJAC	JAC	N	Y	Y	N	Y
Jackson/Intl ,Ms.	KJAN	JAN	N	Y	Y	N	Y
Jackson/Mc Kellar-Sipes Regional,Tn.	KMKL	MKL	N	Y	Y	N	Y
Jacksonville/Intl, Fl..	KJAX	JAX	N	Y	Y	N	Y
Jamestown Muni,Nd.	KJMS	JMS	N	Y	Y	N	Y
Johnstown-Cambria County,Pa.	KJST	JST	N	Y	Y	N	Y
Jonesboro Muni,Ar.	KJBR	JBR	N	Y	Y	N	Y
Joplin Regional,Mo.	KJLN	JLN	N	Y	Y	N	Y
Kalamazoo/Battle Creek Intl, Mi.	KAZO	AZO	N	Y	Y	N	Y
Kankakee/Greater,Il.	KIKK	IKK	N	Y	Y	N	Y
Kansas City International, Mo.	KMCI	MCI	N	Y	Y	N	Y
Kansas City/Kansas City Downtown,Mo.	KMKC	MKC	N	Y	Y	N	Y
Key West/Key West Intl, Fl.	KEYW	EYW	N	Y	Y	N	Y
Kirksville/ Regional,Mo.	KIRK	IRK	N	Y	Y	N	Y
Klamath Falls Intl,Or.	KLMT	LMT	N	Y	Y	N	Y
Knoxville/Mcgee Tyson,Tn.	KTYS	TYS	N	Y	Y	N	Y
La Crosse Muni,Wi.	KLSE	LSE	N	Y	Y	N	Y
Lafayette/Regional, La.	KLFT	LFT	N	Y	Y	N	Y
Lake Charles/Regional,La.	KLCH	LCH	N	Y	Y	N	Y
Lansing/Capital City,Mi.	KLAN	LAN	N	Y	Y	N	Y
Laramie/General Brees Field Wy.	KLAR	LAR	N	Y	Y	N	Y
Laredo International, Tx.	KLRD	LRD	Y	Y	Y	N	Y
Las Cruces/Intl,Nm.	KLRU	LRU	N	Y	Y	N	Y
Las Vegas/Mccarran International, Nv.	KLAS	LAS	Y	Y	Y	N	Y
Latrobe/Westmorland County, Pa.	KLBE	LBE	N	Y	Y	N	Y
Lawrence/Muni,Ma.	KLWM	LWM	N	Y	Y	N	Y
Lebanon Muni,Nh.	KLEB	LEB	N	Y	Y	N	Y
Lexington/Blue Grass,Ky.	KLEX	LEX	N	Y	Y	N	Y
Liberal Muni,Ks.	KLBL	LBL	N	Y	Y	N	Y
Lincoln/Municipal, Ne.	KLNK	LNK	N	Y	Y	N	Y
Little Rock/Adams Field,Ar.	KLIT	LIT	N	Y	Y	N	Y
Livingston/Mission Field,Mt.	KLVM	LVM	N	Y	Y	N	Y
London-Corbin/Mage Field,Ky.	KLOZ	LOZ	N	Y	Y	N	Y
Long Beach/Daugherty Field, Ca.	KLGB	LGB	N	Y	Y	N	Y
Longview/Gregg County, Tx.	KGGG	GGG	N	Y	Y	N	Y
Los Angeles International, Ca.	KLAX	LAX	N	Y	Y	N	Y
Louisville/Bowman Field,Ky.	KLOU	LOU	N	Y	Y	N	Y
Louisville/Standiford,Ky.	KSDF	SDF	N	Y	Y	N	Y

NAM - UNITED STATES							
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Lubbock/Intl, Tx.	KLBB	LBB	N	Y	Y	N	Y
Lynchburg/Regional Preston Glenn Field,Va.	KLYH	LYH	N	Y	Y	N	Y
Macon/Middle Georgia Regional,Ga.	KMCN	MCN	N	Y	Y	N	Y
Madison/Dane County Regional Truax Field,Wi.	KMSN	MSN	N	Y	Y	N	Y
Manchester/Manchester,Nh.	KMHT	MHT	N	Y	Y	N	Y
Manhattan/Muni,Ks.	KMHK	MHK	N	Y	Y	N	Y
Mansfield/Lahm Muni,Oh.	KMFD	MFD	N	Y	Y	N	Y
Martinsburg/Eastern Wv. Regl-Shepherd Field,Wv.	KMRB	MRB	N	Y	Y	N	Y
Marysville/Yuba County Aprt, Ca.	KMYV	MYV	N	Y	Y	N	Y
Massena/Intl Richards Field, Ny	KMSS	MSS	N	Y	Y	N	Y
Mcalester/Regional,Ok.	KMLC	MLC	N	Y	Y	N	Y
Mcallen/Miller Intl, Tx.	KMFE	MFE	N	Y	Y	N	Y
Medford-Jackson County,Or.	KMFR	MFR	N	Y	Y	N	Y
Melbourne/Regional,Fl.	KMLB	MLB	N	Y	Y	N	Y
Memphis International, Tenn.	KMEM	MEM	N	Y	Y	N	Y
Meridian/Key Field,Ms.	KMEI	MEI	N	Y	Y	N	Y
Metropolitan Oakland International, Ca.	KOAK	OAK	N	Y	Y	N	Y
Miami International, Fl.	KMIA	MIA	Y	Y	Y	N	Y
Midland/Intl,Tx.	KMAF	MAF	N	Y	Y	N	Y
Miles City/Frank Wiley Field Mt.	KMLS	MLS	N	Y	Y	N	Y
Millville/Muni, Nj.	KMIV	MIV	N	Y	Y	N	Y
Milwaukee/General Mitchell International, Wi.	KMKE	MKE	Y	Y	Y	N	Y
Minneapolis-St. Paul Intl (Wold Chamberlain), Mn.	KMSP	MSP	Y	Y	Y	N	Y
Minot/Intl, Nd.	KMOT	MOT	N	Y	Y	N	Y
Missoula/Intl,Mt.	KMSO	MSO	N	Y	Y	N	Y
Mobile Downtown, Al	KBFM	BFM	N	Y	Y	N	Y
Mobile/Regional, Al.	KMOB	MOB	N	Y	Y	N	Y
Moline/Quad-City,Il.	KMLI	MLI	N	Y	Y	N	Y
Monroe/Monroe Regional,La.	KMLU	MLU	N	Y	Y	N	Y
Monterey/Peninsula,Ca.	KMRY	MRY	N	Y	Y	N	Y
Montgomery/Dannelly Field,Al	KMGM	MGM	N	Y	Y	N	Y
Morgantown/Muni-Walter L. Bill Hart Fld,Wv.	KMGW	MGW	N	Y	Y	N	Y
Morristown/Muni,Nj.	KMMU	MMU	N	Y	Y	N	Y
Muscle Shoals/Regional,Ms.	KMSL	MSL	N	Y	Y	N	Y
Muskegon/County,Mi.	KMKG	MKG	N	Y	Y	N	Y
Myrtle Beach/Myrtle Beach Afb, Sc.	KMYR	MYR	N	Y	Y	N	Y
Nantucket Memorial, Ma.	KACK	ACK	N	Y	Y	N	Y
Naples-Muni,Fl.	KAPF	APF	N	Y	Y	N	Y
Nashville International, Tn.	KBNA	BNA	N	Y	Y	N	Y
New Bedford/Muni,Ma.	KEWB	EWB	N	Y	Y	N	Y
New Bern/Craven County Regional,Nc.	KEWN	EWN	N	Y	Y	N	Y
New Haven/Tweed,Ct.	KHVN	HVN	N	Y	Y	N	Y
New Orleans/Lakefront,La.	KNEW	NEW	N	Y	Y	N	Y
New Orleans/Louis Armstrong New Orleans Intl,	KMSY	MSY	N	Y	Y	N	Y
New York/John F. Kennedy International, Ny.	KJFK	JFK	Y	Y	Y	N	Y
New York/La Guardia, Ny.	KLGA	LGA	N	Y	Y	N	Y
Newark Liberty International, Nj.	KEWR	EWR	Y	Y	Y	N	Y
Newburgh/Stewart Intl,Ny.	KSWF	SWF	N	Y	Y	N	Y

NAM - UNITED STATES							
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Newport News/Williamsburg Intl,Va.	KPHF	PHF	N	Y	Y	N	Y
Niagara Falls International, Ny.	KIAG	IAG	N	Y	Y	N	Y
Norfolk/Intl,Va.	KORF	ORF	N	Y	Y	N	Y
North Bend Muni,Or.	KOTH	OTH	N	Y	Y	N	Y
North Kingstown/Quonset State,Ri.	KOQU	OQU	N	Y	Y	N	Y
North Platte/Regional,Ne.	KLBF	LBF	N	Y	Y	N	Y
Ogden/Hinckley,Ut.	KOGD	OGD	N	Y	Y	N	Y
Oklahoma City/Will Roger World, Ok.	KOKC	OKC	N	Y	Y	N	Y
Olympia,Wa.	KOLM	OLM	N	Y	Y	N	Y
Omaha/Eppley Air Field,Ne.	KOMA	OMA	N	Y	Y	N	Y
Omaha/Offut Afb,Ne.	KOFF	OFF	N	Y	Y	N	Y
Ontario International, Ca.	KONT	ONT	Y	Y	Y	N	Y
Orlando International, Fl.	KMCO	MCO	N	Y	Y	N	Y
Orlando/Central Florida Regional,Fl.	KSFB	SFB	N	Y	Y	N	Y
Oshkosh/Wittman Regional,Wi.	KOSH	OSH	N	Y	Y	N	Y
Ottumwa/Industrial,Ia.	KOTM	OTM	N	Y	Y	N	Y
Owensboro-Davies County,Ky.	KOWB	OWB	N	Y	Y	N	Y
Paducah/Barkley Regional,Ky.	KPAH	PAH	N	Y	Y	N	Y
Palm Beach International, Fl.	KPBI	PBI	Y	Y	Y	N	Y
Palm Springs/Regional,Ca	KPSP	PSP	N	Y	Y	N	Y
Palmdale Production Flight/Test Intl Af Plant Ca.	KPMD	PMD	Y	Y	Y	N	Y
Panama City/Bay County,Fl.	KPFN	PFN	N	Y	Y	N	Y
Parkeresburg/Wood County-Gil Robb Wilson Arpt	KPKB	PKB	N	Y	Y	N	Y
Paso Robles/Muni,Ca.	KPRB	PRB	N	Y	Y	N	Y
Pellston/Regional Airport Of Emmet County,Mi.	KPLN	PLN	N	Y	Y	N	Y
Pensacola/Regional, Fl.	KPNS	PNS	N	Y	Y	N	Y
Peoria/Greaterpreoria Regional,Il.	KPIA	PIA	N	Y	Y	N	Y
Philadelphia International, Pa.	KPHL	PHL	N	Y	Y	N	Y
Phoenix Sky Harbor International, Az.	KPHX	PHX	N	Y	Y	N	Y
Pierre/Muni,Sd.	KPIR	PIR	N	Y	Y	N	Y
Pittsburgh/Allegheny County, Pa.	KAGC	AGC	N	Y	Y	N	Y
Pittsburgh/Pittsburgh International, Pa.	KPIT	PIT	Y	Y	Y	N	Y
Plattsburgh/Clinton Co,Ny.	KPLB	PLB	N	Y	Y	N	Y
Pocatello/Regional,Id.	KPIH	PIH	N	Y	Y	N	Y
Point Mugu/Point Mugu Nas, Ca.,U.S	KNTD	NTD	N	Y	Y	N	Y
Pontiac-Oakland,Mi.	KPTK	PTK	N	Y	Y	N	Y
Port Angeles/William R. Fairchild Intl,Wa.	KCLM	CLM	N	Y	Y	N	Y
Portland International, Or.	KPDX	PDX	Y	Y	Y	N	Y
Portland/Intl Jetport,Me.	KPWM	PWM	N	Y	Y	N	Y
Portsmouth/Pease Intl Tradeport,Nh.	KPSM	PSM	N	Y	Y	N	Y
Poughkeepsie/Dutchess County Ny.	KPOU	POU	N	Y	Y	N	Y
Prescott/Ernest A, Love Field,Az.	KPRC	PRC	N	Y	Y	N	Y
Presque Is/Northern Maine Regional Arpt,Me.	KPQI	PQI	N	Y	Y	N	Y
Providence/Theodore Francis Greene State,Ri.	KPVD	PVD	N	Y	Y	N	Y
Pueblo Memorial, Co.	KPUB	PUB	Y	Y	Y	N	Y
Quincy/Muni Baldwin Field, Il.	KUIN	UIN	N	Y	Y	N	Y
Raleigh-Durham International, Nc.	KRDU	RDU	N	Y	Y	N	Y
Rapid City/Regional,Sd.	KRAP	RAP	N	Y	Y	N	Y
Reading/Regional Carl A. Spaatz Field,Pa.	KRDG	RDG	N	Y	Y	N	Y

NAM - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Red Bluff/Muni,Ca.	KRBL	RBL	N	Y	Y	N	Y
Redding/Muni,Ca.	KRDD	RDD	N	Y	Y	N	Y
Redmond/Roberts Field,Or.	KRDM	RDM	N	Y	Y	N	Y
Reno/Tahoe International, Nv.	KRNO	RNO	N	Y	Y	N	Y
Renton/Muni,Wa.	KRNT	RNT	N	Y	Y	N	Y
Richmond/Intl (Byrd Field), Va.	KRIC	RIC	N	Y	Y	N	Y
Roanoke/Regional Woodrum Field,Va.	KROA	ROA	N	Y	Y	N	Y
Rochester/Greater Rochester Intl,Ny.	KROC	ROC	N	Y	Y	N	Y
Rochester/Muni,Mn.	KRST	RST	N	Y	Y	N	Y
Rockford/Greater Rockford,Il	KRFD	RFD	N	Y	Y	N	Y
Rocksprings/Swetwater County Wy.	KRKS	RKS	N	Y	Y	N	Y
Rocky-Mount/Wilson,Nc.	KRWI	RWI	N	Y	Y	N	Y
Roswell/Industrial Air Center, Nm.	KROW	ROW	N	Y	Y	N	Y
Sacramento International, Ca.	KSMF	SMF	N	Y	Y	N	Y
Sacramento/Executive, Ca.	KSAC	SAC	N	Y	Y	N	Y
Saginaw/Tri City Intl,Mi.	KMBS	MBS	N	Y	Y	N	Y
Salina/Muni,Ks.	KSLN	SLN	N	Y	Y	N	Y
Salinas/Muni,Ca.	KSNS	SNS	N	Y	Y	N	Y
Salisbury/Wicomico County Regional,Md.	KSBY	SBY	N	Y	Y	N	Y
Salt Lake City International, Ut.	KSLC	SLC	N	Y	Y	N	Y
San Angelo/Mathis Field,Tx.	KSJT	SJT	N	Y	Y	N	Y
San Antonio International, Tx.	KSAT	SAT	Y	Y	Y	N	Y
San Bernardino/Norton Afb, Ca.	KSBD	SBD	N	Y	Y	N	Y
San Diego International, Ca.	KSAN	SAN	Y	Y	Y	N	Y
San Diego/Brown Fld Muni,Ca.	KSDM	SDM	N	Y	Y	N	Y
San Francisco/Intl,Ca.	KSFO	SFO	Y	Y	Y	N	Y
San Jose Norman Y. Mineta International, Ca.	KSJC	SJC	Y	Y	Y	N	Y
San Lui Obispo/County Mc Chesney Field,Ca.	KSBP	SBP	N	Y	Y	N	Y
Santa Ana/John Wayne Arpt Orange County,Ca	KSNA	SNA	N	Y	Y	N	Y
Santa Barbara/Muni,Ca.	KSBA	SBA	N	Y	Y	N	Y
Santa Maria/Publiv,Ca.	KSMX	SMX	N	Y	Y	N	Y
Saranac Lake/Adirondack,Ny.	KSLK	SLK	N	Y	Y	N	Y
Sarasota/Bradenton,Fl.	KSRQ	SRQ	N	Y	Y	N	Y
Sault Ste Marie/Chippewa County Intl,Mi.	KCIU	CIU	N	Y	Y	N	Y
Savannah/Intl, Ga.	KSAV	SAV	N	Y	Y	N	Y
Schenectady,Ny.	KSCH	SCH	N	Y	Y	N	Y
Scottsbluff/William B.Heilig Field,Ne.	KBFF	BFF	N	Y	Y	N	Y
Scranton/Wilkes-Barre Intl, Pa.	KAVP	AVP	N	Y	Y	N	Y
Seattle Boeing Field/King Country Intl, Wa.	KBFI	BFI	N	Y	Y	N	Y
Seattle/Seattle-Tacoma International, Wa.	KSEA	SEA	Y	Y	Y	N	Y
Sheridan/County,Wy	KSHR	SHR	N	Y	Y	N	Y
Shreveport/Regional,La.	KSHV	SHV	N	Y	Y	N	Y
Sioux City/Gateway,Ia.	KSUX	SUX	N	Y	Y	N	Y
Sioux Falls/Joe Foss Field, Sd.	KFSD	FSD	N	Y	Y	N	Y
South Bend/Michiana Rgnal, In.	KSBN	SBN	N	Y	Y	N	Y
South Lake Tahoe/Lake Tahoe, Ca.	KTVL	TVL	N	Y	Y	N	Y
Southwest Georgia Regional, Albany,Ga.	KABY	ABY	N	Y	Y	N	Y
Spokane International, Wa.	KGEG	GEG	Y	Y	Y	N	Y
Spokane/Felts Field,Wa.	KSFF	SFF	N	Y	Y	N	Y

NAM - UNITED STATES							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
Springfield/Capital,Il.	KSPI	SPI	N	Y	Y	N	Y
Springfield/Regional,Mo.	KSGF	SGF	N	Y	Y	N	Y
Springfield-Chicope/Westover Afb Metropolit	KCEF	CEF	N	Y	Y	N	Y
St Cloud/Muni,Mn.	KSTC	STC	N	Y	Y	N	Y
St Joseph/Rosecrans Memorial Mo.	KSTJ	STJ	N	Y	Y	N	Y
St Paul/Downtown Holman Fld, Mn.	KSTP	STP	N	Y	Y	N	Y
St. Louis, Mo.Spirit Of St Louis	KSUS	SUS	N	Y	Y	N	Y
St. Louis/Lambert-St. Louis International, Mo.	KSTL	STL	Y	Y	Y	N	Y
St. Petersburg/Clearwater Intl, Fl.	KPIE	PIE	N	Y	Y	N	Y
Stockton Metropolitan, Ca.	KSCK	SCK	Y	Y	Y	N	Y
Syracuse Hancock International, Ny.	KSYR	SYR	Y	Y	Y	N	Y
Tacoma/Tacoma Narrows,Wa.	KTIW	TIW	N	Y	Y	N	Y
Tallahassee/Regional,Fl.	KTLH	TLH	N	Y	Y	N	Y
Tampa International, Fl.	KTPA	TPA	Y	Y	Y	N	Y
Terre Haute/Hulman Regional, In.	KHUF	HUF	N	Y	Y	N	Y
Teterboro, Nj.	KTEB	TEB	N	Y	Y	N	Y
Texarkana/Regional-Webb Fld Tx.	KTXK	TXK	N	Y	Y	N	Y
Toledo/Express,Oh.	KTOL	TOL	N	Y	Y	N	Y
Trenton/Mercer County,Nj.	KTTN	TTN	N	Y	Y	N	Y
Treverse City/Cherry Capital Mi.	KTVC	TVC	N	Y	Y	N	Y
Truth Or Consequences/ Municipal, Nm.	KTCS	TCS	N	Y	Y	N	Y
Tucson International, Az.	KTUS	TUS	Y	Y	Y	N	Y
Tucumcari/Muni, Nm.	KTCC	TCC	N	Y	Y	N	Y
Tulsa/Intl, Ok.	KTUL	TUL	N	Y	Y	N	Y
Tupelo/Muni-C D Lemons,Ms.	KTUP	TUP	N	Y	Y	N	Y
Tuscaloosa/Muni,Al.	KTCL	TCL	N	Y	Y	N	Y
Twin Falls/Sun Valley Regnl Joslin Fld,Id.	KTWF	TWF	N	Y	Y	N	Y
Tyler/Pounds Field,Tx.	KTYR	TYR	N	Y	Y	N	Y
Ukiah/Muni,Ca	KUKI	UKI	N	Y	Y	N	Y
Utica/Oneida County,Ny.	KUCA	UCA	N	Y	Y	N	Y
Valdosta/Regional,Ga.	KVLD	VLD	N	Y	Y	N	Y
Vero Beach/Vero Beach Muni, Fl.	KVRB	VRB	N	Y	Y	N	Y
Victoria/Regional,Tx.	KVCT	VCT	N	Y	Y	N	Y
Waco Regional, Tx.	KACT	ACT	N	Y	Y	N	Y
Walla Walla Regional,Wa.	KALW	ALW	N	Y	Y	N	Y
Washington Dulles International, Dc.	KIAD	IAD	Y	Y	Y	N	Y
Washington/National, Dc.	KDCA	DCA	N	Y	Y	N	Y
Waterloo Muni,Ia.	KALO	ALO	N	Y	Y	N	Y
Watertown Muni,Sd.	KATY	ATY	N	Y	Y	N	Y
Watertown/Intl,Ny.	KART	ART	N	Y	Y	N	Y
Westfield/Barnes Muni,Ma.	KBAF	BAF	N	Y	Y	N	Y
White Plains/Westchester County Ny.	KHPN	HPN	N	Y	Y	N	Y
Wichita Mid-Continent, Ks.	KICT	ICT	Y	Y	Y	N	Y
Williamsport/Lycoming County Pa.	KIPT	IPT	N	Y	Y	N	Y
Wilmington/New Castle,De.	KILG	ILG	N	Y	Y	N	Y
Wilmington/New Hannover Intl, Nc.	KILM	ILM	N	Y	Y	N	Y
Wink/Winkler County, Tx.	KINK	INK	N	Y	Y	N	Y
Winston Salem/Smith Reynolds, Nc.	KINT	INT	N	Y	Y	N	Y
Worcester/Muni,Ma.	KORH	ORH	N	Y	Y	N	Y

NAM - UNITED STATES							
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Worland/Muni,Wy.	KWRL	WRL	N	Y	Y	N	Y
Wrightstown/Mcguire Afb,Nj.	KWRI	WRI	N	Y	Y	N	Y
Yakima/Air Terminal,Wa.	KYKM	YKM	N	Y	Y	N	Y
Youngstown/Muni, Oh.	KYNG	YNG	N	Y	Y	N	Y
Yuma/Yuma Mcas.Yuma Intl,Az.	KYUM	YUM	N	Y	Y	N	Y
Zanesville,Oh.	KZZV	ZZV	N	Y	Y	N	Y

ANNEX 1 – NAT

NAT - BERMUDA (UNITED KINGDOM)							
Name of Aerodrome	**CCCC**	**IATA**	**AOP**	**SA**	**SP**	**FC**	**FT**
L.F. Wade International Airport	TXKF	BDA	Y	Y	Y	N	Y
NAT - DENMARK							
Vagar Y	EKVG		N	Y	Y	Y	N
NAT - GREENLAND (DENMARK)							
Ilulissat Y	BGJN		N	Y	Y	Y	N
Kangerlussuaq	BGSF	SFJ	N	Y	Y	N	Y
Kulusuk	BGKK		N	Y	Y	Y	N
Narsarsuaq	BGBW		N	Y	Y	Y	N
Nuuk	BGGH		N	Y	Y	Y	N
Thule Air Base (Mil)	BGTL	THU	N	Y	Y	N	Y
NAT - ICELAND							
Akureyri	BIAR	AEY	Y	Y	Y	N	Y
Egilsstadir	BIEG	EGS	Y	Y	Y	N	Y
Hofn/Hornafjordur	BIHN	HFN	N	Y	Y	Y	N
Isafjordur	BIIS	IFJ	N	Y	Y	Y	N
Keflavik Airport,App/Twr,Ops,Met	BIKF	KEF	Y	Y	Y	N	Y
Reykjavik Airport,Nof,Met	BIRK	REK	Y	Y	Y	N	Y
Saudarkrokur	BIKR	SAK	N	Y	Y	Y	N
Vestmannaeyjar	BIVM	VEY	N	Y	Y	Y	N
NAT - PORTUGAL (MADEIRA AND AZORES) (PORTUGAL)							
Ponta Delgada	LPPD	PDL	Y	Y	Y	N	Y
Santa Maria	LPAZ	SMG	Y	Y	Y	N	Y

AFI OPMET DB Catalogue Section 2 :

SIGMET

Structure of the tables :

- State
- FIR name
- CCCC ICAO location indicator of the FIR/UIR

The tables are sorted by ICAO regions:

  - AFI
  - ASIA/PAC
  - CAR/SAM
  - EUR
  - MID
  - NAM
  - NAT

ANNEX 2 – AFI

State	FIR Name	CCCC
Algeria	Alger FIR/SRR	DAAA
ANGOLA	Luanda FIR/SRR	FNAN
BOTSWANA	Gaborone FIR/SRR	FBGR
BURUNDI	Bujumbura FIR	HBBA
CANARY ISLANDS (Spain)	Canarias FIR and Grando RSS	GCCC
CAPE VERDE	Sal Oceanic FIR/SRR	GVSC
CHAD	N'Djamena FIR/SRR	FTTT
CONGO	Brazzaville FIR/SRR	FCCC
DEMOCRATIC REP. OF THE CONGO	Zaire FIR, Kinshasa SRR	FZAA
EGYPT	Cairo FIR/SRR	HECC
ETHIOPIA	Addis Ababa FIR/SRR	HAAA
ERITREA	Asmara FIR	HHAA
GHANA	Accra FIR/SRR	DGAC
KENYA	Nairobi FIR/SRR	HKNA
LIBERIA	Roberts FIR/SRR	GLRB
LIBYAN ARAB JAMAHIRIYA	Tripoli FIR/SRR	HLLL
MADAGASCAR	Antananarivo FIR/SRR	FMMM
MALAWI	Lilongwe FIR/SRR	FWLL
MAURITIUS	Mauritius FIR/SRR	FIMM
MOROCCO	Casablanca FIR/SRR	GMMM
MOZAMBIQUE	Beira FIR/SRR	FQBE
NAMIBIA	Windhoek FIR/SRR	FYWH
NIGER	Niamey FIR/SRR	DRRR
NIGERIA	Kano FIR/SRR	DNKK
RWANDA	Kigali FIR/SRR	HRYR
SENEGAL	Dakar FIR/SRR	GOOO
	Dakar oceanic FIR	
SEYCHELLES	Seychelles FIR/SRR	FSSS
SOMALIA	Mogadishu FIR/SRR	HCSM
SOUTH AFRICA	Johannesburg FIR/ARCC	FAJS
SUDAN	Khartoum FIR/SRR	HSSS
TUNISIA	Tunis FIR/UIR	DTTC
UGANDA	Entebbe FIR	HUEC
UNITED REPUBLIC OF TANZANIA	Dar-es-Salaam FIR	HTDC
ZAMBIA	Lusaka FIR/SRR	FLFI
ZIMBABWE	Harare FIR/SRR	FVHA

ANNEX 2 – ASIA/PAC

State	FIR Name	CCCC
AUSTRALIA	Melbourne FIR 1)	YMMM
	Brisbane FIR 2)	YBBB
BANGLADESH	Dhaka FIR and SRR	VGFR
CAMBODIA	Phnom-Penh FIR and SRR	VDPP
CHINA	Beijing FIR and SRR	ZBPE
	Guangzhou FIR and SRR	ZGZU
	Kunming FIR and SRR	ZPKM
	Lanzhou FIR and SRR	ZLHW
	Sanya FIR and SRR	ZJSA
	Shanghai FIR and SRR	ZSHA
	Shenyang FIR and SRR	ZYSH
	Taibei FIR and SRR	RCAA
	Urumqi FIR and SRR	ZWUQ
	Wuhan FIR and SRR	ZHWH
	Hong Kong FIR and SRR	VHHK
DEMOCRATIC PEOPLE'S REPUBLIC OF KOREA	Pyongyang FIR and SRR	ZKKK
FIJI	Nadi FIR and SRR	NFFF
FRENCH POLYNESIA	Tahiti FIR and SRR	NTTT
INDIA	Chennai FIR and SRR	VOMF
	Delhi FIR and SRR	VIDF
	Kolkata FIR and SRR	VECF
	Mumbai FIR and SRR	VABF
INDONESIA	Jakarta FIR/UIR and SRR	WIIF
	Ujung Pandang FIR/UIR and SRR	WAAF
JAPAN	Fukuoka FIR and Tokyo SRR	RJJJ
LAO PEOPLE'S DEMOCRATIC REPUBLIC	Vientiane FIR and SRR	VLVT
MALAYSIA	Kota Kinabalu FIR and SRR	WBFC
	Kuala Lumpur FIR and SRR	WMFC
MALDIVES	Male FIR and SRR	VRMM
MONGOLIA	Ulan Bator FIR and SRR	ZMUB
MYANMAR	Yangon FIR and SRR	VYYY
NAURU	Nauru FIR and SRR	ANAU
NEPAL	Kathmandu FIR and SRR	VNSM
NEW ZEALAND	Auckland Oceanic FIR and SRR	NZZO
	New Zealand FIR AND SRR	NZZC
PAKISTAN	Karachi FIR and SRR	OPKR
	Lahore FIR and SRR	OPLR
PAPUA NEW GUINEA	Port Moresby FIR and SRR	AYPY
PHILIPPINES	Manila FIR and SRR	RPHI
REPUBLIC OF KOREA	Incheon FIR and SRR	RKRR
SINGAPORE	Singapore FIR and SRR	WSJC
SOLOMON ISLANDS	Honiara FIR and SRR	AGGG
SRI LANKA	Colombo FIR and SRR	VCBI
THAILAND	Bangkok FIR and SRR	VTBB
UNITED STATES	Anchorage FIR	PAZA
	Oakland Oceanic and Honolulu SRR.	KZOA
	Oakland Oceanic FIR	KZOA
VIET NAM	Hanoi FIR and SRR	VVNB
	Ho-Chi-Minh FIR and SRR	VVTS

ANNEX 2 – EUR

State	FIR Name	CCCC
ALBANIA	Tirana FIR/RCC	LAAA
ARMENIA	Yerevan FIR/Armenia SRR	UDYZ
AUSTRIA	Wien FIR/RCC	LOVV
AZERBAIJAN	Baku FIR	UBBB
BELARUS	Minsk FIR/Belarus SRR	UMMV
BELGIUM	Brussels FIR/SRR	EBBU
BOSNIA AND HERZEGOVINA	Sarajevo FIR/UIR/SSR	LYBA
	Sarajevo FIR/UIR/SSR	LDZB
BULGARIA	Sofia FIR/ SRR	LBSR
	Varna FIR/SRR	LBWR
CROATIA	Zagreb FIR/UIR/SRR	LDZO
CYPRUS	Nicosia FIR	LCCC
	Episkop SRR	LCRO
CZECH REPUBLIC	Praha FIR/SRR	LKAA
DENMARK	København FIR	EKDK
	Karup SRR	EKMC
ESTONIA	Tallinn FIR/UIR	EETT
FINLAND	Tampere FIR/UIR/SRR	EFES
	Rovaniemi FIR/UIR/SRR	EFPS
FRANCE	Marseille FIR/SRR	LFMM
	Bordeaux FIR/SRR	LFBB
	Brest FIR/SRR	LFRR
	Reims FIR/SRR	LFEE
	Paris FIR/SRR	LFFF
GEORGIA	Tbilisi FIR/Georgia SRR	UGGZ
GERMANY	Berlin FIR/ Berlin UIR	EDBB
	Düsseldorf FIR	EDLL
	Frankfurt FIR	EDFF
	Bremen FIR	EDWW
	München FIR	EDM
GREECE	Athinai FIR/UIR/SRR	LGGG
HUNGARY	Budapest FIR/UIR/SRR	LHCC
IRELAND	Shannon FIR/SRR	EISL
	Shannon UIR	EISU
ITALY	Brindisi FIR	LIBB
	Milano FIR	LIMM
	Roma FIR	LIRR
KAZAKHSTAN	Aktyubinsk FIR	UATT
	Almaty FIR	UAAA
	Zhezkazgan FIR	UAKD
	Atyrau FIR	UATG
	Kostanay FIR	UAUU
	Kyzylorda FIR	UAOO
	Semipalatinsk FIR	UASS
	Aktau FIR	UATE
	Astana FIR	UACC
	Shymkent FIR	UAII
	Uralsk FIR	UARR

State	FIR Name	CCCC
KYRGYZSTAN	Bishkek FIR	UAFM
LATVIA	Riga FIR/UIR	EVRR
LITHUANIA	Vilnius FIR/UIR	EYVL
MALTA	Malta FIR/SRR	LMMM
NETHERLANDS	Amsterdam FIR	EHAA
NORWAY	Norway FIR/UIR	ENOR
	Bodø Oceanic FIR	ENOB
POLAND	Warszawa FIR/SRR	EPWW
PORTUGAL	Lisboa FIR/UIR/SRR	LPPC
REPUBLIC OF MOLDOVA	Chisinau FIR/Moldova SRR	LUKK
ROMANIA	Bucuresti FIR/SRR	LRBB
RUSSIAN FEDERATION	Amderma FIR	ULDD
	Anadyr FIR	UHMA
	Arkhangelsk FIR	ULAA
	Astrakhan FIR	URWA
	Batagay FIR/North-East	UEBB
	Beryozovo FIR/North	USHB
	Blagoveshchensk FIR/Far East SRR	UHBB
	Bratsk FIR/East Siberia SRR	UIBB
	Chaybukha FIR	UHMG
	Chersky FIR/North-East Siberia SRR	UESS
	Chita FIR/East Siberia SRR	UIAA
	Chokurdakh FIR/North-	UESO
	Chulman FIR	UELL
	Dickson FIR	UODD
	Irkutsk FIR/East Siberia SRR	UIII
	Kaliningrad FIR	UMKK
	Kazan FIR/Tatarstan SRR	UWKD
	Khabarovsk FIR/Far East SRR	UHHH
	Pevek FIR	UHMP
	Rostov FIR/North Caucasus SRR	URRV
	Salekhard FIR/North	USDD
	Samara FIR/Privolzhsky SRR	UWWW
	Seymchan FIR	UHMS
	Omolon FIR	UHMN
	Surgut FIR/North Siberia SRR	USRR
	Syktyvkar FIR/Komi SRR	UUYY
	Tarko-Sale FIR	USD
	Tiksi FIR/North-East	UEST
	Tyumen FIR/North	USTT
	Turukhansk FIR	UOTT
	Ufa FIR	UWUU
	Velikie Luki FIR	ULOL
	Vladivostok FIR/	UHWW
	Volgograd FI	URWW
	Vologda FIR	ULWW
	Vorkuta FIR	UUYW
	Yakutsk FIR/North-East	UEEE
	Yekaterinburg FIR/Urals SRR	USSS
	Yeniseysk FIR	UNII
	Yuzhno-Sakhalinsk FIR	UHSS
	Zhigansk FIR	UEVV
	Zyryanka FIR/North-	UESU

State	FIR Name	CCCC
SERBIA & MONTENEGRO	Beograd FIR/UIR/SRR	LYBA
SLOVAKIA	Bratislava FIR/UIR	LZBB
SLOVENIA	Ljubljana FIR/UIR	LJLA
SPAIN	Barcelona FIR/UIR	LECB
	Canarias FIR/UIR/SRR	GCCC
	Madrid FIR/UIR	LECM
	Baleares SRR	LECP
SWEDEN	Sweden FIR/UIR/SRR	ESAA
SWITZERLAND	Genève FIR/UIR	LSAW
THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA	Ohrid FIR	LWOH
	Skopje FIR/UIR/SRR	LWSS
TAJIKISTAN	Dushanbe FIR/SRR	UTDD
TURKEY	Ankara FIR/SRR	LTAA
	Istanbul FIR	LTBB
TURKMENISTAN	Askhabad FIR	UTAA
UKRAINE	Kyiv FIR/SRR	UKBV
	Kharkiv FIR/SRR	UKHV
	L'viv FIR/SSR	ULLV
	Odesa FIR/SRR	UKOV
	Simferopol' FIR/SRR	UKFV
UNITED KINGDOM	London FIR/UIR	EGTT
	Shanwick Oceanic Control Area/FIR	EGGX
	Scottish FIR/UIR	EGPX
	UK Mission Control Centre SRR	EGQP
UZBEKISTAN	Nukus FIR	UTNN
	Samarkand FIR	UTSS
	Tashkent FIR	UTTT

ANNEX 2 – MID

State	FIR Name	CCCC
AFGHANISTAN	KABUL FIR and SRR	OAKX
BAHRAIN	BAHRAIN FIR and SRR	OBBB
EGYPT	CAIRO FIR and SRR	HECC
IRAN (ISLAMIC REPUBLIC OF)	TEHRAN FIR and SRR	OIIX
IRAQ	BAGHDAD FIR and SRR	ORBS
ISRAEL	TEL AVIV FIR and SRR	LLAD
JORDAN	AMMAN FIR and SRR	OJAC
KUWAIT	KUWAIT FIR and SRR	OKAC
LEBANON	BEIRUT FIR and SRR	OLBA
OMAN	MUSCAT FIR and SRR	OOMM
SAUDI ARABIA	JEDDAH FIR and SRR	OEJD
SYRIAN ARAB REPUBLIC	DAMASCUS FIR and SRR	OSDI
UNITED ARAB EMIRATES	EMIRATES FIR and SRR	OMAE
YEMEN	SANAA FIR and SRR	OYSN

ANNEX 2 – CAR/SAM

State	FIR Name	CCCC
ARGENTINA	Ezeiza FIR/SRR	SAEF
	Ezeiza ACC/UIR	SAEU
	Comodoro Rivadavia FIR/SRR	SAVF
	Comodoro Rivadavia ACC/UIR	SAVU
	Córdoba FIR/SRR	SACF
	Córdoba ACC/UIR	SACU
	Mendoza FIR/SRR	**SAMF**
	Mendoza ACC/UIR	SAMV
	Resistencia FIR/SRR	**SARR**
	Resistencia ACC/UIR	SARU
BOLIVIA	La Paz FIR/SRR	SLLP
BRAZIL	Brasilia FIR/UIR/SRR	SBBS
	Curitiba FIR/UIR/UTA/SRR	SBCW
	Amazónica FIR/UIR/SRR	SBAZ
	Recife FIR/UIR/SRR	SBRE
	Atlántico FIR/UIR/SRR	SBAO

ANNEX 2 – NAM

State	FIR Name	CCCC

ANNEX 2 – NAT

State	FIR Name	CCCC

ANNEXE 3

AFI OPMET DB Catalogue Section 3 :

Database Bulletins

At this moment, the common database catalogue contains only a limited list of the AFI database bulletins. For the complete lists of available bulletins of the individual database agents, please refer to the national AFI OPMET DB catalogues (for URLs : see section 5 of this document).

Structure of the tables :

- Bulletin type (FC, FT or SA)
- “AAii” bulletin identifier
- CCCC ICAO location indicators.

ANNEXE 3 : AFI Bulletin Catalogue

TT	AAii	CCCC of Aerodromes
AFI - Addis Ababa		
SA	EA31	HAAB HAAY HADR HDAM
FT	EA31	HAAB HAAY HADR HDAM
AFI - Alger		
SA	AF31	DAAE DAUB DAAJ DAUO DAOV DAAP DATG DAAV DAUU DAOB DAUT DAUK
		DAAG DABB DABC DAOO DAON DAAT DTTA HLLT HLLB
FC	AF31	DAAE DAUB DAAJ DAUO DAOV DAAP DATG DAAV DAUU DAOB DAUT DAUK
FT	AF31	DAAG DABB DABC DAOO DAON DAAT DTTA HLLT HLLB
AFI - Antananarivo		
SA	IO31	FMMI FIMP FMEE FMNM FMCH FMMT
FT	IO31	FMMI FIMP FMEE FMNM FMCH FMMT
AFI - Brazzaville		
SA	AM31	FCBB FEFF FKKD FZAA FOOL FPST FCPP FKYS FOOG FGSL FNLU
FT	AM31	FCBB FEFF FKKD FZAA FOOL FPST FCPP FKYS FOOG FGSL FNLU
AFI - Caire		
SA	AF31	HECA HEAX HELX HSSS
FT	AF31	HECA HEAX HELX HSSS
AFI - Casablanca		
SA	MC31	GMMC GMAA GMMX GMME GMTT GCLP GCTS
FT	MC31	GMMC GMAA GMMX GMME GMTT GCLP GCTS
AFI - Dakar		
SA	AO32	GOOY GBYD GABS GFLL GLRB GQNN DIAP GUCY GQPP GVAC GGOV
FT	AO32	GOOY GBYD GABS GFLL GLRB GQNN DIAP GUCY GQPP GVAC GGOV
AFI - Pretoria (Johannesburg)		
SA	AP32	FAPR FACT FADN FBSK FVHA FWLI FLLS FQMA FQBR FABL FDMS FXMM FYWH
FT	AP32	FAPR FACT FADN FBSK FVHA FWLI FLLS FQMA FQBR FABL FDMS FXMM FYWH
AFI - Nairobi		
SA	AE32	HKJK HTDA HUEN HKMO HTKJ HBBA HRYR FSIA HCMM
FT	AE32	HKJK HTDA HUEN HKMO HTKJ HBBA HRYR FSIA HCMM
AFI - Niamey		
SA	AO33	DRNN DGAA DBBB DNKN DNMM DXXX FTTJ DFFDY
FT	AO33	DRNN DGAA DBBB DNKN DNMM DXXX FTTJ DFFDY

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFRICA AND INDIAN OCEAN (AFI) REGIONAL SIGMET GUIDE

NINTHEDITION — SEPTEMBER 2007

Amendment 2- June 2011

Prepared by the ICAO ESAF &WACAF Offices
And published under the authority of the Secretary General

RECORD OF AMENDMENTS AND CORRIGENDA

Amendments			
No.	Date of issue	Date entered	Entered by
1	31/05/2010	07/06/2010	RO/MET
2	2/06/2011	30/06/2011	ROMET

Corrigenda			
No.	Date of issue	Date entered	Entered by
1	28/10/2008	27/10/2008	RO/MET

TABLE OF CONTENTS

1. INTRODUCTION

1.1 The main purpose of this document is to provide guidance for standardization and harmonization of the procedures and formats related to the aeronautical meteorological warnings for hazardous en-route meteorological phenomena, known as SIGMET information. The guidance is complementary to the Annex 3 standards and recommended practices regarding SIGMET and to the SIGMET related provisions of the AFI Basic ANP and FASID, ICAO **Doc 7474**.

1.2 ICAO provisions concerning the issuance and dissemination of SIGMET information are contained in:

- **Annex 3 -** *Meteorological Service for International Air Navigation*, Part I, Chapter 3, 3.4 – 3.7, Chapter 7, 7.1, and Part II, Appendix 6;
- **AFI Basic ANP**, Part I and VI, and **AFIFASID** Table MET 1B, MET 3A and MET 3B;
- **Annex 11 -** *Air Traffic Services*, Chapter 4, 4.2.1 and Chapter 7, 7.1;
- PANS – *Air Traffic Management*, **Doc 4444**, Chapter 9, 9.1.3.2;
- Regional Supplementary Procedures**, Doc 7030**, Part 1, 8.2.

Additional guidance on the SIGMET procedures is contained in the *Manual of Aeronautical Meteorological Practice* (**Doc 8896**), and the *Manual on Coordination between Air Traffic Services, Aeronautical Information Services and Aeronautical Meteorological Services* (**Doc 9377**).

1.3 The SIGMET Guide is intended mainly to assist the MWOs in the ICAO African and Indian Ocean (AFIAFI) Region in preparing and disseminating SIGMET information. It provides detailed information on the format of SIGMET messages as specified by Annex 3. The explanations of the format are accompanied by examples based on region-specific meteorological phenomena. The guide also provides information regarding the necessary coordination between the MWOs, the ATS units and the pilots, and their respective responsibilities.

1.4 This document was prepared by the ICAO AFI and ESAF Regional Offices. It is reviewed and updated regularly in order to be kept in line with the relevant ICAO SARPs and regional procedures. This current version incorporates the changes to SIGMET-related provisions included in Amendment 74 to Annex 3 which was approved by ICAO Council on 21 February 2007.

2. RESPONSIBILITIES AND COORDINATION

2.1 General

2.1.1 SIGMET is warning information, hence it is of highest priority among other types of meteorological information provided to the aviation users. The primary purpose of SIGMET is for in-flight service, which requires timely transmission of the SIGMET messages to pilots by the ATS units and/or through VOLMET and D-VOLMET.

2.1.2 Airlines are the main users of the SIGMET information. They contribute to the effectiveness of the SIGMET service through issuance of special air-reports reported by pilots to the ATS units. Special air-reports are among the most valuable sources of information for the Meteorological Watch Offices (MWO) in the preparation of SIGMET. The ATS units receiving special air-reports should forward them to the associated MWOs without delay.

2.1.3 In view of the foregoing, it should be well understood that the effectiveness of the SIGMET service depends strongly on the level of collaboration between the MWOs, ATS units and pilots. That is why, close coordination between these parties, as well as mutual understanding of their needs and responsibilities, are essential for the successful implementation of the SIGMET service.

2.1.4 For the special cases of SIGMET for volcanic ash and tropical cyclones, the MWOs are provided with advisories from the volcanic ash advisory centres (VAAC), and tropical cyclone advisory centres (TCAC) designated in the Regional ANP.

2.1.5 Another use of SIGMET is for the flight planning. This requires global dissemination of SIGMET through the international OPMET data banks and the satellite broadcasts: ISCS and SADIS. SIGMET should also be distributed to the World Area Forecast Centres (WAFC) London and Washington for use in the preparation of the significant weather (SIGWX) forecasts.

2.1.6 In the next paragraphs, the main responsibilities and coordination links,related to the provision of SIGMET information, are described.

2.2 Meteorological Watch Office - responsibilities and procedures related to SIGMET

2.2.1 SIGMET information should be issued by the meteorological watch offices (MWO) in order to provide timely warning for occurrence or expected occurrence of specified en-route weather phenomena, affecting the safety of the flight operations in the MWO’s area of responsibility (AOR). SIGMET provides information concerning the location, extent, intensity and expected evolution of the specified phenomena.

2.2.2 Information about the provision of SIGMET service, including details on the designated MWO(s), should be included in the State’s Aeronautical Information Publication (AIP) as specified in Annex 15, Aeronautical Information Service, Appendix 1, GEN 3.5.8.

2.2.3 All designated MWOs in the AFI Region are listed in Appendix A to this Guide extracted from the FASID AFI Table MET 1B. The MWOs situated outside of the AFI Region are in italic.

2.2.4 If, for some reason, a State is not able to meet its obligations for establishing MWO(s) and for provision of SIGMET for the FIR(s) or control area(s) the State is providing air traffic services, arrangements should be made between the meteorological authorities of the States concerned, that another

MWOtakes over these responsibilities for certain period of time. Such delegation of responsibilities should be notified by a NOTAM and a letter to the ICAO Regional Office.

2.2.5 Since the MWO is normally not a separate administrative unit, but part of the functions of an aerodrome meteorological office or other meteorological office, the meteorological authority concerned should ensure that the MWO obligations and responsibilities are clearly defined and assigned to the unit designated to serve as MWO. Corresponding operational procedures should be established and the meteorological staff should be trained accordingly.

2.2.6 In preparing SIGMET information MWOs should follow strictly the format determined in Annex 3 (detailed format description is provided in Appendix 6, Table A6-1 of Annex 3). SIGMET should be issued only for those weather phenomena listed in Annex 3 and only when specified criteria for their intensity and spatial extent are met.

Note: MWOs should not issue SIGMET for weather phenomena of lower intensity or such of transient nature or smaller scale, which do not affect significantly the flight safety and their transmission to users may lead to unnecessary precautionary measures.

2.2.7 The MWOs should be adequately equipped in order to be able to identify, analyze and forecast (to the extent required) those phenomena for which SIGMET is required. The MWO should make use of all available sources of information, such as special air-reports, information from meteorological satellites and weather radars.

2.2.8 On receipt of a special air-report from the associated ACC or FIC, the MWO should:

a) issue SIGMET information based on the special-air report; or

b) send the special air-report for on-ward transmission in case that the issuance of SIGMET information is not warranted (e.g., the phenomenon concerned is of transient nature).

2.2.9 Appropriate telecommunication means should be available at the MWO in order to ensure timely dissemination of SIGMET according to a dissemination scheme, which should include transmission to:

- Local ATS users;
- Aeronautical MET offices within its AOR, where SIGMET is required for briefing and/or flight documentation;
- Other MWOs concerned (it should be ensured that SIGMET is sent to all MWOs whose AORs are, at least partly, within the 1800 km (1000 NM) range from the observed phenomenon);
- Centres designated for transmission of VOLMET or D-VOLMET where SIGMET is required for those transmissions;
- Responsible AMBEX centre and Regional OPMET Data Bank (it should be arranged that through the AMBEX scheme SIGMETs are sent to the designated OPMET data banks in the other ICAO regions, to the WAFCs and to the SADIS and ISCS providers);

- Responsible TCAC or VAAC according to FASID Tables MET 3A and MET 3B.

2.2.10 In issuing SIGMET for tropical cyclones or volcanic ash, the MWOs should include as appropriate the advisory information received from the responsible TCAC or VAAC. In addition to the information received from the TCAC and VAAC the MWOs may use the available complementary information from other reliable sources. In such a case the responsibility for this additional information would lie completely on the MWO concerned.

2.3 Responsibilities of ATS units

2.3.1 Close coordination should be established between the MWO and the corresponding ATS unit (ACC or FIC) and arrangements should be in place to ensure:

- receipt without delay and display at the relevant ATS units of SIGMET issued by the associated MWO;

- receipt and display at the ATS unit of SIGMETs issued by MWOs responsible for the adjacent FIRs/ACCs if these SIGMETs are required according to para2.3.4 below, (within 1800 km (1000 NM) range from the observed phenomenon); and

- transmission without delay by the ATS unit of special air-reports received through voice communication to the associated MWO.

2.3.2 SIGMET information should be transmitted to aircraft with the least possible delay on the initiative of the responsible ATS unit, by the preferred method of direct transmission followed by acknowledgement or by a general call when the number of aircraft would render the preferred method impracticable.

2.3.3 SIGMET information transmitted to aircraft-in-flight should cover a portion of the route up to two hours flying time ahead of the aircraft. SIGMET should be transmitted only during the time corresponding to their period of validity (p. 3.4.2.3 refers).

2.3.4 Air traffic controllers should ascertain whether any of the currently valid SIGMETs may affect any of the aircraft they are controlling, either within or outside the FIR/CTA boundary, up to a distance of 1000 NM (1800 KM), which corresponds to two hours flying time ahead of the current position of the aircraft. If this is the case, the controllers should at their own initiative transmit the SIGMET promptly to the aircraft-in-flight likely to be affected. If necessary, the controller should pass to the aircraft available SIGMETs issued for the adjacent FIR/CTA, which the aircraft will be entering, if relevant to the expected flight route.

2.3.5 The ATS units concerned should also transmit to aircraft-in-flight the special air reports received, for which SIGMET has not been issued. Once a SIGMET for the weather phenomenon reported in the special air report is made available this obligation of the ATS unit expires.

2.4 Responsibilities of pilots

2.4.1 Timely issuance of SIGMET information is largely dependant on the prompt receipt by MWOs of special air-reports. That is why, it is essential that pilots prepare and transmit such reports to the ATS units whenever any of the specified en-route conditions are encountered or observed.

2.4.2 It should be emphasized that, even when automatic dependent surveillance (ADS) is being used for routine air-reports, pilots should continue to make special air-reports.

2.5 Coordination between MWOs and the TCACs and VAACs

2.5.1 Amongst the phenomena for which SIGMET information is required, the volcanic ash clouds and tropical cyclones are of particular importance for the planning of long-haul flights.

2.5.2 Since the identification, analysis and forecasting of volcanic ash and tropical cyclones requires considerable technical and human resource, normally not available at each MWO, the Volcanic Ash Advisory Centres (VAAC) and Tropical Cyclone Advisory Centres (TCAC) have been designated to provided VA and TC advisories to the users and assist the MWOs in the preparation of the forecast part of the SIGMETs for those phenomena. Close coordination should be established between the MWO and its responsible TCAC and/or VAAC.

2.5.3 Information regarding the VAACs and TCACs serving the AFIRegionwith their corresponding areas of responsibility and lists of MWOs and ACCs to which advisories are to be sent is provided in FASID Tables MET 3A and MET 3B of the AFIFASID. These tables are reproduced in Appendix B and Appendix C to this Guide.

2.5.4 TC and VA advisories are required for global exchange through the satellite distribution systems, SADIS and ISCS. They are used by the operators during the preflight planning. Nevertheless, it should be emphasized that SIGMET information is still of higher operational status and is required especially for in-flight re-planning. SIGMETs should be transmitted to aircraft-in-flight through voice communication or VOLMET or D-VOLMET thus providing vital information for making in-flight decisions regarding large-scale route deviations due to volcanic ash clouds or tropical cyclones.

3. PROCEDURES FOR PREPARATION OF SIGMET INFORMATION

3.1 General

3.1.1 SIGMET information is prepared in abbreviated plain language using approved ICAO abbreviations, a limited number of non-abbreviated words, geographical names and numerical values of self-explanatory nature. All abbreviations and words to be used in SIGMET are given in Appendix D.

3.1.2 The increasing use of automated systems for handling the MET information by the aviation users makes it essential that all types of OPMET information, including SIGMET, are prepared and transmitted in the prescribed standardized formats. Therefore, the structure and format of the SIGMET message, as specified in Annex 3, Part II, Appendix 6, which provides detailed information regarding the content and order of elements in the SIGMET message, should be followed strictly by the MWOs.

3.1.3 SIGMET is intended for transmission to aircraft in flight either by ATC or by VOLMET or D-VOLMET. Therefore, SIGMET messages should be kept conciseand clear without additional descriptive text other than the prescribed in Annex 3.

3.1.4 After the issuance of a SIGMET the MWO should maintain watch over the evolution of the phenomenon for which the SIGMET has been issued and issue updated SIGMET when necessary. The TC and VA SIGMET should be updated at least every 6 hours.

3.1.5 SIGMET should be promptly cancelled when the phenomenon is no longer occurring or no longer expected to occur in the MWO's area of responsibility. The SIGMET is understood to cancel itself automatically at the end of its validity period. If the phenomenon persists a new SIGMET message for a further period of validity should be issued.

3.2 Types of SIGMET

3.2.1 Although Annex 3 provides one general SIGMET format, which encompasses all weather phenomena, it is convenient when describing the structure and format of the messages to distinguish between three types of SIGMET, as follows:

- SIGMET for en-route weather phenomena other than VA and TC (this includes: TS, CB, TURB, ICE, MTW, DS and SS); this SIGMET will be referred as WS SIGMET;
- SIGMET for volcanic ash, which will hereafter be denoted as VA SIGMET or WV SIGMET; and
- SIGMET for tropical cyclones, which will hereafter be denoted as TC SIGMET or WC SIGMET.

3.2.2 The three types of SIGMET can be identified by the data type designator included in the WMO abbreviated heading of the SIGMET message, as explained below.

3.3 Structure of the SIGMET message

3.3.1 A SIGMET message consists of:

- ***WMO heading*** – all SIGMETs are preceded by an appropriate WMO heading;

- ***First line***, containing location indicators of the respective ATS unit and MWO, sequential number and period of validity;
- ***SIGMET main body***, containing information concerning the observed or forecast weather phenomenon for which the SIGMET is issued together with its expected evolution within the period of validity;

3.3.2 The first two parts of the SIGMET message are common for all types of SIGMET. The format and content of the third part is different; that is why, in the following paragraphs the meteorological part of the SIGMET message is described separately for the three types of SIGMET.

3.4 Format of SIGMET

Note: In the following text, square brackets - [ ] - are used to indicate an optional or conditional element, and angled brackets - <> - for symbolic representation of a variable element, which in a real SIGMET accepts concrete numerical value.

3.4.1 WMO Header

$T_1T_2A_1A_2$ii CCCC YYGGgg [CCx]

3.4.1.1 The group **$T_1T_2A_1A_2$ii** is the bulletin identification for the SIGMET message. It is constructed in the following way:

T_1T_2	Data type designator	**WS** – for SIGMET for meteorological phenomena other than volcanic ash cloud or tropical cyclone **WC** – for SIGMET for tropical cyclone **WV** – for SIGMET for volcanic ash
A_1A_2	Country or territory designators	Assigned according to Table C1, Part II of Manual on the Global Telecommunication System, Vol I – Global Aspects (WMO - No. 386)
ii	Bulletin number	Assigned on national level according to p 2.3.2.2, Part II of Manual on the Global Telecommunication System, Vol I – Global Aspects (WMO - No. 386)

3.4.1.2 **CCCC** is the ICAO location indicator of the communication centre disseminating the message (could be the same as the MWO location indicator).

3.4.1.3 **YYGGgg** is the date/time group, where YY is the date and GGgg is the time of transmission of the SIGMET in hours and minutes UTC (normally this time is assigned by the disseminating (AFTN) centre).

3.4.1.4 The group **CCx** should be used only when issuing a correction to a SIGMET which had already been transmitted.The third letter “x” takes the value A for the first correction, B for the second correction, etc.

Examples:

WSSG31 GOOY121200
WVCV31 GVAC 010230
WCGG31FCBB 100600 CCA

3.4.2 First line of SIGMET

CCCC SIGMET [nn]n VALID YYGGgg/YYGGgg CCCC-

3.4.2.1 The meaning of the groups in the first line of the SIGMET is as follows:

CCCC	ICAO location indicator of the ATS unit serving the FIR or CTA to which the SIGMET refers
SIGMET	Message identifier
[nn]n	Daily sequence number (see p.3.4.2.2)
VALID	Period of validity indicator
YYGGgg/YYGGgg	Validity period of the SIGMET given by date/time group of the beginning and date/time group of the end of the period (see p.3.4.2.3)
CCCC	ICAO location indicator of the issuing MWO
-	**hyphen** to separate the preamble from the text

3.4.2.2 The numbering of SIGMETs starts every day at 0001 UTC. The sequence number should consist of up to three symbols and may be a combination of letters and numbers, such as:

- 1, 2, …
- 01, 02, …
- A01, A02, …

Examples:

GOOO SIGMET 2 VALID 121100/121700 GOOY-
DGACSIGMET A04 VALID 202230/210430 DGAA-

Note 1: No other combinations should be used, like "CHARLIE 05" or "NR7".

Note 2: Correct numbering of SIGMET is very important since the number is used for reference in communication between ATC and pilots and in VOLMET and D-VOLMET.

3.4.2.3 The following considerations should be taken into account when determining the validity period:

- The period of validity of a WS SIGMET should not be more than 4 hours;
- The period of validity of a WC or WV SIGMET should not be more than 6 hours;
- In case of a SIGMET for an observed phenomenon, the filing time (date/time group in the WMO header) should be the same or very close to the time in the date/time group indicating the start of the SIGMET validity period;
- When the SIGMET is issued for a forecast phenomenon:
  - o the beginning of validity period should be the time of the expected commencement (occurrence) of the phenomenon in the MWO area of responsibility;
  - o the time of issuance of the SIGMET should not be more than 4 hours before the start of validity period (i.e., expected time of occurrence of the phenomenon); for TC and VA SIGMET the lead time should be up to 12 hours.

3.4.2.4 The period of validity is that period during which the SIGMET information is valid for transmission to aircraft in flight.

Examples:

1. SIGMET for an observed phenomenon:

WSNI31 DNKN241120
DNKKSIGMET 3 VALID 241120/241500 DNKN-

2. SIGMET for a forecast phenomenon (expected time of occurrence 1530)

WSCG31 FCBB 311130
FCBBSIGMET 1 VALID 1530/1930 FCCC-

3.4.3 Format of the meteorological part of SIGMET messages for weather phenomena other than TC and VA

3.4.3.1 The meteorological part of a SIGMET for weather phenomena consists of seven elements as shown in the table below.

Start of the second line of the message

1	**2**	**3**	**4**	**5**
Name of the FIR/UIR or CTA	Description of the phenomenon	Observed or forecast	Location	Level
<CCCC><name> FIR [CTA]	<Phenomenon>	OBS [AT <GGgg>Z] FCST OBS [AT <GGgg>Z] AND FCST	Geographical location of the phenomenon given by coordinates, or geographical objects, or location indicators	FL<nnn> or FL<nnn/nnn> or [TOP [ABV or BLW]] FL<nnn>

6	7
Movement or expected movement	Changes in intensity
MOV <direction, speed>KMH[KT] or STNR	INTSF or WKN or NC

3.4.3.1.1 Name of the FIR/UIR or CTA*(Column 1)*

CCCC <name> FIR[/UIR]
or
CCCC <name> CTA

The ICAO location indicator and the name of the FIR/CTA is given followed by the appropriate abbreviation: FIR, FIR/UIR or CTA.

Examples:

DRRRNIAMEYFIR

3.4.3.1.2 Phenomenon*(Column 2)*

The phenomenon description consists of a qualifier and a phenomenon abbreviation. SIGMET should be issued only for the following phenomena:

at cruising levels (irrespective of altitude):

- thunderstorms (TS) – if they are OBSC, EMBD, FRQ or SQL with or without hail;
- turbulence (TURB) – only SEV
- icing (ICE) – only SEV with or without FZRA
- mountain waves (MTW) – only SEV
- dust storm (DS) – only HVY
- sand storm (SS) – only HVY
- radioactive cloud – RDOACT CLD

The appropriate abbreviations and combinations, and their meaning are given in Appendix E.

3.4.3.1.3 Indication whether the phenomenon is observed or forecast*(Column 3)*

OBS [AT <GGgg>Z]
or FCST

The indication whether the phenomenon is observed or forecast is given by using the abbreviations OBS or FCST. OBS is followed by anoptionaltime group in the form AT GGggZ, where GGgg is the time of the observation in hours and minutes UTC. If the exact time of the observation is not known the time is not included. When FCST is used, it is assumed that the time of occurrence or commencement of the phenomenon coincides with the beginning of the period of validity included in the first line of the SIGMET.

Examples:

OBS AT 0140Z
FCST

3.4.3.1.4 Location of the phenomenon*(Column 4)*

The location of the phenomenon is given with reference to geographical coordinates (latitude and longitude) or with reference to geographical features well known internationally. The MWOs should try to be as specific as possible in reporting the location of the phenomenon and, at the same time, to avoid overwhelming geographical information, which may be difficult to process or perceive.

The following are the most common ways to describe the location of the phenomenon:

- Indication of a part of the FIR with reference to latitude:
  N OF or S OF <Nnn[nn]> or <Snn[nn]>
- Indication of a part of the FIR with reference to longitude:

E OF or W OF <Ennn[nn]> or <Wnnn[nn]>

- Indication of a part of the FIR with reference to latitude and longitude: **any combination of the above two cases**;
- with reference to a location with ICAO location abbreviation CCCC (normally, this should be the case of SIGMET based on special air-report in which the reported phenomenon is given with reference to an airport or another object with ICAO location indicator CCCC);
- with reference to geographical features well known internationally.

More details on reporting the location of the phenomenon are given in Appendix 6 to Annex 3 and in Appendix F to this Guide.

3.4.3.1.5 Flight level and extent*(Column 5)*

FL<nnn>
or FL<nnn/nnn>
or TOP FL<nnn>
or [TOP] ABVFL<nnn>
or [TOP] BLWFL<nnn>

The location or extent of the phenomenon in the vertical is given by one or more of the above abbreviations, as follows:

- reporting single level – **FL<nnn>**
- reporting a layer – **FL<nnn/nnn>**, where the lower level is reported first; this is used particularly in reporting turbulence and icing;
- reporting a level or layer with reference to one FL using ABV or BLW
- reporting the level of the tops of the TS clouds using the abbreviation TOP.

Examples:

EMBD TS … TOP ABV FL340
SEV TURB … FL180/210
SEV ICE … BLW FL150
SEV MTW … FL090

3.4.3.1.6 Movement*(Column 6)*

MOV <direction><speed>KMH[KT]
or
STNR

Direction of movement is given with reference to one of the eight points of compass. Speed is given in KMH or KT. The abbreviation STNR is used if no significant movement is expected.

Examples:

MOV NW 30KMH
MOV E 25KT

3.4.3.1.7 Expected changes in intensity*(Column 7)*

The expected evolution of the phenomenon's intensity is indicated by one of the following abbreviations:

INTSF – intensifying
WKN – weakening
NC – no change

3.4.4 Structure of the meteorological part of VA SIGMET

3.4.4.1 The general structure of the meteorological part of the SIGMET message is given in the table below:

Start of the second line of the message

1	2			3
FIR/UIR or CTA	Phenomenon	Volcano		Volcanic ash cloud observed or forecast
		Name	Location	
<CCCC><name> FIR [/UIR][CTA]	VA	[ERUPTION] [MT <name>]	[LOC <lat,lon>]	VA CLD OBS AT <GGgg>Z VA CLD FCST

4			5
Extent of the cloud			Expected movement
Vertical	Horizontal	Position	
FL <nnn/nnn>	[APRX <nnn> KM[NM] BY <nnn> KM[NM]]	[<lat,lon> - <lat,lon> - …]	MOV <direction><speed>

6	
Volcanic ash cloud forecast at the end of the period of validity	
FCST time	Position
FCST <GGgg>Z	VA CLD APRX <lat,lon> - <lat,lon> - …

3.4.4.2 Name and location of the volcano and/or indicator for VA cloud*(Column 2)*

VA [ERUPTION] [MT <name>] [LOC <lat,lon>] VA CLD
or
VA CLD

3.4.4.2.1 The description of the volcano injecting volcanic ash consists of the following elements:

- starts with the abbreviation **VA** – volcanic ash;
- the word **ERUPTION** is used when the SIGMET is issued for a known volcanic eruption;
- geographical/location information:

i. if the name of the volcano is known, it is given by the abbreviation **MT** – mountain, followed by the name;
e.g., **MT RABAUL**

ii. location of the volcano is given by the abbreviation **LOC** – location, followed by the latitude and longitude in degrees and minutes;
e.g., **LOC N3520 E09040**

- this section of the message ends with the abbreviation **VA CLD** – volcanic ash cloud.

3.4.4.2.2 If the FIR is affected by a VA cloud with no information about the volcanic eruption which generated the cloud, only the abbreviation **VA CLD** should be included in the SIGMET.

3.4.4.3 Time of observation or indication of forecast*(Column 3)*

VA CLD OBS AT <GGgg>Z
or
VA CLD FCST

The time of observation is taken from the source of the observation – satellite image, special air- report, report from a ground volcano logical station, etc. If the VA cloud is not yet observed over the FIR but the volcanic ash advisory received from the responsible VAAC indicates that the cloud is going to affect the FIR within the next 12 hrs, SIGMET should be issued, according to paragraph 2.4 above, and the abbreviation VA CLD FCST should be used.

Examples:

VA CLD OBS AT 0100Z
VA CLD FCST

3.4.4.4 Level and extent of the volcanic ash cloud*(Column 4)*

FL<nnn/nnn> [APRX <nnn>KM BY <nnn>KM] [<P1(lat,lon) - P2(lat,lon) - … >]
or
FL<nnn/nnn> [APRX <nnn>NM BY <nnn>NM] [<P1(lat,lon) - P2(lat,lon) - … >]

FL<nnn/nnn>	The layer of the atmosphere where the VA cloud is situated, given by two flight levels from the lower to the upper boundary of the cloud
[APRX <nnn>KM BY <nnn>KM] or [APRX <nnn>NM BY <nnn>NM]	Approximate horizontal extent of the VA cloud in KM or NM
[<P1(lat,lon) – P2(lat,lon) - … >]	Approximate description of the VA cloud by a number of points given with their geographical coordinates[1]; the points should be separated by hyphen

If the VA cloud spreads over more than one FIR, separate SIGMETs should be issued by all MWOs whose FIRs are affected. In such a case, the description of the volcanic ash cloud by each MWO should encompass the part of the cloud, which lies over the MWO's area of responsibility. The MWOs should try and keep the description of the volcanic ash clouds consistent by checking the SIGMET messages received from the neighbouring MWOs.

[1] The format of geographical coordinates reporting in SIGMET is given in Appendix E.

Examples:

FL100/180 APRX 10KM BY 50KM N0100 E09530 – N1215 E11045
FL 150/210 S0530 E09300 – N0100 E09530 – N1215 E11045

3.4.4.5 Movement or expected movement of the VA cloud*(Column 5)*

MOV <direction><speed>KMH[KT]
or
STNR

The direction of movement is given by the abbreviation **MOV** – moving, followed by one of the eight points of compass: N, NE, E, SE, S, SW, W, NW. The speed of movement is given in KMH or KT.

Examples:

MOV E 35KMH
MOV SW 20KT
STNR

3.4.4.6 Forecast position of the VA cloud at the end of the validity period of the SIGMET message*(Column 6)*

FCST <GGgg>Z VA CLD APRX <P1(lat,lon) - P2(lat,lon) - … >

3.4.4.6.1 The **GGggZ** group should indicate the end of validity period given in the first line of the SIGMET message. The description of the expected position of the volcanic ash cloud is given by a number of points forming a simplified geometrical approximation of the cloud.

3.4.4.6.2 In describing the VA cloud up to four different layers can be used, indicated by flight levels in the form FL<nnn/nnn>. The use of more than one level is necessary when the wind direction distribution with height determines that the cloud is spread horizontally into different directions at different height layers.

3.4.5 Structure of the meteorological part of TC SIGMET

3.4.5.1 The general structure of the meteorological part of the TC SIGMET is given in the table below:

Start of the second line of the message

1	2	3		4
FIR/UIR or CTA	TC name	Observed or forecast		Extent
		Time	Locationof TC centre	
<CCCC><name> FIR [/UIR][CTA]	TC <name>	OBS AT <GGgg>Z [FCST]	<lat,lon>	CB TOP [ABV or BLW] FL<nnn> WI <nnn>KM[NM] OF CENTRE

5	6	7
Expected movement	Intensity change	Forecast of the centre position at the end of the validity period
MOV <direction><speed>KMH[KT] or STNR	INTSF or WKN or NC	FCST <GGgg>Z TC CENTRE <lat,lon>

3.4.5.2 Name of the tropical cyclone*(Column 2)*

TC <name>

The description of the tropical cyclone consists of the abbreviation TC followed by the international name of the tropical cyclone given by the corresponding WMO RSMC.

Examples:

TC GLORIA
TC 04B

3.4.5.3 Time of observation or indication of forecast*(Column 3.1)*

OBS AT <GGgg>Z
or
FCST

The time in UTC is given in hours and minutes, followed by the indicator Z. Normally, time is taken from own observations or from a TC advisory received from the responsible TCAC. If the TC is not yet observed in the FIR but the tropical cyclone advisory received from the responsible TCAC, or any other TC forecast used by the MWO, indicates that the TC is going to affect the FIR within the next 12 hrs, SIGMET should be issued, according to paragraph 2.4 above, and the abbreviation FCST should be used.

Examples:

OBS AT 2330

3.4.5.4 Location of the TC centre*(Column 3.2)*

<location>

The location of the TC centre is given by its lat,lon coordinates in degrees and minutes.

Examples:

N1535 E14230

3.4.5.5 Vertical and horizontal extent of the CB cloud formation around TC centre *(Column 4)*

CB TOP [ABV or BLW] <FLnnn> WI <nnnKM or nnnNM> OF CENTRE

Examples:

CB TOP ABV FL450 WI 200NM OF CENTRE
CB TOP FL500 WI 250KM OF CENTRE

3.4.5.6 Movement or expected movement*(Column 5)*

MOV <direction><speed>KMH[KT]
or
STNR

Direction of movement is given with reference to one of the eight points of compass. Speed is given in KMH or KT. The abbreviation STNR is used if no significant movement is expected.

Examples:

MOV NW 30KMH
MOV E 25KT

3.4.5.7 Intensity change*(Column 6)*

The expected change of the intensity of the tropical cyclone is indicated by one of the following abbreviations:

INTSF – intensifying
WKN – weakening
NC – no change

3.4.5.8 Forecast location of the TC centre at the end of the validity period of the SIGMET message*(Column 7)*

FCST <GGgg>Z TC CENTRE <location>

Normally, the time given by GGggZ should be the same as the end of validity period indicated in the first line of the SIGMET message. Since the period of validity is up to 6 hours (normally, 6 hours), this is a 6-hour forecast of the position of the TC centre.

The location of the TC centre is given by its lat, lon coordinates following the general rules of reporting lat, lon information provided in Appendix F to this Guide.

Examples:

FCST 1200Z TC CENTRE N1430 E12800

3.4.6 Cancellation of SIGMET

3.4.6.1 If during the validity period of a SIGMET the phenomenon for which the SIGMET had been issued is no longer occurring or no longer expected, the SIGMET should be cancelled by the issuing MWO. The cancellation is done by issuing same type of SIGMET with the following structure:

- WMO heading with the same data type designator;
- First line that contains as period of validity the remaining time of the original period of validity;
- Second line, which contains the name of the FIR or CTA, the combination CNL SIGMET, followed by the sequential number of the original SIGMET and its validity period.

Examples:

1. WS SIGMET:

WSZR31 FZAA 101200
FZAA SIGMET 5 VALID 101200/101600 FZAA-
FZAA FIR KINSHASA…

Cancellation of WS SIGMET:

WSZR31 FZAA 101430
FZAA SIGMET 6 VALID 101430/101600 FZAA-
FZAA FIR KINSHASACNL SIGMET 5 101200/101600=

2. VA SIGMET

WVCG31 FCBB 131518
FCCC SIGMET 03 VALID 131515/132115 FCBB-
FCCC FIR BRAZZAVILLE…

Cancellation of a VASIGMET:

WVCG31 FCBB 132000
FCCC SIGMET 04 VALID 132000/132115 FCBB-
FCCCFIR BRAZZAVILLE CNL SIGMET 03 13151500/132115=

or, in case that the volcanic ash cloud moves to an adjacent FIR:

WSZR31 FZAA 132000
FZAA SIGMET 04 VALID 132000/132115 FZAA -

FZAA FIR KINSHASACNL SIGMET 03 13151500/132115 VA MOV TO YUDO FIR=

3.5 Dissemination

3.5.1 SIGMET information is part of the operational meteorological (OPMET) information. According to Annex 3 the telecommunication facilities used for the exchange of the operational meteorological information should be the aeronautical fixed service (AFS).

3.5.2 The AFS consists of a terrestrial segment, AFTN or ATN (AMHS), and a satellite segment which comprises the SADIS and ISCS satellite broadcasts provided by the UK and the USA respectively.

3.5.3 Currently, AFTN links should be used by the MWOs to send the SIGMET, as follows:

– to the adjacent MWOs and ACCs* using direct AFTN addressing;

– When required for VOLMET or D-VOLMET, SIGMET should be sent to the relevant centre providing the VOLMET service;

– SIGMET should be sent to all regional OPMET Data Banks (RODB);

– It should be arranged that SIGMET is relayed to the SADIS and ISCS providers for satellite dissemination, as well as to the WAFCs London and Washington, either through the AMBEX scheme, or directly by the issuing MWO;

– SIGMET for volcanic ash should be disseminated to the responsible VAAC.

3.5.4 Through SADIS and ISCS, SIGMET is disseminated to all authorised users . In this way, SIGMET is available on a global basis, meeting the aeronautical requirements.

* *Note: For this dissemination it is required that SIGMET is available at the ACCs for transmission to aircraft in flight for the route ahead up to a distance corresponding to two hours flying time.*

APPENDIX A: Meteorological Watch Offices

EXPLANATION OF THE TABLE

Column

1. Location of the meteorological watch office (MWO)
2. ICAO location indicator, assigned to the MWO

3 Name of the FIR, UIR and/or search and rescue region (SRR) served by the MWO

4 ICAO location indicator assigned to the ATS unit serving the FIR, UIR and/or SRR

5 X if the MWO in column 2 issues VA SIGMET

6 X if the MWO in column 2 issues TC SIGMET

7 Remarks

Note: MWOs in italics are situated outside the AFI Region.

MWO Location	ICAO loc. ind.	Area served		SIGMET		Remarks
		Name	ICAO loc. ind.	VA	TC	
1	2	3	4	5	6	7
ALGERIA						
ALGER/Baraki1	*DAAL*	*Alger FIR/SRR*	*DAAA*	*X*		
ANGOLA						
LUANDA/4 de Fevereiro	*FNLU*	*Luanda FIR/SRR*	*FNAN*	*X*		
BOTSWANA						
GABORONE/Sir SeretseKhamaIntl	*FBSK*	*Gaborone FIR/SRR*	*FBGR*	*X*	*X*	
BURUNDI						
BUJUMBURA/Bujumbura	*HBBA*	*Bujumbura FIR*	*HBBA*	*X*		
CANARYISLANDS (Spain)						
GRAN CANARIA/Gran Canary, Canary I.	*GCLP*	*Canarias FIR and Grando RSS*	*GCCC*	*X*		
CAPE VERDE						
SAL I./AMILCAR CABRAL	GVAC	Sal Oceanic FIR/SRR	GVSC	X		
CHAD						
N'DJAMENA/N'Djamena	FTTJ	N'Djamena FIR/SRR	FTTT	X		
CONGO						
BRAZZAVILLE/Maya-Maya	FCBB	Brazzaville FIR/SRR	FCCC	X		
DEMOCRATIC REP. OF THE CONGO						
KINSHASA/N'Djili	FZAA	Zaire FIR, Kinshasa SRR	FZAA	X		
EGYPT						
CAIRO/Cairo Intl	*HECA*	*Cairo FIR/SRR*	*HECC*	*X*		
ETHIOPIA						
ADDIS ABABA/Bole Intl	*HAAB*	*Addis Ababa FIR/SRR*	*HAAA*	*X*		
ERITREA						
ASMARA	*HHAS*	*Asmara FIR*	*HHAA*	*X*		
GHANA						
ACCRA/Kotoka Intl	DGAA	Accra FIR/SRR	DGAC	X		

MWO Location	ICAO loc. ind.	Area served		SIGMET		Remarks
		Name	ICAO loc. ind.	VA	TC	
1	2	3	4	5	6	7
KENYA						
NAIROBI/Jomo Kenyatta Intl	*HKJK*	*Nairobi FIR/SRR*	*HKNA*	*X*	*X*	
LIBERIA2						/
MONROVIA/Roberts Intl	GLRB	Roberts FIR/SRR	GLRB	X		
LIBYAN ARAB JAMAHIRIYA						
TRIPOLI/Tripoli Intl	*HLLT*	*Tripoli FIR/SRR*	*HLLL*	*X*		
MADAGASCAR						
ANTANANARIVO/Ivato	*FMMI*	*Antananarivo FIR/SRR*	*FMMM*	*X*	*X*	
MALAWI						
LILONGWE/Lilongwe Intl	*FWLI*	*Lilongwe FIR/SRR*	*FWLL*	*X*	*X*	
MAURITIUS						
MAURITIUS/Sir SeewoosagurRamgoolam Intl	*FIMP*	*Mauritius FIR/SRR*	*FIMM*	*X*	*X*	
MOROCCO						
CASABLANCA/Anfa	*GMMC*	*Casablanca FIR/SRR*	*GMMM*	*X*		
MOZAMBIQUE						
MAPUTO/Maputo Intl	*FQMA*	*Beira FIR/SRR*	*FQBE*	*X*	*X*	
NAMIBIA						
WINDHOEK/Hosea Kutako	*FYWH*	*Windhoek FIR/SRR*	*FYWH*	*X*		
NIGER						
NIAMEY/DioriHamani Intl	DRRN	Niamey FIR/SRR	DRRR	X		
NIGERIA						
KANO/MallamAminu Kano Intl	DNKN	Kano FIR/SRR	DNKK	X		
RWANDA						
KIGALI/GregoireKayibanda	*HRYR*	*Kigali FIR/SRR*	*HRYR*	*X*		
SENEGAL						
DAKAR/Leopold Sedar Senghor	GOOY	Dakar FIR/SRR Dakar oceanic FIR	GOOO	X		

MWO Location	ICAO loc. ind.	Area served		SIGMET		Remarks
		Name	ICAO loc. ind.	VA	TC	
1	2	3	4	5	6	7
SEYCHELLES						
MAHE/Seychelles Intl	*FSIA*	*Seychelles FIR/SRR*	*FSSS*	*X*	*X*	
SOMALIA						
MOGADISHU/Mogadishu	*HCMM*	*Mogadishu FIR/SRR*	*HCSM*	*X*		
SOUTH AFRICA						
CAPE TOWN/Cape Town	*FACT*	*Cape town FIR*	*FACT*	*X*		
JOHANNESBURG/Johannesburg	*FAJS*	*Johannesburg FIR/ARCC*	*FAJS*	*X*	*X*	
JOHANNESBURG/Johannesburg	*FAJO*	*Johannesburg Oceanic*	*FAJO*	*X*	*X*	
SUDAN						
KHARTOUM/Khartoum	*HSSS*	*Khartoum FIR/SRR*	*HSSS*	*X*		
TUNISIA						
Institut National de la Météorologie	*DTTA*	*Tunis FIR/UIR*	*DTTC*	*X*		
UGANDA						
ENTEBBE/Entebbe Intl.	*HUEN*	*Entebbe FIR*	*HUEC*	*X*		
UNITED REPUBLIC OF TANZANIA						
DAR-ES-SALAAM/Dar-es-Salaam	*HTDA*	*Dar-es-Salaam FIR*	*HTDC*	*X*	*X*	
ZAMBIA						
LUSAKA/Lusaka Intl	*FLLS*	*Lusaka FIR/SRR*	*FLFI*	*X*		
ZIMBABWE						
HARARE/Harare	*FVHA*	*Harare FIR/SRR*	*FVHA*	*X*	*X*	

APPENDIX B: Tropical Cyclone Advisory Centres

FASID AFI TABLE MET 3A

EXPLANATION OF THE TABLE

Column

1. Location of the tropical cyclone advisory centre (TCAC).
2. ICAO location indicator of TCAC (for use in the WMO heading of advisory bulletin).
3. Area of responsibility for the preparation of advisory information on tropical cyclones by the TCAC in Column 1.
4. Period of operation of the TCAC.
5. MWOs to which the advisory information on tropical cyclones should be sent.
6. ICAO location indicator of the MWOs in Column 4.

Note: MWOs in italics are situated outside the AFI Region.

TABLE MET 3A

TROPICAL CYCLONE ADVISORY CENTRES

TROPICAL CYCLONE ADVISORY CENTRE	ICAO LOC. INDICATOR	AREA OF RESPONSIBILITY	PERIOD OF OPERATION	MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT	
				Name	ICAO LOC. INDICATOR
1	2	3	4	5	6
RÉUNION (France)	FMEE	SouthwestIndianOcean Sud-ouest de l'océan Indien Sudoeste del océano Índico N: 0° S S: 30°S W: 30°E E: 90°E	1 November–30 April 1er novembre–30 avril 1 de noviembre–30 de abril	*Antananarivo* *Bloemfontein* *Bombay/Mumbay* *Dar-es-Salaam* *Durban* *Gaborone* *Harare* *Johannesburg* *Lilongwe* *Mahé/Seychelles* *Male* *Maputo* *Mauritius* *Nairobi* *Perth*	*FMMA* *FABL* *VABB* *HTDC* *FADN* *FBSK* *FVHA* *FAJS* *FWKI* *FSIA* *VRMM* *FQMA* *FIMM* *HKJK* *YYPPH*

APPENDIX C: Volcanic Ash Advisory Centres

FASID AFI TABLE MET 3B

EXPLANATION OF THE TABLE

Column

3. Location of the volcanic ash advisory centre (VAAC).
4. ICAO location indicator of VAAC (for use in the WMO heading of advisory bulletin).
5. Area of responsibility for the preparation of advisory information on volcanic ash by the VAAC in Column 1.
6. MWOs to which the advisory information on volcanic ash should be sent.
7. ICAO location indicator of the MWOs in Column 4.
8. ACCs to which the advisory information on volcanic ash should be sent.
9. ICAO location indicator of the ACCs in Column 6.

Note: MWOs and ACCs in italics are situated outside the AFI Region

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FASID TABLE MET 3B — VOLCANIC ASH ADVISORY CENTRES

VOLCANIC ASH ADVISORY CENTRE	**ICAO LOCATION INDICATOR**	**AREA OF RESPONSIBILITY**	**MWOs TO WHICH ADVISORY INFORMATION IS TO BE SENT**		**ACC TO WHICH ADVISORY INFORMATION IS TO BE SENT**	
			Name	**ICAO LOCATION INDICATOR**	**Name**	**ICAO LOCATION INDICATOR**
1	2	3	4	5	6	7
Toulouse (France)	LFPW	AFI Region Santa Maria Oceanic*, EUR* (except for London, Scottish and Shannon FIRs) and MID* Regions: south of 71°N, west of 60°E FIR Santa Maria Oceanic*, régions EUR* (sauf les FIR London, Scottish et Shannon) et MID*: au sud de 71°N, ouest de 60°E Santa MariaOceanic*, EUR* (excepto las FIR London, Scottish y Shannon) y Regiones MID: sur del paralelo 71°N oestedelparalelo 60°E	Accra *Addis Ababa* Amilcar Cabral *Antananarivo* Brazzaville *Bujumbura* Dakar *Gran Canaria* Kano *Kigali* Kinshasa *Nairobi* Niamey N'Djamena Sal I.	DGAA *HAAB* GVAC *FMMI* FCBB *HBBA* GOOY *GCLP* DNKN *HRYR* FZAA *HKNA* DRRN FTTJ GVAC	Accra *Addis Ababa* *Antananarivo* Brazzaville *Bujumbura* Dakar *Gran Canaria* Kano *Kigali* Kinshasa *Nairobi* Niamey N'Djamena Robertsfield (Conakry) Sal I.	DGAA *HAAB* *FMMI* FCBB *HBBA* GOOY *GCLP* DNKN *HRYR* FZAA *HKNA* DRRN FTTJ GUCY GVAC

APPENDIX D: List of the Abbreviations and Code Words Used in SIGMET

ABV	Above
AND*	And
APRX	Approximate or approximately
AT	At *(followed by time)*
BLW	Below
BY*	By
CB	Cumulonimbus
CENTRE*	Centre *(used to indicate tropical cyclone centre)*
CLD	Cloud
CNL	Cancel *or* cancelled
CTA	Control area
DS	Dust storm
E	East *or* eastern longitude
ERUPTION*	Eruption *(used to indicate volcanic eruption)*
EMBD	Embedded in layer *(to indicate CB embedded in layer of other clouds)*
FCST	Forecast
FIR	Flight information region
FL	Flight level
FRQ	Frequent
FZRA	Freezing rain
GR	Hail
HVY	Heavy *(used to indicate intensity of weather phenomena)*
ICE	Icing
INTSF	Intensify *or* intensifying
ISOL	Isolated
KM	Kilometers
KMH	Kilometers per hour
KT	Knots
LINE*	Line
MOV	Move *or* moving *or* movement
MT	Mountain
MTW	Mountain waves
N	North *or* northern latitude
NC	No change
NE	North-east
NM	Nautical miles
NW	North-west
OBS	Observed
OBSC	Obscured
OCNL	Occasional
OF*	Of … *(place)*
RA	Rain
RDOACT	Radioactive
S	South *or* southern latitude
SE	South-east
SEV	Severe *(used e.g. to qualify icing and turbulence reports)*

SIGMET	SIGMET *(used to indicate SIGMET information)*
SQL	Squall line
SS	Sandstorm
STNR	Stationary
SW	South-west
TC	Tropical cyclone
TO	To … *(place)*
TOP	Cloud top
TS	Thunderstorm
TURB	Turbulence
UIR	Upper flight information region
VA	Volcanic ash
VALID*	Valid
W	West *or* western longitude
WI	Within
WID	Width
Z	Coordinated Universal Time *(used in meteorological messages)*

** not in the ICAO Doc 8400, ICAO Abbreviations and Codes*

APPENDIX E: Meteorological Phenomena to be Reported by SIGMET

Phenomenon	Description	Meaning
TS	OBSC[2] TS EMBD[3] TS FRQ[4] TS SQL[5] TS OBSC TSGR EMBD TSGR FRQ TSGR SQL TSGR	Obscured thunderstorm(s) Embedded thunderstorm(s) Frequent thunderstorm(s) Squall line thunderstorm(s) Obscured thunderstorm(s) with hail Embedded thunderstorm(s) with hail Frequent thunderstorm(s) with hail Squall line thunderstorm(s) with hail
TC	TC (+ TC name)	Tropical cyclone (+ TC name)
TURB	SEV TURB[6]	Severe turbulence
ICE	SEV ICE SEV ICE FZRA	Severe icing Severe icing due to freezing rain
MTW	SEV MTW[7]	Severe mountain wave
DS	HVY DS	Heavy duststorm
SS	HVY SS	Heavy sandstorm
VA	VA (+ volcano name, if known)	Volcanic ash (+ volcano name)

Notes:

1 *Only one of the weather phenomena listed should be selected and included in each SIGMET*

2. *Obscured (**OBSC**) indicates that the thunderstorm (including, if necessary, CB-cloud which is not accompanied by a thunderstorm) is obscured by haze or smoke or cannot be readily seen due to darkness*

3. *Embedded (**EMBD**) – indicates that the thunderstorm (including, if necessary, CB-cloud which is not accompanied by a thunderstorm) is embedded within cloud layers and cannot be readily recognized*

4. *Frequent (**FRQ**) indicates an area of thunderstorms within which there is little or no separation between adjacent thunderstorms with a maximum spatial coverage greater than 75% of the area affected, or forecasts to be affected, by the phenomenon (at a fixed time or during the period of validity)*

5. *Squall line (**SQL**) indicates thunderstorms along a line with little or no space between individual clouds*

6. *Severe (**SEV**) turbulence (**TURB**) refers only to:*
   - *low-level turbulence associated with strong surface winds;*
   - *rotor streaming;*
   - *turbulence whether in cloud or not in cloud (CAT) near to jet streams.*

   Turbulence is consideredsevere whenever the peak value of the cube root of EDR exceeds 0.7.

7. *A mountain wave (**MTW**) is considered severe – whenever an accompanying downdraft of 3.0 m/s (600 ft/min) or more and/or severe turbulence is observed or forecast.*

APPENDIX F: Standard for Reporting Geographical Coordinates in SIGMET

When reporting geographical coordinates of points in SIGMET the following should apply:

1. Each point is represented by a latitude/longitude coordinates in whole degrees or degrees and minutes in the form:

N(S)nn[nn] W(E)nnn[nn]

Note: There is a space between the latitude and longitude value.

Examples:	**N0518 W00401**	*Abidjan*
	S0419 E01519	*Kinshasa*
	N1443 W01728	*Dakar*

2. In describing lines or polygons, the lat,lon values of the respective points are separated by the combination space-hyphen-space, as in the following examples:

N1334 W00739 – N1327 W01635 – N0932 W1340– N0518 W00401 **(***Bamako, Banjul, Conakry, Abidjan)*

S05 E093 – N01 E095 – N12 E110 – S08 E103

Note: It is not necessary to repeat the first point when describing a polygon.

3. When describing a volcanic ash cloud approximate form and position, a limited number of points, which form a simplified geometric figure (a line, or a triangle, or quadrangle, etc.) should be used in order to allow for a straightforward interpretation by the user.

4. Reporting a phenomenon occupying two different geographical areas within the FIR. This is frequently the case with two (or more) separate TS formations occurring in different parts of the FIR at the same time. The question is whether a separate SIGMET should be issued for each formation, or, one SIGMET could include location description for two (or more) geographical areas. The current SIGMET format does not allow for reporting of more than one phenomenon or two different TS areas. Therefore, in cases like this, two separate SIGMETs should be issued. The main concern with issuing separate SIGMETs is that, in general, a new SIGMET for the same FIR would replace the previous one; this may lead to rejecting valid information in case as described above. It should be noted in this regard, that the current SIGMET format allows for using different sequence numbers and thus, for keeping more than one SIGMET at a time valid for the FIR concerned; for instance, a series A1, A2,… could be used for "phenomenon A" and B1, B2, … , for "phenomenon B".

APPENDIX G: Examples

Note: Most examples are based on real SIGMETs. The real SIGMETs have been corrected in order to make them compliant with the Annex 3 format.

1. WS SIGMET

SIGMET for thunderstorms

WSCG31 FCBB 122305
FCCC SIGMET 9 VALID 122330/130230 FCBB-
FCCCBRAZZAVILLE FIR EMBD TS OBS N0241 E01250 – N0443 E01552 – N0200 E01630 – N0300 E01500 TOP FL400 STNR NC=

WSNT03 KKCI 032340
KZNY SIGMET C17 VALID 032345/040345 KKCI-
KZNY NEW YORK OCEANIC FIR FRQ TS OBS WI AREA N2400 W05500 - N2300 W04930 - N1845 W05645 - N2100 W05800 - N2400 W05500 TOP FL450 MOV E 15KT INTSF=

WSSG31 GOOY 091131
GOOO SIGMET 3 VALID 091140/091540 GOOY-
GOOODAKAR FIR SQL OBS 1130Z LINEN17W10 –N13 W07 – N07 W05MOV W 10KMH WKN=

WSUK31 EGGY 121120
EGTT SIGMET 01 VALID 121125/121525 EGRR-
EGTT LONDON FIR EMBD TSGR OBS AT 1115Z SE OF LINE N5130 E00200 - N5000 W00400 TOPS FL220 MOV NE 30KT NC=

1.2 SIGMET for severe turbulence

WSAU21 AMMC 280546
YBBB SIGMET BS02 VALID 280600/281200 YMMC-
YBBB BRISBANE FIR SEV TURB FCST WI S3900 E15100 - S4300 E15100 - S4300 E16000 - S4100 E16300 - S3700 E16300 - S3900 E16000 FL260/370 MOV E 20 KT NC=

WSZR31FZAA 280003
FZAA SIGMET 01 VALID 280002/280402 FZAA-
FZAA KINSHASA FIR SEV TURB OBS W OF MT KILIMANJARO BLW FL100 STNR NC=

1.3 SIGMET for severe icing

WSFR31 LFPW 280400
LFMM SIGMET 2 VALID 280500/280900 LFMM-
LFMM FIR MARSEILLE SEV ICE OBS AT 0400Z LIONGULF FL040/100 STNR NC=

WSIY31 LIIB 032152
LIMM SIGMET 07 VALID 032200/040200 LIMM-
LIMM MILANO FIR SEV ICE FCST OVER ALPS AND N PART APPENNINIAN AREA FL030/120 MOV E NC=

1.4 SIGMET for heavy duststorm

WSNR31 DRRN 160530
DRRR SIGMET 4 VALID 160600/161000 DRRN-
DRRR NIAMEY FIR HVY DS OBS N OF N1800 S OF N2300 W OF E01500 E OF E00600 MOV W 10KMH NC=

1.5 SIGMET for severe mountain wave

WSUK31 EGGY 150550
EGTT SIGMET 03 VALID 150600/151000 EGRR-
EGTT LONDON FIR SEV MTW FCST N OF N5100 FL090/140 STNR WKN=

2. VA SIGMET

2.1 VA SIGMET - full

WVPH01 RPLL 211110
RPHI SIGMET 2 VALID 211100/211700 RPLL-
RPHI MANILA FIR VA ERUPTION MT PINATUBO LOC S1500 E07348
VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 – S1530 E07642 MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 – S1518 E08112 – S1712 E08330 – S1824 E07836=

Note:The coordinates used in describing the VA cloud are fictitious.

2.2 “Short” first SIGMET (no FCST)

YUDD SIGMET 2 VALID 211100/211700 YUSO-
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL LOC S1500 E07348
VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 – S1530 E07642 MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 – S1518 E08112 – S1712 E08330 – S1824 E07836=

or

YUDD SIGMET 2 VALID 211100/211700 YUSO-
YUDD SHANLON FIR/UIR VA ERUPTION MT ASHVAL LOC S1500 E07348
VA CLD OBS AT 1100Z FL100/180 APRX 220KM BY 35KM S1500 E07348 – S1530 E07642=

WVFJ01 NFFN 090900
NFFF SIGMET 03 VALID 090915/091515 NFFN-
NFFF NADI FIR VA ERUPTION MT LOPEVI LOC S1630 E16820 VA CLD OBS AT 0330Z FL090 APRX 10NM BY 10NM MOV SE 25KT FCST 1515Z VA CLD APPRX S1630 E16820 - S1900 E17600 - S1930 E17030=

2.3 SIGMET for VA CLD in the FIR but the volcano information is unknown

YUDD SIGMET 2 VALID 211100/211700 YUSO-
YUDD SHANLON FIR/UIR VA CLD OBS AT 1100Z FL310/450 APRX 220KM BY 35KM S1500 E07348 – S1530 E07642 MOV SE 65KMH FCST 1700Z VA CLD APRX S1506 E07500 – S1518 E08112 – S1712 E08330 – S1824 E07836=

2.4 SIGMET for VA CLD forecast to affect the FIR

We assume that the responsible VAAC has issued an advisory at 0200Z with forecast positions of the VA CLD for 0800Z, 1400Z and 2000Z. From this forecast it is seen that the VA CLD will enter the YUDD FIR around 0800Z. The responsible MWO, YUSO receiving this advisory prepares a SIGMET for the expected penetration of the VA cloud in its FIR and this SIGMET is send at 0230Z.

WVXY01 YUSO 210230
YUDD SIGMET 2 VALID 210800/211400 YUSO-
YUDD SHANLON FIR/UIR VA CLD FCST FL310/450 APRX 220KM BY 35KM S1500 E07348 – S1530 E07642 MOV SE 65KMH FCST 1400Z VA CLD APRX S1506 E07500 – S1518 E08112 – S1712 E08330 – S1824 E07836=

Notes: 1. The forecast positions at 0800Z and 1400Z are taken from the VA advisory.

3. TC SIGMET

3.1. TC Graham – SIGMET issued by MWO Perth - Australia

WCOC31 APRF 280453
YBBB SIGMET PH01 VALID 280500/281100 YPRF-
YBBB BRISBANE FIR TC GRAHAM OBS AT 0400Z S1806 E12145 CB TOP FL450 WI 120NM OF CENTRE MOV SE 7KT INTSF FCST 1100Z TC CENTRE S1808 E12150=

3.2. SIGMET messages issued in July 2003 during the passage of TC Koni

WCSS20 VHHH 200240
VHHK SIGMET 2 VALID 200900/201500 VHHH-
VHHK HONG KONG CTA TC KONI OBS AT 0000Z N1618 E11506CB TOP FL500 WI 90NM OF CENTRE MOV NW 8KT NCFCST 1500Z TC CENTRE N1749 E11347=

Note: This SIGMET is issued before the TC Koni started affecting the Hong Kong CTA, as seen from the issuing time and the start of validity time

WCSS20 VHHH 201150
VHHK SIGMET 7 VALID 201200/201800 VHHH-
VHHK HONG KONG CTA TC KONI OBS AT 0900Z N1712 E11400 CB TOP FL500 WI 90NM OF CENTRE MOV NW 10KT NCFCST 1800Z TC CENTRE N1810 E11300=

WCSS20 VHHH 201450
VHHK SIGMET 10 VALID 201800/210000 VHHH-
VHHK HONG KONG CTA TC KONI OBS AT 1500Z N1730 E11330CB TOP FL500 WI 60NM OF CENTRE MOV NW 10KT NCFCST 2100Z TC CENTRE N1818 E11240=

APPENDIX H: WMO Headings for SIGMET Bulletins Used by AFIMeteorological Watch Offices (MWO)

EXPLANATION OF THE TABLE

Col 1: State and name of the MWO

Col 2: ICAO location indicator of the MWO

Col 3: $T_1T_2A_1A_2$ii group of the WMO heading for the WS SIGMET bulletin

Col 4: $T_1T_2A_1A_2$ii group of the WMO heading for the WC SIGMET bulletin (tropical cyclone)

Col 5: $T_1T_2A_1A_2$ii group of the WMO heading for the WV SIGMET bulletin (volcanic ash)

Col 6: ICAO location indicator of the FIR/CTA served by the MWO

Col 7: Remarks

WMO HEADINGS FOR SIGMET BULLETINS
USED BY AFI METEOROLOGICAL WATCH OFFICES

MWO Location	ICAO location indicator	WMO SIGMET Headings			FIR/ACC served	Remarks
		WS	WC	WV	ICAO location indicator	
1	2	3	4	5	6	7
ALGERIA ALGER/Baraki	DAAL	WSAL31		WVAL31	DAAA	
ANGOLA LUANDA/4 de Fevereiro	FNLU	WSAN31		WVAN31	FNAN	
BOTSWANA GABORONE/Sir SeretseKhama	FBSK	WSBC31	WCBC31	WVBC31	FBGR	
BURUNDI BUJUMBURA/Bujumbura	HBBA	WSBI31		WVB131	HBBA	
CANARYISLANDS (Spain) GRAN CANARIA/Gran Canary, Canary I	GCLP	WSCR31		WVCR31	GCCC	
CAPEVERDE SAL I/Amilcar Cabral	GVAC	WSCV31		WVCV31	GVSC	
CHAD N’DJAMENA/N’djamena	FTTJ	WSCD31		WVCD31	FTTT	
CONGO BRAZZAVILLE/Maya-Maya	FCBB	WSCG31		WVCG31	FCCC	
D.R.CONGO KINSHASA/N’Djili	FZAA	WSZR31	WCZR31	WVZR31	FZAA	
EGYPT CAIRO/Cairo International	HECA	WSEG31	WCEG31	WVEG31	HECC	
ETHIOPIA ADDIS ABABA/Bole Intl	HAAB	WSET31		WVET20	HAAA	
ERITREA ASMARA	HHAS	WSEI31		WVEI31	HHAA	
GHANA ACCRA/Kotoka Int’l	DGAA	WSGH31		WVGH31	DGAC	
KENYA KENYA/Jomo Kenyatta Int’l	HKJK	WSKN31	WCKN31	WVKN31	HKNA	
LIBERIA MONROVIA/Roberts Int’l	GLRB	WSLI31		WVSL31	GLRB	
LIBYAN ARAB JAMAHIRIYA TRIPOLI/Tripoli Int’l	HLLT	WSLY31		WVLY31	HLLL	
MADAGASCAR ANTANANARIVO/Ivato	FMMI	WSMG31	WCMG20	WVMG20	FMMM	
MALAWI LILONGWE/Lilongwe Int’l	FWLI	WSMW31	WCMG31	WVLI31	FWLL	

MWO Location	ICAO location indicator	WMO SIGMET Headings			FIR/ACC served	Remarks
		WS	WC	WV	ICAO location indicator	
1	2	3	4	5	6	7
MAURITIUS MAURITIUS/Sir SeewoosagurRamgoolam Int'l	FIMP	WSMA31	WCMG20	WVMA31	FIMM	
MOROCCO CASABLANCA/Anfa	GMMC	WSMC31		WVMC31	GMMM	
MOZAMBIQUE MAPUTO/Maputo Int'l	FQMA	WSMZ31	WCMZ20	WVMZ31	FQBE	
NAMIBIA WINDHOEK/Hosea Kutako	FYWH	WSNM31		WVNM31	FYWH	
NIGER NIAMEY/DioriHmaniInt'l	DRRN	WSNR31		WVNR31	DRRR	
NIGERIA KANO/MallamAminuKanoInt'l	DNKN	WSNI31		WVNI31	DNKK	
RWANDA KIGALI/GregoireKayibanda	HRYR	WSRW31		WVRW31	HRYR	
SENEGAL Leopold Sedar Senghor	GOOY	WSSG31		WVSG31	GOOO	
SEYCHELLES MAYE/Seychelles Int'l	FSIA	WSSC31	WCSC20	WVSC31	FSSS	
SOMALIA MOGADISHU/Mogadishu	HCMM	WSSI31		WVSI31	HCSM	
SOUTH AFRICA JOHANNESBURG/Johannesburg	FAJS	WSZA31	WCZA31	WVZA31	FACA FAJA FAJO	
SUDAN KHARTOUM/Khartoum	HSSS	WSSU31		WVSU31	HSSS	
TUNISIA TUNIS/Carthage	DTTA	WSTS31		WVTS31	DTTC	
UGANDA ENTEBBE/Entebbe Int'l	HUEN	WSUG31		WVUG31	HUEC	
UNITED REPUBLIC OF TANZANIA DAR-ES-SALAAM/Dar-es-Salaam	HTDA	WSTN31	WCTN31	WVTN31	HTDC	
ZAMBIA LUSAKA/Lusaka Int'l	FLLS	WSZB31		WVZB31	FLFI	
ZIMBABWE HARARE/Harare	FVHA	WSZW31	WCZW31	WVZW31	FVHA	

APPENDIX H1: OPERATIONAL UNITS

OPERATIONAL UNITS/*UNITES OPERATIONNELLES*

MWO, RODB, VAAC, TCAC AND ACC/FIC AFTN ADDRESSES OF THE AFI REGION

ADRESSES RSFTA DES CVM, BRDO, VAAC, TCAC ET CCR/CIV DE LA REGION AFI

MWO, RODB, VAAC, TCAC AND ACC/FIC Location	ICAO location indicator	AFTN Address/Adresse RSFTA			FIR/ACC served	Confirmation Date/ Date de confirmation
		MWO/CVM	ACC/CCR	FIC/CIV	ICAO location indicator	
1	2	3	4	5	6	7
ALGERIA ALGER/Houari Boumedienne	DAAG	**DAAGYMYX**	**DAAAZQZX**	**DAAAZQZX**	DAAA	
ANGOLA 4 de Fevereiro	FNLU	**FNLUYMYX**	**FNANZAZX**	**FNANZQZX**	FNAN	02/05/2008
BOTSWANA Gaborone/Sir Seretse Khama Int.	FBSK	**FBSKYMYX**	**FBGRZRZX**	**FBGRZRZX**	FBGR	18/03/2008
BURUNDI BUJUMBURA	HBBA	**HBBAYMYX**	**HBBAZQZX**	**HBBAZQZX**	HBBA	
CANARY ISLANDS GRAN CANARIA	GCLP	**GCLPYMYX**	**GCLPZQZX**	**GCLPZQZX**	GCCC	
CAPE VERDE SAL I/Amilcar Cabral	GVAC	**GVACYMYX**	**GVSCZQZX**	**GVSCZQZX**	GVSC	11/01/2008. Fax N° T/10-1009
CHAD N'Djamena/Hassan Djamous International	FTTJ	**FTTJYMYX**	**FTTTZQZX** **FTTTZRZX** **FTTTZUZX** **FTTTZFZX**	**FTTTZIZX** **FTTTZFZX** **FTTTZQZX**	FTTT	15/04/2009. Fax N° 2009/000119/ ASECNA/DEED/DEETT
CONGO BRAZZAVILLE/Maya-Maya	FCBB	**FCBBYMYX**	**FCCCZQZX** **FCCCZRZX** **FCCCZUZX** **FCCCZFZX**	**FCCCZQZX** **FCCCZFZX** **FCCCZIZX**	FCCC	15/04/2009. Fax N° 2009/000119/ ASECNA/DEED/DEETT
D.R. CONGO KINSHASA/N'Djili	FZAA	**FZAAYMYX**	**FZAAZQZX**	**FZAAZQZX**	FZAA	18/01/2008. E-mail from ASECNA HQ (Sougué)
EGYPT CAIRO	HECA	**HECAYMYX**	**HECAZQZX**	**HECAZQZX**	HECC	
ERITREA ASMARA	HHAS	**HHASYMYX**	**HHASZQZX**	**HHASZQZX**	HHAA	
ETHIOPIA ADDIS ABABA/Bole Int.	HAAB	**HAABYMYX**	**HAAAZQZX**	**HAAZQZX**	HAAA	07/03/2008
GHANA ACCRA/Kotoka International Airport	DGAA	**DGAAYMYX**	**DGACZQZX**	**DGACZQZX**	DGAC	24/12/2007. E-mail at 09:12 from Juati Ayilari-Naa
KENYA NAIROBI/Jomo Kenyatta	HKJK	**HKJKYMYX**	**HKNAZQZX**	**HKNAZQZX**	HKNA	10/03/2008

LIBERIA MONROVIA/Roberts International Airport	GLRB	**GLRBYMYX**	**GLRBZQZX**	**GLRBZQZX**	GLRB	
LIBYA TRIPOLI	HLLT	**HLLTYMYX**	**HLLTZQZX**	**HLLTZQZX**		
MADAGASCAR ANTANANARIVO/Ivato	FMMI	**FMMIYMYX**	**FMMIZTZX**	**FMMIZQZX**	FMMM	14/03/2008
MALAWI LILONGWE/Kamuzu Int.	FWKI	**FWKIYMYX**	**FWLLZQZX**	**FWLLZQZX**	FWLL	
MOROCCO CASABLANCA/Anfa	GMMC	**GMMCYMYX**	**GMMMZQZX**	**GMMMZQZX**	GMMM	E-mail du 30/03/2009
MAURITIUS MARITIUS/Sir Seewoosagur Ramgoolam Int.	FIMP	**FIMPYMYX**	**FIMMZQZX**	**FIMMZQZX**	FIMM	17/03/2008
MOZAMBIQUE MAPUTO/Maputo Intl	FQMA	**FQMAYMYX**	**FQBEZQZX**	**FQBEZIZX**	FQBE	07/03/2008
NAMIBIA WINDHOEK/Hosea Kutako	FYWH	**FYWHYMYX**	**FYNMZQZX**	**FYNMZQZX**	FYNM	06/03/2008
NIGER NIAMEY/Diori Hmani International Airport	DRRN	**DRRNYMYX**	**DRRRZQZX** **DRRRZRZX** **DRRRZUZX** **DRRRZFZX**	**DRRRZIZX** **DRRRZQZX** **DRRRZFZX**	DRRR	15/04/2009. Fax N° 2009/000119/ ASECNA/DEED/DEETT
NIGERIA KANO/Mallam Aminu Kano International Airport	DNKN	**DNKNYMYX**	**DNKNZQZX**	**DNKNZQZX**	DNKK	07/01/2008. E-mail at 14:08 from Rahim Adewara
RWANDA KIGALI/Gregoire Kayibanda	HRYR	**HRYRYMYX**	**HRYRZQZX**	**HRYRZQZX**	HRYR	
SENEGAL DAKAR/Leopold Sedar Senghor	GOOY	**GOOYYMYX**	**GOOOZQZX** **GOOOZRZX** **GOOOZUZX** **GOOOZFZX**	**GOOOZIZX** **GOOOZFZX** **GOOOZQZX** **GOOOZOZX**	GOOO	15/04/2009. Fax N° 2009/000119/ ASECNA/DEED/DEETT
SEYCHELLES MAHE/Seychelles Intl	FSIA	**FSIAYMYX**	**FSSSZQZX**	**FSSSZQZX**	FSSS	06/03/2008

SOMALIA MOGADISHU/Mogadishu	HCMM	**HCMMYMYX**	**HCSMZQZX**	**HCSMZQZX**	HCSM	
SOUTH AFRICA JOHANNESBURG/O.R.Tambo Int	FAJS	**FAJSYMYX**	**FACAZQZX**	**FACAZQZX**	FACA	06/03/2008
JOHANNESBURG/O.R.Tambo Int	FAJS	**FAJSYMYX**	**FAJAZQZX**	**FAJAZQZX**	FAJA	
JOHANNESBURG/O.R.Tambo Int	FAJS	**FAJSYMYX**	**FAJOZQZX**	**FAJOZQZX**	FAJO	
SUDAN KHARTOUM	HSSS	**HSSSYMYX**	**HSSSZQZX**	**HSSSZQZX**	HSSS	
TUNISIA TUNIS/Carthage	DTTA	**DTTAYMYX**	**DTTCZQZX** **DTTCZRZX**	**DTTCQZX** **DTTCZRZX**	DTTC	24/04/2009. Fax N° 01391 du 27 avril 2009
UGANDA ENTEBBE/Entebbe Int.	HUEN	**HUENYMYX**	**HUECZQZX**	**HUECZQZX**	HUEC	
UNITED REPUBLIC OF TANZANIA DAR-ES-SALAAM/Dar-es-Salaam	HTDA	**HTDAYMYX**	**HTDCZQZX**	**HTDCZQZX**	HTDC	
ZAMBIA LUSAKA/Lusaka Int.	FLLS	**FLLSYMYX**	**FLFIZQZX**	**FLFIZQZX**	FLFI	25/03/2008
ZIMBABWE HARARE/Harare	FVHA	**FVHAYMYX**	**FVHAZQZX**	**FVHAZQZX**	FVHA	
RODB/BRDO Dakar DAKAR/Leopold Sedar Senghor		**GOOYYZYZ**	**GOOYYZYZ**	**GOOYYZYZ**		15/04/2009. Fax N° 2009/000119/ ASECNA/DEED/DEETT
RODB/BRDO Pretoria Pretoria		**FAPRYMYX**	**FAPRYMYX**	**FAPRYMYX**		
VAAC Toulouse, France		**LFPWYMYX**				
TCAC La Réunion, France		**FMEEYMYX**	**FMEEYAYX**	**FMEEYAYX**	FMEE	

APPENDIX I: WMO Headings for Tropical Cyclone and Volcanic Ash Advisory Bulletins (FK And FV) Used by AFITCAC And VAAC

Explanation of Table

Col. 1: Name of the TCAC or VAAC

Col 2: ICAO location indicator used by the TCAC or VAAC

Col 3: WMO heading (TTAAii CCCC) of the FK or FV bulletin

Col 4: Remarks (e.g., Area of coverage of the advisory, or any other bulletin-specific information)

TCAC/VAAC (State)	**ICAO location indicator**	**WMO Heading TTAAii CCCC**	**Remarks**
1	2	3	4
TC Advisories (FK)			
Réunion (France)	FMEE	FKIO20 FMEE	
VA Advisories (FV)			
Toulouse (France)	LFPW	FVXX01LFPW 1st volcano in activity FVXX02LFPW 2ndvolcano in activity, FVXX03LFPW 3rdvolcano in activity FVXX04LFPW 4thvolcano in activity FVXX05LFPW usedfor VAAC TOULOUSE back up byLONDON	

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APPENDIX J - AFI SIGMET Test Procedures

(Amendment 1 – May 2010)

1. Introduction

1.1 The MET Divisional Meeting (2002) formulated recommendation 1/12 b), *Implementation of SIGMET requirements,* which call, *inter alia,* for the relevant planning and implementation regional groups (PIRGs) to conduct periodic tests of the issuance and reception of SIGMET messages, especially those for volcanic ash.

1.2 Concerns by the users for the timely reception of SIGMET information has prompted the need to improve awareness on the critical and important nature of SIGMETs. In order to maintain the International Airways Volcano Watch (IAVW) and TC watch systems ready-for-action, regular exercises involving the advisory centres and the MWOs under their areas of responsibility should be performed.

1.3 The requirements for dissemination of SIGMET are specified in Annex 3, Appendix 6, 1.2. Regional guidance on the preparation and dissemination of SIGMET is provided in this *Regional SIGMET Guide*.

2. Purpose and Scope of SIGMET tests

2.1 The purpose of the tests is to check the awareness of the participating MWOs of the ICAO requirements for the issuance of SIGMET, and the adequacy of the existing telecommunication procedures for dissemination of the advisories and SIGMETs. Based on the results of the tests, the States will be provided with advice aimed at improving their practices and procedures.

2.2 In the case of SIGMET for tropical cyclones and volcanic ash clouds (referred hereafter as WC SIGMET and WV SIGMET respectively) the scope of the tests will involve issuance of test advisories by the VAACs and TCACs in the region, which will be disseminated to the corresponding MWOs and the Regional OPMET Data Banks (RODBs). The MWOs will have to issue a test SIGMET on receipt of a test advisory from the responsible VAAC or TCAC, and disseminate it according to the distribution list used for normal (non-test) SIGMETs.

2.3 The RODBs will record the reception of the test SIGMETs and the corresponding time and will provide a summary table to the VAAC or TCAC with a copy to the Regional Office.

2.4 A consolidated summary report will be prepared by the ICAO Secretariat and reported to the MET/SG and APIRG. The report will include recommendations for improvement of the SIGMET exchange and availability.

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3. SIGMET test procedures

3.1 Procedures for WC and WV SIGMET TEST :

3.1.1 Operational Units:

3.1.1.1 Tropical Cyclone Advisory Centre (TCAC: **La Réunion**

3.1.1.2 Volcanic Ash Advisory Centre (VAAC): **Toulouse**

3.1.1.3 Regional OPMET Data Bank (RODB): **Dakar, Pretoria**

3.1.1.4 Meteorological Watch Office (MWO)

3.1.1.4.1 All MWOs listed in AFI FASID Table MET 3A and MET 3B, under the responsibility of Toulouse, VAAC and La Réunion, TCAC.

Note: The participation of MWOs of States, which do not belong to AFI region, should be coordinated through the relevant ICAO Regional Office.

3.1.2 **Test date and time**

3.1.2.1 ICAO Regional Office will set a date and time after consultation with the VAAC, TCAC and RODB. The information about the agreed date and time will be sent to all States concernedand copied to the States SIGMET Tests Focal Points.

3.1.3 Test messages

3.1.3.1 Each VAAC or TCAC prepares a simple TEST message in the form of VA or TC advisory. The formats of the said TESTsare given in **Attachment 1** to this Appendix.

3.1.3.2 The MWOs, upon receipt of the TEST VA/TC advisory, should prepare a TEST SIGMET for volcanic ash or tropical cyclone, respectively, and send it to the RODBs. The WMO heading and the first line of the SIGMET should be valid ones, while the body of the message should contain an explanatory text on the testsas show in **Attachment 1** to this Appendix.

3.1.3.3 The MWOs should issue a WV or WC TEST SIGMET within the 10-minute period following the issuance of VA or TC test message by the corresponding VAAC or TCAC.

3.2 Procedures for WS SIGMET Tests

3.2.1 WS SIGMET advisory Test should be initiated by Pretoria RODB in coordination with ICAO Regional Offices in Dakar and Nairobi. The information about the date and time will be sent to all States concerned and copied to the State's SIGMET Tests Focal Points.

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3.2.2 Operational Units:

-AFI Regional OPMET data Banks: Dakar and Pretoria.

-Meteorological Watch Offices (MWO): All MWOs listed in FASID Table MET 3A and MET 3B of the AFI FASID.

3.3 Common Procedures Applicable to All Types of SIGMET

3.3.1 The AFTN addresses of the RODBs to which the test SIGMETs should be sent are as follows:

Dakar	:	GOOYYZYZ
Pretoria	:	FAPRYMYX

3.3.2 To avoid over-writing of a valid SIGMET, the test SIGMET may not be sent if there is a valid SIGMET for responsible area of the MWO. Such MWOs are strongly encouraged to notify the Regional Office via e-mail of their non-participation in the test due to the said reasons.

3.3.3 Test for different types of SIGMET should preferably be conducted on separate dates.

3.3.4 At least two SIGMET tests per year should be conducted.

3.4 Special procedure to avoid overwriting of a valid SIGMET

3.4.1 It is vital to ensure that TEST SIGMET is not confused with operational SIGMET and avoid overwriting a valid operational SIGMET in an automated system. In order to prevent this it is suggested that:

a) If at the time of the SIGMET test NO SIGMET is current for the FIR, the number of the Test SIGMET should follow the normal numbering sequence; e.g. if the last “normal” SIGMET before the test was number “03”,

b) the TEST SIGMET should be number “04”, and the first “normal” SIGMET after the test should be number “05”.If a SIGMET is VALID at the time of the test then the TEST SIGMET should be issued and the valid SIGMET should be repeated immediately after the TEST SIGMET. E.g., if the following SIGMET is issued at 0100 on the date of the test:

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WSCG31 FCBB 250100
FCCC SIGMET 1 VALID 250100/250500 FCBB-
FCCC BRAZZAVILLE FIR SEV TURB FCST WI ….=

A SIGMET test is scheduled for 0200 UTC on the 25th. The TEST SIGMET is issued with the next consecutive sequence number as follows:

WSCG31 FCBB 250200
FCCC SIGMET 2 VALID 250200/250210 FCBB-
FCCC THIS IS A TEST SIGMET PLEASE DISREGARD=

The original SIGMET is then retransmitted immediately after this with the next consecutive sequence number and the validity period is amended accordingly:

WSCG31 FCBB 250200
FCCC SIGMET 3 VALID 250200/250500 FCBB-
FCCC BRAZZAVILLE FIR SEV TURB FCST WI … =

4. Dissemination of test SIGMETs and Advisories

4.1 All TEST SIGMETs and TC/VA advisories should be sent to the two AFI RODBs. The AFTN addresses to be used by the MWOs, TCACs and VAACs are as follows:

Dakar – GOOYYZ YZ
Pretoria – FAPRYMYX

4.2 SIGMET tests should be terminated within **2 hours** of the test start time.

4.3 Coordination with the ATS units

4.3.1 MWOs should inform the associated ATS units of the forthcoming SIGMET tests by a suitable advanced notice.

4.4 Processing of the test messages and results

4.4.1 The RODBs will be requested to file all incoming TEST advisories and SIGMETs and perform an analysis of the availability, timeliness of arrival for WV and WC SIGMETs and the correctness of the headers and meteorological content of WS SIGMET. A SIGMET TEST Summary Table as shown in **Attachment 4** to this Appendix should be prepared by each RODB and sent to the Rapporteur of the AFI OPMET Management Task Force (AFI OPMET MTF), and the contact given below with a copy to the ICAO Dakar and Nairobi Regional Office.

4.4.2 The Rapporteur and SIGMET test contact should prepare the final report of the test and present it to the AFI Regional Offices. A summary report should be submitted to the next AFI OPMET MTF meeting.

4.4.3 The current contact information for sending summary tables is as follows :

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WS SIGMET summary table sent to :

Mr DiemeSaidou
Service Exploitation Météorologique ASECNA – Sénégal
Tél 221 33 869 22 03
Fax 221 33 820 06 00
E-mail : saidoudieme@yahoo.fr

WV/WC SIGMET summary table sent to :

Mrs G.E Khambule
South African Weather Service
Tel 27113909326
Fax 27113209332
Email : gaborekwe.khambule@weathersa.co.za

All Summary Tables and any enquires about SIGMET tests sent to :

ICAO Regional Office, Dakar
E-mail : icaoAFI@dakar.icao.int
Cc : aokossi@dakar.icao.int

And

ICAO Regional Office, Nairobi
Email : icao@icao.union.org
Cc: vitalis.ahago@icao.unon.org

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Attachment 1 to Appendix J

AFI SIGMET TEST PROCEDURES

Format of VA Test advisories and SIGMETs

1. The format of VA and TC advisories are as in ICAO Annex 3:
   - **Table A2-1. Template for advisory message for volcanic ash**
   - **Table A2-2. Template for advisory message for tropical cyclones.**

<u>Example of TEST Volcanic Ash Advisory</u>

VA ADVISORY
DTG : YYYYMMDD/hhmm
VAAC: (name of VAAC
VOLCANO : TEST
PSN : UNKNOWN
AREA : (name of VAAC) VAAC AREA
SUMMIT ELEV : UNKNOWN
ADVISORY NR : YYYY/nn (actual number)
INFO SOURCE : NIL
AVIATION COLOUR CODE : NIL
ERUPTION DETAILS : NIL
OBS VA DTG : DD/0150Z
OBS VA DTG : ASH NOT IDENTIFIABLE FROM SATELLITE DATA
FCST VA CLD + 6HR : 01/ 0800 Z SFC/FL600 NO ASH EXP
FCST VA CLD + 12 HR : 01/1400 Z SFC/FL600 NO ASH EXP
FCST VA CLD + 18 HR : 01/2000 Z SFC/FL600 NO ASH EXP
RMK: THIS IS A TEST VA ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR VA, UNLESS THERE IS A VALID SIGMET FOR VA.
PLEASE REFER TO THE LETTER FROM ICAO AFI OFFICE DATED xxxxxx.
NXT ADVISORY : NO FURTHER ADVISORIES =

2. <u>Example of Format of TEST Tropical Cyclone ADVISORY</u>

TC ADVISORY

DTG : YYYYMMDD/hhmm
TCAC : (name of TCAC)
TC : TEST
NR : nn (actual number)
PSN : NIL
MOV : NIL
C: NIL
MAX WIND : NIL
FCST PSN + 06HR : NIL
FCST MAX WIND + 6HR : NIL

FCST PSN +12 HR :	NIL
FCST MAX WIND +12HR :	NIL
FCST PSN +18HR :	NIL
FCST MAX WIND +18HR :	NIL
FCST PSN + 24 HR :	NIL
FCST MAX WIND +24HR :	NIL

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RMK : THIS IS A TEST TC ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR TC, UNLESS THERE IS VALID SIGMET FOR TC
PLEASE REFER TO THE LETTER FROM ICAO AFI OFFICE DATED XXXXXX
NXT MSG : NIL

3. Example of TEST SIGMET for Volcanic Ash

WVXXii CCCC YYGGgg
CCCC SIGMET n (nn) VALID YYGGgg/ YYGGggCCCC-
THIS IS A TEST SIGMET , PLEASE DISREGARD. TEST VA ADVISORY NUMBER xx

RECEIVED AT YY GGggz =

Example:

WVHK31 VHHH 180205
VHHK SIGMET 01 VALID 180205/180215 VHH-
THIS IS A TEST SIGMET, PLEASE DISREGARD. TEST VA DVISORY NUMBER 01
RECEIVED AT 180200Z =

4. Format of TEST SIGMET for Tropical Cyclone

WCXXii CCCC YYGGgg
CCCC SIGMET n (nn) VALID YYGGgg/YYGGgg CCCC-
THIS IS A TEST SIGMET, PLEASE DISREGARD. TEST VA DVISORY NUMBER xx
RECEIVED AT YYGGggZ=

Example :

WCHK31 VHHH 180205
VHHK SIGMET 01 VALID 180205/180215 VHHH-
THIS IS A TEST SIGMET, PLEASE DISREGARD. TEST TC ADVISORY NUMBER 01
RECEIVED AT 180200Z=

5. Format of TEST SIGMET for other weather phenomena
WSXXii CCCC YYGGgg
CCCC SIGMET n (nn) VALID YYGGgg/YYGGgg CCCC
THIS IS A TEST SIGMET, PLEASE DISREGARD =

Example :
WSHK31 VHH H180200

VHHK SIGMET 04 VALID 180200/ 180210 VHHH-
THIS IS A TEST SIGMET, PLEASE DISREGARD =

Note : 1) " x x " in the WMO heading to be used replaced by the respective WMO geographical designator
2) Actual number to be used in all TEST SIGMETS

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6. AFI Volcanic ash test procedure

Format of the test VAA

a) The format for the TEST VAA that will be provided by the Toulouse VAAC can be seen below. DD is the day of the month, *HH* the hour of issuance.

FVAF01 LFPW ***DDHH****00*
VOLCANIC ASH ADVISORY
ISSUED: 200506***DD/HH***00Z
VAAC: TOULOUSE
VOLCANO: FICTITIOUS
LOCATION: NIL

AREA : NIL
SUMMIT ELEVATION : NIL
ADVISORY NUMBER : 2005/01
INFORMATION SOURCE: NIL
AVIATION COLOUR CODE: NIL
ERUPTION DETAILS : NIL
OBS ASH DATE/TIME : NIL
OBS ASH CL: NIL
FCST ASH CL+6H:NIL
FCST ASH CL+12H:NIL
FCST ASH CL+18H:NIL
NEXT ADVISORY: NO FURTHER ADVISORIES

REMARKS:

THIS IS A VAA TEST MESSAGE APPLICABLE TO THE WHOLE OF ICAO AFI REGION. EACH METEOROLOGICAL WATCH OFFICE, AREA CONTROL CENTRE AND FLIGHT INFORMATION CENTRE SERVING FLIGHT INFORMATION REGIONS WITHIN THE AFI REGION RECEIVING THIS MESSAGE SHOULD ISSUE AN ADMINISTATIVE MESSAGE USING THE WMO HEADER NOAF33 LFPW AND SEND IT TO THE AFTN ADDRESS LFZZMAFI TO ACKNOWLEDGE THE RECEPTION OF THIS VAA MESSAGE.

b) Template of the SIGMET (without meteorological content = acknowledgement of receipt) to be sent by the MWO/ACC/FIC to both RODBs:

TO: VAAC TOULOUSE, RODB DAKAR, RODB PRETORIA
WVFR31LFPW080200

LFFF SIGMET **1** VALID 080400/081000 LFPW-
LFFF PARIS FIR/UIR TEST TESTTESTTEST
ACK RECEP TEST VAA FROM VAAC TOULOUSE
VOLCANO UNKNOWN AREA ICAO AFI REGION

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INFO SOURCE TEST VOLCAFI
DTG 20071127/0615Z RECEIVED AT 27/0621Z
TEST VA SIGMET PLEASE DISREGARD
TEST TESTTESTTESTTESTTESTTESTTESTTESTTESTTEST TEST=

Note : ***Parts of the SIGMET message (acknowledgement of receipt) highlighted, must be replaced with information about the Recipients, date, your MWO/ACC/FIC and corresponding FIR.***

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Attachment 2 to Appendix J

EXEMPLE OF TCA TEST MESSAGE FORMAT FROM LA REUNION TCAC

KIO20 FMEE 100900
TC ADVISORY
DTG: 20090610/0900Z
TCAC: REUNION
TC: TEST
NR: 01
PSN: NIL
MOV: NIL
C: NIL
MAX WIND: NIL
FCST PSN +06HR: NIL
FCST MAX WIND +06HR: NIL
FCST PSN +12HR: NIL
FCST MAX WIND +12HR: NIL
FCST PSN +18HR: NIL
FCST MAX WIND +18HR: NIL
FCST PSN +24HR: NIL
FCST MAX WIND +24HR: NIL
RMK: THIS IS A TEST TC ADVISORY. MWO SHOULD NOW ISSUE A TEST SIGMET FOR TC, UNLESS THERE IS A VALID SIGMET FOR TC.
NXT MSG: NIL

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Attachment 3 to Appendix J

SIGMET TEST PROCEDURES
- Examples of TEST advisories and SIGMETs -

1. Format of TEST SIGMET for Volcanic Ash

WVXXiiCCCCYYGGgg
CCCC SIGMET n(nn) VALID YYGGgg/YYGGgg CCCC−
THIS IS A TEST SIGMET PLEASE DISREGARD. TEST VA ADVISORY NUMBER XX RECEIVED AT YYGGggZ=

Example:

WVSG31 GOOY 180205
GOOO SIGMET 01 VALID 180205/180215 GOOY-
THIS IS A TEST SIGMET, PLEASE DISREGARD. TEST VA ADVISORY NUMBER 01 RECEIVED AT 180200Z=

2. Exemple of TEST SIGMET for Tropical Cyclone

WCXXiiCCCCYYGGgg
CCCC SIGMET n(nn) VALID YYGGgg/YYGGggCCCC−
THIS IS A TEST SIGMET PLEASE DISREGARD. TEST TC ADVISORY NUMBER XX RECEIVED AT YYGGggZ=

Example:

WCHK31 VHHH 180205
VHHK SIGMET 01 VALID 180205/180215 VHHH-
THIS IS A TEST SIGMET PLEASE DISREGARD. TEST TC ADVISORY NUMBER 01 RECEIVED AT 180200Z=

3. Exemple of TEST SIGMET for other weather phenomena

WSXXiiCCCCYYGGgg
CCCC SIGMET n(nn) VALID YYGGgg/YYGGggCCCC−
THIS IS A TEST SIGMET PLEASE DISREGARD=

Example:

WSCG31 FCBB 180200
FCCC SIGMET 04 VALID 180200/180210 FCBB-
THIS IS A TEST SIGMET PLEASE DISREGARD=

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Attachment 4 to Appendix J

SAMPLE TABLE TO BE USED BY RODBS

AFI SIGMET TEST Summary (Reception time at RODBs)

Name of RODB	:	Dakar or Pretoria
Date of test	:	YYYY/MM/DD
Target	:	VA (Volcanic Ash)

VAA	Header		Received time (UTC)
TTAAii	**CCCC**	**YYGGgg**	
FVXX01	LFPW	180200	18:00:27

SIGMET	Header				Received time (UTC)
TTAAii	**CCCC**	**YYGGgg**	**MWO**	**FIR/UIR**	
WVSG31	GOOY	180235	GOOY	GOOO	18:06:02
WVCD31	FTTJ	180311	FTTJ	FTTT	18:07:58
WVNI31	DNKN	180255	DNKN	DNKK	18:17:55

Name of RODB	:	Dakar or Pretoria
Date of test	:	YYYY/MM/DD
Target	:	TC (Tropical Cyclone)

TCA	Header		Received time (UTC)
TTAAii	**CCCC**	**YYGGgg**	
FKIO01	FMEE	180200	18:08:27

SIGMET	Header				Received time (UTC)
TTAAii	**CCCC**	**YYGGgg**	**MWO**	**FIR/UIR**	
WCMG20	FMMI	180250	FMMI	FMMM	18:02:55
WCTN31	HTDA	180402	HTDA	HTDC	18:03:58
WCZA31	FAJS	180356	FAJS	FAJA	18:03:44
WCBC31	FBSK	180322	FBSK	FBGR	18:03:15

Appendix F - PROPOSED AMENDMENTS TO OPMET INFORMATION

FROM NON-AOP AERODROMES

	ICAO Location Indicator	SA	SP	FC	FT	SUG	Name	State	Region
1	DAAD	Yn		Yn		Yn	BOU-SAADA	Algeria	AFI
2	DAAS	Yn		Yn		Yn	SETIF	Algeria	AFI
3	DAAY	Yn		Yn		Yn	MECHERIA_AIRFROCE _BASE	Algeria	AFI
4	DABT	Yn		Yn		Yn	BATNA/MOSTEPHA_BEN_BOULAID	Algeria	AFI
5	DAFH	Yn		Yn		Yn	HASSI_RMEL	Algeria	AFI
6	DAOF	Yn		Yn		Yn	TINDOUF	Algeria	AFI
7	DAOI	Yn				Yn	ECH_CHELIFF	Algeria	AFI
8	DAOL	Yn	Yn			Yn	ORAN/TAFARAOUI	Algeria	AFI
9	DAOR	Yc	Yc	Yn		Yc	BECHAR	Algeria	AFI
10	DAOY			Yn		Yn	EL_BAYADH	Algeria	AFI
11	DATM	Yn		Yn		Yn	BORDJ_MOKHTAR	Algeria	AFI
12	DAUE	Yn		Yn		Yn	EL_GOLEA	Algeria	AFI
13	DAUL	Yn		Yn		Yn	LAGHOUT_AFB	Algeria	AFI
14	DGTK	Yn			Yn	Yn	TAKORADI	Ghana	AFI
15	DNGO	Yn			Yn	Yn	GOMBE	Nigeria	AFI
16	DNZA	Yn				Yn	ZARIA	Nigeria	AFI
17	DTNZ	Yn			Yn	Yn	ENFIDHA_/ZINE_EL_ABIDINE_BEN	Tunisia	AFI
18	DTTL	Yn				Yn	KILIBIA	Tunisia	AFI
19	DTTR	Yn		Yn		Yn	EL_BORMA	Tunisia	AFI
20	FAEL			Yn		Yn	EAST_LONDON	South_Africa	AFI
21	FAGG	Yn		Yn		Yn	GEORGE/P.O.BOTHA	South_Africa	AFI
22	FAHS			Yn		Yn	HOEDSPRUIT _AFB	South_Africa	AFI
23	FAKM			Yn		Yn	KIMBERLEY_(KIMBERLEY_AIRPORT)	South_Africa	AFI
24	FAKN	Yn		Yn		Yn	KRUGER_MPUMALANGA_INT	South_Africa	AFI
25	FALM	Yn		Yn		Yn	MAKHADO	South_Africa	AFI
26	FAPN			Yn		Yn	PILANESBERG	South_Africa	AFI
27	FAPP			Yn		Yn	POLOKWANE_INTERNATIONAL	South_Africa	AFI
28	FAUT			Yn		Yn	UMTATA	South_Africa	AFI
29	FAWB			Yn		Yn	PRETORIA/WONDERBOOM	South_Africa	AFI
30	FAWK			Yn		Yn	WATERKLOOF	South_Africa	AFI
31	FBFT	Yn		Yn		Yn	FRANCISTOWN	Botswana	AFI
32	FBKE	Yn		Yn		Yn	KASANE	Botswana	AFI
33	FBMN	Yn		Yn		Yn	MAUN	Botswana	AFI
34	FBSP	Yn		Yn		Yn	SELEBEI-PHIKWE	Botswana	AFI
35	FIMR	Yn			Yn	Yn	RODRIGUES/PALINE_CORAIL	Mauritius	AFI
36	FMCZ	Yn		Yn		Yn	DZAOUDZI	Comoros	AFI
37	FMEP	Yn		Yn		Yn	SAINT_PIERRE/PIERREFONDS	Reunion_(Fra	AFI
38	FMMS	Yn				Yn	SIANT_MARIE	Madagascar	AFI
39	FMNA	Yn			Yn	Yn	ANTSIRANANA	Madagascar	AFI
40	FMST				Yn	Yn	TOLIARA	Madagascar	AFI
41	FQCH				Yn	Yn	CHIMOI	Mozambique	AFI

	ICAO Location Indicator	SA	SP	FC	FT	SUG	Name	State	Region
42	FQIN				Yn	Yn	INHAMBANE	Mozambique	AFI
43	FQLC				Yn	Yn	LICHINGA	Mozambique	AFI
44	FQPB				Yn	Yn	PEMBA	Mozambique	AFI
45	FQVL					Yn	VILANKULO	Mozambique	AFI
46	FVCZ			Yn		Yn	CHIREDZI/BUFFAO_RANGE	Zimbabwe	AFI
47	FVKB			Yn		Yn	KARIBA	Zimbabwe	AFI
48	FVMV			Yn		Yn	MASVINGO	Zimbabwe	AFI
49	FVWN			Yn		Yn	HWANGE_NATIONAL_PARK	Zimbabwe	AFI
50	FYGF			Yn		Yn	GROORFONTEIN	Namibia	AFI
51	FYOA			Yn		Yn	ONDANGWA	Namibia	AFI
52	FYWE			Yn		Yn	WINDHOEK/EROS	Namibia	AFI
53	GCGM	Yn				Yn	LA_GOMERA	Canary_Island	AFI
54	GMMC	Yn				Yn	CASAMBLANCA/ANFA	Moroco	AFI
55	GMMH	Yn				Yn	DAKHILA	Moroco	AFI
56	GMML	Yc	Yc	Yn	Yc	Yc	LAAYOUNE/HASSAN_1ER	Moroco	AFI
57	GMTA	Yn				Yn	AL_HOCEIMA	Moroco	AFI
58	GOOK	Yn				Yn	KAOLACK	Senegal	AFI
59	GOTK	Yn				Yn	KEDOUGOU	Senegal	AFI
60	GVBA	Yn			Yn	Yn	RABIL/BOA_VISTA8ISLAND	Cape_Verde	AFI
61	HEAR				Yn	Yn	EL_ARISH	Egypt	AFI
62	HEBA				Yn	Yn	ALEXANDRIA/BORG_EL_ARAB	Egypt	AFI
63	HEPS	Yn			Yn	Yn	PORT_SAID	Egypt	AFI
64	HLGD				Yn	Yn	GARDABYA	Libyan_Arab_	AFI
65	HLKF				Yn	Yn	KUFRA	Libyan_Arab_	AFI
66	HLLM	Yn			Yn	Yn	TRIPOLI/MITIGA	Libyan_Arab_	AFI
67	HRZA	Yn			Yn	Yn	KAMEMBE	Rwanda	AFI

SA:	METAR required
SP:	SPECI required
FC:	Short TAF required
FT:	Long TAF required
SUG:	SADIS User Guide
Yn:	Yes - new requirements
Yc:	Yes - current requirements

APPENDIX 3.6E

Appendix G - AMENDEMENT TO OPMET INFORMATION FROM NON-AOP AERODROMES

Note. - the nomenclature is based on the one provided by IATA; it does not reflect the official ICAO posisition in the regard

ICAO Location Indicator	SA	SP	FC	FT	FX	SUG	Name	State	Region
~~DATG~~	¥	¥	¥			¥	IN_GUEZZAM	Algeria	AFI
~~DIKO~~	¥	¥				¥	KORHOGO	Cote d'Ivoire	AFI
~~DIMN~~	¥	¥				¥	MAN	Cote d'Ivoire	AFI
~~DISP~~	¥	¥				¥	SAN_PEDRO	Cote d'Ivoire	AFI
~~FAAB~~	¥	¥				¥	ALEXANDER_BAY	South-Africa	AFI
~~FEFG~~	¥	¥				¥	BANGASSOU	Central-African- Republic	AFI
~~FOOD~~	¥	¥				¥	MOANDA	Gabon	AFI
~~FZAB~~	¥	¥		¥		¥	KINSHASHA/N'DOLO	Democratique _Republique of the Congo	AFI
~~FZBN~~	¥	¥		¥		¥	MALEBO	Democratique _Republique of the Congo	AFI
~~FZEA~~	¥	¥		¥		¥	MBANDAKA	Democratique _Republique of the Congo	AFI
~~FZOA~~	¥	¥		¥		¥	KINDU	Democratique _Republique of the Congo	AFI
~~FZOS~~	¥	¥		¥		¥	KASESE	Democratique _Republique of the Congo	AFI
~~FZRF~~	¥	¥		¥		¥	KALEMIE	Democratique _Republique of the Congo	AFI
~~FZSA~~	¥	¥		¥		¥	KAMINA	Democratique _Republique of the Congo	AFI
~~GLMR~~	¥	¥		¥		¥	MONROVIA/SPRIGGS_PAYNE	Liberia	AFI
~~GQNK~~	¥	¥		¥		¥	KAEDI	Mauritania	AFI
~~GUFH~~	¥	¥		¥		¥	FARANAH	Guinea	AFI
~~GUOK~~	¥	¥		¥		¥	BOKE/BARALANDE	Guinea	AFI
~~HKML~~	¥	¥		¥		¥	MALINDI	Kenya	AFI
~~HKNW~~	¥	¥		¥		¥	NAIROBI/WILSON	Kenya	AFI
~~HSDN~~	¥	¥		¥		¥	DONGOLA	Sudan	AFI
~~HTMW~~	¥	¥		¥		¥	MWANZA	United_Republique_of Tanzania	AFI
~~HTTG~~	¥	¥		¥		¥	TANGA	United_Republique_of Tanzania	AFI

SA: METAR required
SP: SPECI required
FC: Short TAF required
FT: Long TAF required
SUG: Listed in the SADIS User Guide
~~¥:~~ Information no more required by IATA

SUMMARY OF OPERATIONAL SHORTCOMINGS AND DEFICIENCIES IDENTIFIED

	Operational Shortcomings and Deficiencies	VAAC, TCAC, RODBs or MWOs
1	2	3
1	23 MWOs out of 35 in the AFI region (65,7%) did not issue any WV SIGMET during the Test period	**ESAF (18):** FNLU, FBSK, HBBA, HECA*, HAAB, HHAS, HKJK, HLLT*, FWLI, FQMA, FYWH, HRYR, FSIA*, HSSS*, HUEN, HTDA, FLLS, FVHA **WACAF (5):** DAAL*, GCLP*, GLRB, DTTA*, FZAA,
2	29 MWOs out of 35 in the AFI region (83%) did not issue any WS SIGMET during the Test period	**ESAF (23):** FBSK, HBBA, HECA*, HAAB, HHAS, HKJK, HLLT*, FMMI, FWLI, FIMP, GMMC, FQMA, FYWH, HRYR, FSIA*, HCMM, FAJS, HSSS*, HUEN, HTDA, FLLS, FVHA **WACAF (6):** DAAL*, GCLP*, FZAA, DGAA, GLRB, DTTA*
3	The listed 21 MWOs (60%) have never issued any SIGMET during AFI SIGMET Tests	**ESAF (17):** FNLU, HBBA, HECA*, HAAB, HHAS, HKJK, HLLT*, FWLI, FQMA, FYWH, HRYR, FSIA*, HSSS*, HUEN, HTDA, FLLS, FVHA **WACAF (4):** DAAL*, GCLP*, FZAA, GLRB,
4	6 MWOs out of 10 TC-MWOs in the AFI region (60%) did not issue any WC SIGMET during the Test period	**ESAF**: FWLI, FIMP, FQMA, FSIA*, HTDC, FVHA
5	5 MWOs used GG priority indicator to disseminate WS and WV SIGMET, instead of the FF indicator	DNKK, HCMM, FTTJ, GVAC, GMMC
6	4 MWOs issued a WC SIGMET while it is not required	GMMC, DNKN, GOOY, GVAC
7	WC SIGMETs from 3 MWOs were received late at the RODBs, more than 10 mn after the advisory was issued by FMEE.	FAJS, FBSK, HKJK
8	WV SIGMETs from 11 MWOs were received late at the RODBs, more than 10 mn after the advisory was issued by LFPW	FMMI, GMMC, DNKN, DRRN, FCBB, GVAC, FIMP, FAJS, DGAA, HCMM, FTTJ
9	A real V SIGMET from RJTD received at Pretoria RODB, was confused with a WV SIGMET Test message	Pretoria RODB
10	16 SIGMET Tests were repeated at Dakar RODB during the tests	Dakar RODB
11	6 MWOs issued a SIGMET with incorrect validity period	FAJS HKJK DGAA FCBB GOOY DNKN FIMP HCMM FTTJ GVAC
12	7 MWO issued SIGMETs with an incorrect weather phenomena description	FAJS GOOY DNKN FCBB FTTJ DRRN GVAC
13	6 MWOs issued SIGMET test messages without including a line of 12 “TEST” at the end of the SIGMET message	FAJS FBSK GMMC FIMP DRRN GOOY
14	6 MWOs issued SIGMETs without including the ICAO indicator of the corresponding FIR at the beginning of the main text of the SIGMET	FBSK HKJK DGAA FAJS FIMP HCMM
15	6 MWOs issued SIGMETs without including any hyphen at the end of the line containing the validity period	HKJK DGAA GMMC FIMP HCMM GVAC
16	3 MWOs issued SIGMETs without including the MWO ICAO indicator just after the validity period	HKJK FIMP GVAC
17	1 MWO issued a SIGMET without including the word “VALID” just before the validity period	HCMM

*: MWOs in the AFI region but not accredited to ESAF and to WACAF

Air Navigation Deficiencies in the Meteorology Field

(REF. Air Navigation Plan - Africa-Indian Ocean region (Doc 7474)
Part IV - Meteorology (MET)

	Identification		**Deficiencies**			**Corrective action**			
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
ANGOLA	Requirement to provide aerodrome forecasts (AFI FASID Table MET 1A)	Angola/Luanda 4 de Fevereiro Associated MET Office	TAF of Luanda not regularly available	2003	Advice given by correspondence	Improve reliability of telecomm	INAMET and ENANA	As soon as possible	A
BURUNDI	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Busumbura aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Burundi/ Busumbura International Airport	MET station located very far from the runway and among buildings	2006	Data observed not representative of weather conditions along the runway. Unreliable exchange of data to users	Install an automatic weather observing system with sensors appropriately located. Install a MET message distribution system.	Meteorological Services Department	2007	U
CAMEROON	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway at N'Djamena International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b) and Cameroon AIP	Cameroon, Douala International Airport	Airport fence damaged resulting in vandalism of visibility, RVR and cloud base height sensors. No RVR sensor at the touchdown zone	08/2010	Advice given during the mission	1. Repairs to the fence and replacement of visibility, RVR and height of cloud base sensors. 2. Installation of new sensors RVR area of the midpoint of the runway	ASECNA	1. Juin 2011 2. Décembre 2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CAMEROON	Requirement to provide meteorological information to aerodrome control tower, approach control unit and flight information centre in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Cameroon, Douala International Airport	Aerodrome Warning (AD WRNG) and wind shear (WS WRNG) reports issued by Douala Aerodrome MET Office do not reach ATS units and ADC-SA premises.	08/2010	Advice given during the mission	Display warning reports (AD WRNG and WS WRNG) in the premises of ADC- SA	ADC- SA and ASECNA	December 2011	U
	Requirement to report the information related to pre-eruption volcanic activity, or a cessation thereof and/or volcanic ash in the atmosphere and send this information as quickly as practicable to its associated Douala ACC, Brazzaville MWO and Toulouse VAAC: ICAO Annex 3, para. 3.6	Cameroon, Douala International Airport	No letter of agreement has been established between the CCAA, ASECNA and the Observatory of the Institute of Geological and Mining Research (IRGM) in order to collect and send information relating to volcanic eruptions to the Brazzaville MWO and Toulouse VAAC on time.	08/2010	Advice given during the Mission	Arrange for a letter of agreement to be signed between the CCAA, ASECNA and the Volcano Observatory of the Institute of Geological and Mining Research (IRGM)	CCAA, ASECNA, IRGM/ Volcano Observatory	December 2011	U
CAPE VERDE	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Cape Verde/Sal International Airport.	Visibility data, RVR, cloud base height, air temperature, dew point and pressure are not provided by an automatic weather observing system at Sal International airport equipped with an ILS	09/2009	Advice given during CODEVMET Mission	Install an automated weather observing system with sensors appropriately located.	INMG/ ASA	2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CAPE VERDE	Requirements for Surface wind, RVR and air pressure displays relating to each sensor to be located in the meteorological station with corresponding displays in the appropriate air traffic services units. The displays in the meteorological station and in the air traffic services units to be related to the same sensors in accordance with ICAO Annex 3. para. 4.1.5 and App. 3 para. **4**.1.2.1, 4.3.3.1 and 4.7.1	Cape Verde/Sal International Airport	The meteorological parameters displayed in the control tower and those displayed in the aerodrome meteorological centre and used for issuance of observation messages METAR, MET REPORT, SPECI and SPECIAL are from two different sources of observations: the Meteorological observation station and an automatic observing system under demonstration.	09/2009	Advice given during CODEVMET Mission	Use the same sensors for the measurement of meteorological parameters to be displayed in ATS units and the aeronautical meteorological station	INMG/ ASA	2011	U
	Requirements to use local routine and special reports MET REPORT and SPECIAL in the meteorological information used pour l'ATIS in accordance with Annex 11, chap. 4, para. 4.3.6.1, g) and Annex 3, Chap. 4 para. 4.3.2 and 4.4.2	Cape Verde/Sal International Airport	Meteorological information used to issue ATIS are not the local routine and special reports MET REPORT and SPECIAL	09/2009	Advice given during CODEVMET Mission	Use local routine and special meteorological reports to issue ATIS information (ATIS voice and D-ATIS)	ASA INMG	2011	A
CHAD	Requirement to provide meteorological information to aerodrome control tower, approach control unit and flight information centre in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Chad, N'Djamena International Airport	Aerodrome Warning (AD WRNG) and wind shear (WS WRNG) reports are not displayed in the control tower and at the ATS units.	02/2010	Advice given during Sate Mission	Display warning reports (AD WRNG and WS WRNG) at the control tower and in the premises of the airport manager.	ASECNA	2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
CHAD	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway at N'Djamena International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Chad, N'Djamena International Airport	Even though N'Djamena International Airport is intended for Category II (ILS) instrument approach and landing operations, RVR assessments are not provided at the mid-point of the runway.	02/2010	Advice given during Sate Mission	Install RVR sensor at the mid-point of the runway..	ASECNA	2010	A
	Requirement to collect, process and relay special air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2-b), 5.5, 5.8 and 5.9	Chad, N'Djamena International Airport	special aircraft observations and reports are not collected, processed and redistributed	02/2010	Advice given during Sate Mission	- Update and implement the provisions of the ATS/MET service agreement - Encourage ATS/MET/pilots coordination meetings	ADAC et ASECNA	2011	B
COMOROS	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Comoros/ Prince Said Ibrahim International Airport of Moroni	Moroni International Airport equipped with a category II approach and landing operations instrument, is not using a proper automated equipment for measuring, assessing, monitoring and remote indicating of MET parameters	09/ 2009	Advice given during Sate Mission	Install an automated aerodrome weather observing system with sensors and display located at required places for the provision of operational MET information	ASECNA	December 2010	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Prince Said Ibrahim International Airport of Moroni, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Comoros/ Prince Said Ibrahim International Airport of Moroni	Runway visual range (RVR) assessments are not representative of the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations	09/ 2009	Advice given during the mission	1°) Introduce manual assessment of RVR in accordance with ICAO Doc. 9328. Install RVR sensor at the touchdown zone and the mid-point of the runway	ASECNA	December 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
COMOROS	Requirement to provide aerodrome forecasts (TAF) in accordance with AFI FASID MET Table 1A	Comoros/ Prince Said Ibrahim International Airport of Moroni	Only three TAF are issued every day, the TAF expected at 16:00 is not issued	09/ 2009	Advice given during the mission	Issue four TAF every day	ASECNA	December 2010	U
CONGO	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Brazzaville International Airport, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Congo, Brazzaville International Airport	Runway visual range (RVR) is not assessed at the mid-point of the runway of Brazzaville International Airport, intended for Category II instrument approach and landing operations	08/2008	Advice given during the mission	Install RVR sensor at the mid-point of the runway.	ASECNA	2009	U
	Requirement to provide VOLMET broadcast at Brazzaville International Airport (VOLMET), in accordance with ICAO Doc 7474 Volume II, Part V, Table ATS 2A..	Congo, Brazzaville International Airport	The VOLMET broadcast service is not operational	08/2008	Deficiency identify during ICAO WACAF mission	Re-establish the VOLMET broadcast service in the Brazzaville FIR	ASECNA	2009	U
	Requirement to collect, process and relay special air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2, 5.3.2, 5.4.1, 5.5, 5.7, 5.8 and 5.9	Congo, Brazzaville International Airport	Aircraft observation and reports are not collected, processed and relayed	08/2008	Advice given during the mission	Necessary arrangements between the MET authority and the appropriate ATS authority be made.	ANAC, ASECNA, Airlines	2009	U
	Requirement to provide Automatic Terminal Information Service (ATIS) in accordance with ICAO Doc 7474 Volume II, FASID AFI, Part III - Tableau AOP 1.	Congo, Brazzaville International Airport	The ATIS service is not implemented at Brazzaville International Airport	08/2008	Deficiency identify during ICAO WACAF mission	Install and implement an operational ATIS system	ASECNA	2009	B

	Identification		Deficiencies				Corrective action		
STATE	Requirements	Facilities or services	Description of Deficiency	Date first reported	Comments on deficiency	Description of corrective action	Executing body	Target date for imple-mentation	Priority for action
	1	2	3	4	5	6	7	8	9
DJIBOUTI	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Djibouti/ Djibouti International Airport	Djibouti International Airport equipped with a category II approach and landing operations instrument, is not using an automated equipment for measuring, assessing, monitoring and remote indicating of MET parameters	09/ 2009	Advice given during the mission	Install an automated aerodrome weather observing system with sensors and display located at required places for the provision of operational MET information	AID-DPW	December 2010	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Djibouti International Airport of Moroni, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Djibouti/ Djibouti International Airport	Runway visual range (RVR) assessments are not representative of the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations	09/ 2009	Advice given during the mission	1°) Introduce manual assessment of RVR in accordance with ICAO Doc. 9328. Install RVR sensor at the touchdown zone and the mid-point of the runway	AID-DPW	December 2010	U
	Requirement to issue local routine and special reports in accordance with Annex 3, chap. 4, para. 4.3.1, 4.3.2 a) et 4.4.2 a)	Djibouti/ Djibouti International Airport	Local routine and special reports (MET REPORT) and SPECIAL) are not issued	09/ 2009	Advice given during the mission	Issue local routine and special reports (MET REPORT) and SPECIAL)	AID-DPW	June 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
DJIBOUTI	Requirement to issue aerodrome and wind shear warnings and wind shear alert in accordance with Annex 3, chap. 7, para. 7.3 et 7.4 et App. 6 Table A6-2 et A6-3	Djibouti/ Djibouti International Airport	Aerodrome and wind shear warnings (AD WRNG, WS WRNG) and wind shear alert are not issued at Djibouti International Airport	07/ 2009	Advice given during the mission	1. sensitize forecasters and observers in the issuance and dissemination of messages and WS WRNG AD WRNG 2. issue and disseminate WS WRNG and AD WRNG information and wind shear alert; 3. develop and enforce a letter of service agreement between the MET and ATS (TWR, CCR, Office of the runway, ..) in order inter alia to promote the regular routing of aircraft reports on wind shear at landing or take off, to assess RVR, etc. .. 4. consider the possibility of installing, after a survey with users, at Djibouti Airport, a wind shear detecting system	1. AID-DPW 2. AID-DPW 3. DACM et AID-DPW 4. DACM et AID-DPW	1. June 2010 2. June 2010 3. June 2010 End 2010	U U U A
	Requirement to provide flight documentation in accordance with AFI FASID Table MET 7 (Doc 7474 Volume II, FASID AFI)	Djibouti/ Djibouti International Airport	Flight documentation is provided from a public non-secured website ADDS	07/2009	Advice given during the mission	In the short term, a SADIS FTP service shall be accessed from the WAFC London to extract required data for the provision of flight documentation. Access procedures are described on the following Website http://www.icao.int/anb/sadisopsg/sadis%20ftp%20service%20v4.0.pdf In the medium term, install a SADIS VSAT station with the required SADIS workstation software:	AID-DPW	- SADIS FTP : avant fin juin 2010 -Station VSAT SADIS 2G : fin 2010	A

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
THE GAMBIA	Requirement to provide runway visual range (RVR) for runway intended for non-precision or Category I approach and landing Operations (Annex 3, Chapter 4, para. 4.6.3. 4 a), 4.6.3.5 and Appendix 3, para.4.3.6.4).	The Gambia/ Banjul/ Yundum International Airport.	Runway visual range (RVR) is not assessed and reported during periods of reduced visibility.	30/07/2007	Reported by the State concerned from a survey questionnaire, advice given during State mission, further advice given CODEVMET 9/2009.	**In the short term:** Training of MET personal for manual assessment and reporting of RVR, or **In the medium term:** Installation of a RVR measurement, assessment and reporting equipment recommended.	Civil Aviation Authority and MET, The Gambia.	2009 2012	U
	Requirement to report visibility along the runway in local routine and special reports: Annex 3, Appendix 3 para; 4.2.4.2.	The Gambia, Banjul/ Yundum International Airport.	MET station located very far from the runway and behind a tree.	07/2007	Data observed not representative of weather conditions along the runway. Advice given during State Mission and CODEVMET Project 9/2009.	Install an automatic weather observing system with sensors appropriately located.	GCAA (Gambia Civil Aviation Authority).	2012	U
	Requirement to relay air reports: Annex 3 Chapter 5, para.5.8.	The Gambia, Banjul/ Yundum International Airport.	Aircraft observations and reports are not collected, processed and disseminated.	07/2007	Advice given during State Mission.	Necessary arrangements between the MET authority and the appropriate ATS authority be made.	GCAA (Gambia Civil Aviation Authority).	2010	B
	Requirement to measure and report wind direction and speed Annex 3 Chapter 4 para.4.6.11.	The Gambia, Banjul/ Yundum International Airport.	Wind direction and speed are estimated due to breaking of wire around the runway.	16/09/2009	Reported to CODEVMET Mission, advice given for immediat solution.	Short Term: Purchase wire and connect at the selected point to restore measurement and reading at MET and controlo Tower. Medium Term: Installation of automatic weather observing system.	GCAA and MET the Gambia.	11//2009 2012	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
THE GAMBIA	Requirement to issue aerodrome warnings (AW) and wind shear warning Annex 3 Chapter 7 para.7.3, 7.4 App.6 Table A6.2 and A6.3.	The Gambia, Banjul/ Yundum International Airport.	No provision for issuance of AW.	16/09/2009	Deficiency assessed during CODEVMET mission, advice given.	Short term, write procedures for issuance of AD and implement immediately.	GCAA and MET The Gambia.	When required starting from 11/2009	U
	Requirement to issue trend forecasts as contained in AFI FASID Table MET 1 A.	The Gambia, Banjul/ Yundum International Airport.	No provision to issue trend forecast.	16/09/2009	Deficiency assessed during CODEVMENT Project, advice given.	Writing required procedures to follow for issuance of Trend forecasts.	GCAA and MET The Gambia	12/2009	A
	Requirement to provide MET Reports to ATS Units Annex 3 Chapter 10 para. 10.1.1.	The Gambia, Banjul/ Yundum International Airport.	Provision of MET reports to ATS Units deficient, messages carried by hand and no wind display at Control Tower.	16/09/2009	Deficiency assessed during CODEVMET Project, advice given.	Repair the internal communication system and the wind measurement system. Medium Term Acquisition of new internal communication system.	GCAA and MET the Gambia GCAA and MET	12/2009 2011	U
GHANA	Requirement to disseminate SIGMET information in accordance with the provisions in the AFI FASID Table 2B.	Ghana, Accra Kotoka International Airport (KIA	SIGMET information issued by Accra MWO is not disseminated properly and the AMBEX procedures are not well known by the telecommunication staff for the dissemination of OPMET information	March 2010	Advice given during State Mission and a new version of the AMBEX Scheme was provided	Disseminate SIGMET information in accordance with AMBEX scheme and AFI FASID Table 2B.	GMet	12/2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentati on**	**Priori ty for actio n**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GHANA	Requirement to provide meteorological parameters affecting landing and take-off operations as surface wind, visibility, runway visual range (RVR), height of cloud base, air and dew-point temperatures and atmospheric pressure from an integrated automatic system for acquisition, processing, dissemination and display in real time: ICAO Annex 3, Chap. 4, para. 4.1.5	Ghana, Accra Kotoka International Airport (KIA)	Surface wind, visibility, runway visual range (RVR), height of cloud base, air and dew-point temperatures and atmospheric pressure are not provided from an integrated automatic system for acquisition, processing, dissemination and display in real time at Accra International Airport	March 2010	Procurement for the purchase of an integrated automatic system underway (Letter N° PPA/CEO/ 436/10 of 22 February 2010 from the Public Procurement Authority)	Install an automatic integrated observing system on AKIA runway (ILS Cat 2) with sensors appropriately sited in accordance with the provision in ICAO Annex 3, Chap 4, para 4.1.5 and 4.6.3.1 and Appendix 3 para; 4.2.4.2	GMet (Ghana Meteorological Agency)	12/2010	U
	Requirement to provide runway visual range (RVR): Annex 3, Chapter 4, para. 4. 6 .3	Ghana, Accra Kotoka International Airport (KIA	Runway visual range (RVR) is not assessed and reported	March 2010	Advice given during State Mission	Install a RVR assessment and reporting system	GMet	12/2010	U
	Requirement to issue compliant local routine report (MET REPORT) and local special report (SPECIAL) in accordance with provisions in ICAO Annex 3, Table 3-1	Ghana, Accra Kotoka International Airport (KIA	MET REPORT and SPECIAL are not compliant with Annex 3, Table 3-1	March 2010	Advice given during the mission	Issue compliant local routine and special reports and display them at the MET Office and at all ATS units	GMet	12/2010	U
GUINEA	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Sal aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Republic of Guinea, Conakry International Airport.	Conakry International Airport equipped with a category II approach and landing operations instrument, is not using an automated equipment for measuring, assessing, monitoring and remote indicating of MET parameters	09/2009	Advice given during CODEVMET mission	Install an automatic integrated observing system on Conakry International Airport runway (ILS Cat 2) with sensors appropriately sited in accordance with the provision in ICAO Annex 3, Chap 4, para 4.1.5 and 4.6.3.1 and Appendix 3 para; 4.2.4.2	DNAC and DNM	December 2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GUINEA	Requirement to issue compliant local routine report (MET REPORT) and local special report (SPECIAL) in accordance with provisions in ICAO Annex 3, Table 3-1	Republic of Guinea, Conakry International Airport.	MET REPORT and SPECIAL are not compliant with Annex 3, Table 3-1	09/2009	Advice given during CODEVMET mission	Issue compliant local routine and special reports and display them at the MET Office and at all ATS units	DNM	Before December 2010	U
	Requirement to provide meteorological information to aerodrome control tower, approach control unit and flight information centre in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Republic of Guinea, Conakry International Airport.	Aerodrome Warning (AD WRNG) and wind shear (WS WRNG) reports are not displayed in the control tower and at the ATS units	09/2009	Advice given during CODEVMET mission	Display warning reports WRNG AD and WS WRNG in the existing system for display of weather information of the control tower of N'djamena.	DNM	Before December 2010	A
	Requirement to provide flight documentation in accordance with AFI FASID Table MET 7 (Doc 7474 Volume II, FASID AFI)	Republic of Guinea, Conakry International Airport..	Flight documentation is provided from a public non-secured website ADDS	09/2009	Advice given during CODEVMET mission	In the short term, a SADIS FTP service shall be accessed from the WAFC London to extract required data for the provision of flight documentation. Access procedures are described on the following Website http://www.icao.int/anb/sadisopsg/sadis%20ftp%20service%20v4.0.pdf In the medium term, install a SADIS VSAT station with the required SADIS workstation software:	DNAC, DNM, ANA, FIR Roberts, SOGEAC	- SADIS FTP before Decembre 2010 - VSAT SADIS before Decembre 2011	A
	Requirement to issue OPMET information from the following AOP aerodromes Kankan, Labé, N'Nzérékoré in accordance with ICAO Doc 7474 Volume II, FASID AFI, Part III - Tableau AOP 1.	Republic of Guinea, Conakry International Airport..	OPMET information from AOP aerodromes Kankan, Labé, N'Nzérékoré is not issued 24h a day	09/2009	Advice given during CODEVMET mission	issue METAR and SPECI from AOP aerodromes Kankan, Labé and N'Nzérékoré	DNAC, DNM and ANA	Before December 2015	B

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
GUINEA BISSAU	Requirement to measure and report wind in accordance with provisions contained in Annex, Chapter 4 para 4.6.1.1..2	Guinée Bissau, Osvaldo Vieira International Airport	The wind sensors are installed on the top of the control tower and wind information is not representative of the condition along the runway.	10/2009	Advice given during CODEVMET mission	Install wind sensors at the touch down zone	ASECNA MET Administration	2011	U
	Requirement to issue aerodrome warnings (AD WRNG) and Wind Shear warnings (WS WRNG) as contained in provisions of Annex 3 Chapter 7 para 7.3.1 and 7.4.1 and App. 6 Table A6.2, A6.3	Guinée Bissau, Osvaldo Vieira International Airport	AD WRNG and WS WRNG are not issued at Osvaldo Vieira International Airport	10/2009	Advice given during CODEVMET mission	**Short term**: Writing of procedures for issuance of AW and WS Warnings and implement immediately. **Medium term:** Acquisition of MET Radar and wind shear detection equipment	AAC, ASECNA, Administration MET	12/2009 2013	U
	Implementation of MET facilities and services AFI/7 Rec. 14/10	Guinée Bissau, Osvaldo Vieira International Airport	Lack of personnel to ensure METY services to aviation properly	10/2009	Advice given during CODEVMET mission	Provide sufficient number of MET personnel	ASECNA et MET	2011	A
	Requirement to issue aerodrome forecasts (TAF) at Osvaldo Vieira International Airport:Annex 3 Chap. 9, para 9.13a)	Guinée Bissau, Osvaldo Vieira International Airport	TAF of Bissau issued by Dakar aerodrome meteorological Office in accordance with a bilateral agreement resulting in a lack of qualified MET personnel	1995 et 10/2009	Advice given during CODEVMET mission	Provide sufficient number of MET personnel	ASECNA , ACC, ENAG and MET	2012	A
LESOTHO	Implementation of MET facilities and services AFI/7 Rec. 14/10	Lesotho/Maseru/Moshoeshoe	Anemometer on RWY 04 has been unserviceable for many months	2003	Advice given through mission	Install a new sensor with displays at appropriate ATC and MET positions	Lesotho	As soon as possible but not later than 2007	A

	Identification		**Deficiencies**				**Corrective action**		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
LIBERIA	Requirement to re-establish the Meteorological Watch Office (MWO) of Robertsfield in accordance with Annex 3, Chap. 3, para. 3.4.1 and ICAO Doc 7474, Volume II, AFI FASID Table MET 1B.	Liberia/ Robertsfield International Airport.	The meteorological watch office (MWO) has not been re-established and the Liberian Administration has not arranged for another contracting State to provide SIGMET.	10/2009	Advice given during the mission and a draft Agreement provided for the issuance of SIGMET by an adjacent MWO	Reach an agreement with the nearest MWO for the provision of meteorological watch services including SIGMET for an interim period of time. Re-establish the MWO in the medium term	LCAA and MET Authority	-Short term: End November 2009 -Medium term: 2012	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Robertsfield International Airport intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Liberia/ Robertsfield International Airport.	Runway visual range (RVR) is not assessed and reported during periods of reduced visibility.	10/2009	Advice given during the mission.	**In the short term:** Training of MET personal for manual assessment and reporting of RVR, and **In the medium term:** Installation of a RVR measurement, assessment and reporting equipment recommended.	LCAA, Meteorological Authority and RIA	-Short term: November 2009 -Medium term: 2012	U
	Requirement to provide appropriate sensors of the automated equipment for measuring, assessing, monitoring and remote indicating visibility, runway visual range (RVR) and height of cloud base at the required in accordance with Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1 and App. 3 para; 4.2.4.2	Liberia/ Robertsfield International Airport.	Except the wind sensor, the other required sensors of the automatic weather observing system, are not installed to support approach, landing and take-off operations.	10/2009	Advice given during the mission.	Install the required sensors of the automatic weather observing system at appropriate location	LCAA, Meteorological Authority and RIA	End of April 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
LIBERIA	Requirement to provide briefing, consultation and flight documentation to flight crew members and/or other flight operations personnel in accordance with Annex 3, Chap. 3, para. 3.3.2 d) and Chap. 9, para. 9.3	Liberia/ Robertsfield International Airport.	Briefing, consultation and flight documentation are not provided to flight crew members and/or other flight operations personnel.	10/2009	A draft statement on the re-establishment of the AMO and the MWO established.	Provide briefing, consultation and flight documentation to flight crew members and other flight operations personnel, and equip the AMO and the future MWO with a high speed Internet access and required MET systems listed in Annex 3 Chap. 9 para. 9.1.3 h) and i). The AMO/MWO should be installed in a suitable room having a direct access to the AIS Office itself having direct access to the apron	LCAA, MET Authority, RIA and RFIR	End of April 2011	A
	Requirement to collect, processed and disseminated aircraft observations and reports (AIREP) in accordance with Annex 3, para. 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8 and 5.9	Liberia/ Robertsfield International Airport.	Aircraft observations and reports (AIREP) are not collected, processed and disseminated at Roberts MWO.	10/2009	Advice given during the Mission.	Develop and implement a service agreement for air traffic services, aeronautic information services and aeronautical MET services at Robertsfield International Airport in accordance with ICAO DOC 9377; Initiate regular meetings between the MET authorities, ATS units and appropriate local airlines.	LCAA, RFIR, RIA	February 2010	A
	Requirement to provide reliable data source for the preparation of aviation weather forecasts in accordance with Annex 3, Chap. 9, para. 9.1.3 c), e), g), h) and i).	Liberia/ Robertsfield International Airport.	Reliable data sources are not available for the preparation of aviation weather forecasts such as SIGMET, aerodrome warnings, Trend forecast, TAFs, flight documentation, etc..	10/2009	Advice given during the Mission.	Supply the meteorological information to operators and flight crew members in accordance with the provisions contained in ICAO Annex 3, Chap. 9, para. 9.1.3 c), e), g), h) and i).	LCAA, MET Authority and RIA	2010	B
	Requirement to use forecasts issued by the WAFCs in the preparation of flight documentation, whenever these forecasts cover the intended flight path in respect of time, altitude and geographical extent, .. in accordance with Annex 3, App. 2, para. 2.1.1	Liberia/ Robertsfield International Airport.	The Roberts AMO does not receive any WAFS products for the provision of flight documentation.	10/2009	Advice given during the Mission.	Short Term: Use SADIS FTP service. Access procedures are described on the following Website: http://www.icao.int/anb/sadisopsg/SADIS%20FTP%20Service%20V4.0.pdf Medium Term: Provide AMO/MWO with SADIS 2G VSAT equipment and compliant SADIS workstation software in accordance with SADISOPSG/9 conclusion 9/15 and SADISOPSG/10 conclusion 10/4..	MET Authority and RIA	11//2009 2012	B

	Identification		Deficiencies			Corrective action			
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
MAURITANIA	Requirements for safety oversight in the area of meteorological service for air navigation in Islamic Republic of Mauritania, (USOAP, 2008)	Islamic Republic of Mauritania, Nouakchott, Nouadhibou, Atar, Nema and Zoueratt Airports	ANAC has not established and implemented a system to ensure effective safety oversight of MET services suppliers. In addition, inspection procedures applicable to ensure effective implementation of safety oversight system as well as verification checklists and inspection schedules are not yet developed (*corrective action planned in November 2010*)	02/2011	Advice given during the Mission.	Recruit MET inspectors to monitor operational requirements	ANAC	November 2011	U
	Requirement to implement MET service for air navigation in three aerodromes listed in AFI Plan (AFI FASID MET Table 1A).	Islamic Republic of Mauritania, Nouakchott, Nouadhibou, Atar, Nema and Zoueratt Airports	FASID MET Table 1A of the AFI Air Navigation Plan, is not implemented in three aerodromes listed in the plan: Atar, Nema and Zoueratt	02/2011	Advice given during the Mission.	Develop human and material resources necessary for the issuance and dissemination of OPMET from three aerodromes (Atar, Nema and Zoueratt).	ANAC/ ONM/	August 2012	B
	Requirement to establish and implement from 15 November 2012, a properly organized quality system comprising procedures, processes and resources necessary to provide for the quality management of the meteorological information to be supplied to the users (ICAO Annex 3, para 2.2.3.)	Islamic Republic of Mauritania, Nouakchott, Nouadhibou, Atar, Nema and Zoueratt Airports	The quality management system (QMS) for MET service is not yet implemented by ANAC, the National Meteorological Office (ONM) and ASECNA	02/2011	Advice given during the Mission.	Train local trainers in QMS and implement the QMS before November 15, 2012	ANAC (oversight) ONM (Service provider) ASECNA (Service provider)	November 2012	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
MAURITANIA	Requirement to provide runway visual range (RVR) assessments at the touchdown and the mid-point zones of the runway at Nouakchott International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b) and Mauritania AIP	Islamic Republic of Mauritania, Nouakchott	RVR is not provided at the midpoint zone of the runway intended for operations in Nouakchott approach and instrument landing in Category II (ILS) in accordance with AIP Mauritania (GQNN AD 2.19 of 06/05/2010).	02/2011	Advice given during the Mission.	Install a system for assessing RVR in the midpoint zone of the at Nouakchott runway.	ASECNA	Before November 2011	A
NIGER	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway at Niamey International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Niger, Niamey International Airport	Even though NiameyInternational Airport is intended for Category II (ILS) instrument approach and landing operations, RVR assessments are not provided at the mid-point of the runway..	03/2010	Advice given during Sate Mission	Install RVR sensor at the mid-point of Niamey runway.	ASECNA	Before December 2010	A
	Requirement to collect, process and relay special air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2-b), 5.5, 5.8 and 5.9.	Niger, Niamey International Airport	special aircraft observations and reports are not collected, processed and redistributed	03/2010	Advice given during Sate Mission	- Update and implement the provisions of the ATS/MET service agreement - Encourage ATS/MET/pilots coordination meetings	DAC and ASECNA	Before December 2010	B

	Identification		**Deficiencies**				**Corrective action**		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
NIGERIA	Requirement to provide measurement of MET elements representative of conditions prevailing on the Runmay – Annex 3, Appendix 3 – Part 4 observing and reporting of MET element	Nigeria / Kano MA	Observing and reporting of MET elements deficient, Site of measurement about 2 kms from touchdown zone	25/09/09	Advice given by CODE VMET Phase 1 mission	Relocation of site of measurement of MET elements at a distance of 120 m or less from touchdown zone install an automatic observing system already available (NIMET Source)	NIMET NCAA and NAMA	2010 2010	U
	Requirement to measure and report RVR for runway intended for category II instrument approach and landing operations – Annex 3 Chapter 4 – Para. 4.6.3.4, 4.6.3.5 – appendix 3 – Para 4.3.6.4.	Nigeria / Kano MA	RVR not measured and reported for runway intended for category II instrument approach and landing operations	25/09/09	Advice given by CODE VMET – Phase I mission	**Short term:** Manuel measurement and reporting as immediate solution **Medium term :** install automatic observing system which is available	NIMET and NAMA	2010	U
	Requirement to assess and report wind shear in accordance with Annex 3 chapter 7 para. 7.4.1 and relevant provisions contained in low level wind shear Manuel 9817	Nigeria / Kano M.A.	Kano Airport affected by WS, no system of detection except for information received from pilots	25/09/09	Advice given by CODE VMET Phase I mission	NIMET, NAMA and NCAA to study possibility of installing WS detection system	NIMET NAMA and NCAA	2011	U
	Requirement to use WAFS products for flight documentation as in provisions contained in Annex 3 Chapter 9 para 9.4.3 and 9.1.6	Nigeria/ Kano AM	Use of other non WAFS products for coverage of flights departing Kano	25/09/2009	Advice given during CODE VMET Phase I mission	NIMET and NAMA to provide a SADIS station to Kano MET centre	NIMET and NAMA	2012	A
DEMOCRATIC REPUBLIC	Requirement to arrange that selected volcano observatory of Goma, observes: a) significant pre-eruption volcanic activity, or a cessation thereof; b) a volcanic eruption, or a cessation thereof; and/or c) volcanic ash in the atmosphere and send this information as quickly as practicable to its associated	Democratic Republic of Congo (DRC), Volcano Observatory of Goma.	Volcanic activity information are not provided to air navigation units because of the lack of communication means between the observatory and MWO, ACC and FIC	09/ 2009	Advice given during Sate Mission	Improve communication means between Goma and Djili	Goma Observatory / METELSAT/ RVA	Before December 2011	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	ACC, MWO and VAAC: ICAO Annex 3, para. 3.6								
	Requirement to provide automated equipment for measuring or assessing, as appropriate, and for monitoring and remote indicating of surface wind, visibility, runway visual range, height of cloud base, air and dew-point temperatures and atmospheric pressure at Djili aerodrome with a runway intended for Category II instrument approach and landing operations in accordance with ICAO Annex 3, Chap 4, para. 4.1.5 and 4.6.3.1	Democratic Republic of Congo (DRC), N'Djili International Airport.	Except the wind sensor, the other required sensors of the automatic weather observing system, are not installed to support approach, landing and take-off operations.	09/ 2009	Advice given during Sate Mission	Install an automatic weather observing system with sensors appropriately located. Install a MET message distribution system..	METELSAT/ RVA	Before december 2010	U

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
DEMOCRATIC REPUBLIC OF CONGO	Requirement to issue aerodrome and wind shear warnings and wind shear alert in accordance with Annex 3, chap. 7, para. 7.3 et 7.4 et App. 6 Table A6-2 et A6-33	DRC, N'Djili International Airport.	Aerodrome and wind shear warnings (AD WRNG, WS WRNG) and wind shear alert are not issued at N'Djili International Airport	09/2009	Advice given during Sate Mission	1. issue and disseminate WS WRNG and AD WRNG information and wind shear alert; 2. develop and enforce a letter of service agreement between the MET and ATS (TWR, CCR, Office of the runway, ..) in order inter alia to promote the regular routing of aircraft reports on wind shear at landing or take off, to assess RVR, etc. .. 3. consider the possibility of installing, after a survey with users, at Djibouti Airport, a wind shear detecting system	METELSAT/ RVA	Before March 2010	U
	Requirements to use local routine and special reports MET REPORT and SPECIAL in the meteorological information used pour l'ATIS in accordance with Annex 11, chap. 4, para. 4.3.6.1, g) and Annex 3, Chap. 4 para. 4.3.2 and 4.4.2	DRC, N'Djili International Airport	Meteorological information used to issue ATIS are not the local routine and special reports MET REPORT and SPECIAL	09/2009	Advice given during Sate Mission	Use local routine and special meteorological reports to issue ATIS information (ATIS voice and D-ATIS)	METTELSAT RVA	July 2010	A
SAO TOME	Requirement to issue aerodrome and wind shear warnings and wind shear alert in accordance with Annex 3, chap. 7, para. 7.3 et 7.4 et App. 6 Table A6-2 et A6-33	Sao Tome, and Principe, Sao Tome International Airport (STIA).	Aerodrome and wind shear warnings (AD WRNG, WS WRNG) and wind shear alert are not issued at Sao Tome International Airport	09/ 2009	Advice given during CODEVMET Mission	1. issue and disseminate WS WRNG and AD WRNG information and wind shear alert; 2. develop and enforce a letter of service agreement between the MET and ATS (TWR, CCR, Office of the runway, ..) in order inter alia to promote the regular routing of aircraft reports on wind shear at landing or take off, to assess RVR, etc. .. 3. consider the possibility of installing, after a survey with users, at Djibouti Airport, a wind shear detecting system	INM, ENASA	Before June 2010	U
	Requirement to issue local routine and special reports in accordance with Annex 3, chap. 4, para. 4.3.1, 4.3.2 a) et 4.4.2 a)	Sao Tome, and Principe, (STIA)..	Local routine and special reports (MET REPORT) and SPECIAL) are not issued	09/ 2009	Advice given during CODEVMET Mission	Issue local routine and special reports (MET REPORT) and SPECIAL)	INM/ ENASA	Before december 2010	A
	Requirements to issue METAR, SPECI) and TAF on 24h Sao Tome	Sao Tome, and	METAR and SPECI are not	09/2009	Advice given during	Issue METAR and SPECI on 24h basis	INM et	Before	

	Identification		Deficiencies				Corrective action		
STATE	**Requirements**	**Facilities or services**	**Description of Deficiency**	**Date first reported**	**Comments on deficiency**	**Description of corrective action**	**Executing body**	**Target date for imple-mentation**	**Priority for action**
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	International Airport: FASID AFI, Tableau MET 1A	Principe, (STIA).	issued on 24h basis		CODEVMET Mission		ENASA	June 2010	A

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi-fication**	**Observa tions sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priori té**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
SAO TOME	Requirement to provide flight documentation in accordance with AFI FASID Table MET 7 (Doc 7474 Volume II, FASID AFI)	Sao Tome, and Principe, Sao Tome International Airport..	Flight documentation is provided from a public non-secured website ADDS	09/2009	Advice given during CODEVMET Mission	In the short term, a SADIS FTP service shall be accessed from the WAFC London to extract required data for the provision of flight documentation. Access procedures are described on the following Website http://www.icao.int/anb/sadisopsg/sadis%20ftp%20service%20v4.0.pdf In the medium term, install a SADIS VSAT station with the required SADIS workstation software:	INM/ ENASA	Before December 2010	B
SÉNÉGAL	Requirement to provide runway visual range (RVR) assessments at the touchdown zone and the mid-point of the runway of Dakar International Airport, intended for Category II instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b)	Senegal/ Leopold Sedar Senghor International Airport or Dakar	Runway visual range (RVR) assessments are not representative of the touchdown zone and the mid-point of the runway intended for Category II instrument approach and landing operations	02/ 2009	Deficiency identify during ICAO WACAF visit	Install RVR sensor at the mid-point of the runway	AID-DPW	December 2010	U
	Requirement to collect, process and relay air reports in accordance with Annex 3 Chapter 5, para 5.1, 5.2, 5.3.2, 5.4.1, 5.5, 5.7, 5.8 and 5.9	Senegal/ Leopold Sedar Senghor International Airport or Dakar	Aircraft observation and reports are not collected, processed and relayed	02/2009	Deficiency identify during ICAO WACAF visit	Necessary arrangements between the MET authority and the appropriate ATS authority be made.	ANACS and ASECNA	December 2009	B

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi-fication**	**Observa tions sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priori té**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
	Requirement to report visibility along the runway in local routine and special reports in accordance with Annex 3, Appendix 3 para; 4.2.4.2	Senegal/ Leopold Sedar Senghor International Airport or Dakar	Many obstacles (2 control towers, airlines hangars, etc ...) around the visibility estimation platform of the aeronautical meteorological station (SMA), does not allow to estimate the visibility along the runway .	02/2009	Deficiency identify during ICAO WACAF visit	Install visibility sensors along the runway Or Relocate the SMA at a location enabling the observer to estimate the visibility along the entire length of the runway.	ASECNA	June 2010	A

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi - fication**	**Observa tions sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priorité**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
SÉNÉGAL	Requirement to provide Automatic Terminal Information Service (ATIS) in accordance with ICAO Doc 7474 Volume II, FASID AFI, Part III - Tableau AOP 1.	Senegal/ Leopold Sedar Senghor International Airport or Dakar	The ATIS service is not implemented at Brazzaville International Airport	02/2009	Deficiency identify during ICAO WACAF visit	Install and implement an operational ATIS system	ASECNA	June 2010	A
SIERRA LEONE	Requirement to measure and report wind in accordance with provisions contained in Annex, Chapter 4 para 4.6.1.1.	Sierra Leone/ Freetown Lungi Airport	Wind measurement system old and deficient	1994	Advice given during mission CODEVMET Phase I 10/2009	Installation of new wind measurement equipment	SLAA and MET Department	2010	U
	Requirement to measure and report RVR for runway intended for Category II instrument approach and landing operations	Sierra Leone/ Freetown Lungi Airport	In case of reduced visibility RVR not measured and reported	29/09/ 2009	Advice given during mission CODEVMET Phase I	**Short term :** manual measurement **Long term :** Installation of RVR measurement, assessment and reporting equipment	MET Department and SLAA	10/2009 2013	U
	Requirement to issue aerodrome warnings (AW) and Wind Shear warnings (WS) as contained in provisions of Annex 3 Chapter 7 para 7.3.1 and 7.4.1 and App. 6 Table A6.2, A6.3	Sierra Leone/ Freetown Lungi Airport	AW and WS are not issued at Lungi Airport	29/09/ 2009	Advice given during mission CODEVMET Phase I	**Short term**: Writing of procedures for issuance of AW and WS Warnings and implement immediately. **Medium term:** Acquisition of MET Radar and wind shear detection equipment	MET Department and SLAA	11/2009 2013	U
	Requirement to observe and report MET elements in accordance with Anne 3, para 4.6	Sierra Leone/ Freetown Lungi Airport	Not in compliance with recommended practices on observing and reporting of MET elements	29/09/ 2009	Advice given during mission CODEVMET Phase I	Relocate measurement site and acquire automated observing system	MET Department SLAA and SLCA	2012	A
	Requirement to provide MET information to ATS units Annex 3 Chapter 10 para 10.1.5 Appendix 9 para 1.1.a)	Sierra Leone/ Freetown Lungi Airport	MET messages MET report, METAR, SPECIAL are hand carried to control TWR Lack of commu-nication system	29/09/ 2009	Deficiency reported during mission CODEVMET Phase I	Repair the communication system and install reliable display system to ATS	SLAA Roberts FIR and MET Department	2010 2012	A
	Requirement to implement MET facilities and services AFI/7 Rec. 10/14	Sierra Leone/ Freetown Lungi Airport	Insufficient number of forecasters and observers at Lungi MET centre	29/09/ 2009	Deficiency assessed during mission CODEVMET Phase I	Provide MET centre with required number of qualified personnel	MET Department SLAA Roberts FIR	2012	A

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi - fication**	**Observa tions sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priorit é**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
SIERRA LEONE	Requirement to use qualify WAFS products for flight documentation in accordance with provision contained in Annex 3 Chapter 9 para 9.1.3, 9.1.6 and 9.1.6 and FASID Table MET7	Sierra Leone/ Freetown Lungi Airport	No SADIS station at Lungi Airport	29/09/ 2009	Deficiency assessed during mission CODEVMET Phase I	**Short Term:** Use FTP to acquire WAFS data Acquisition of SADIS station	MET Department SLAA Roberts FIR SLAA MET Roberts FIR	10/2009 2012	A
SOMA LIA	Situation unknown	FIR Mogadishu							
SWAZI LAND	Requirement to provide MET reports to ATS Units (Annex 3, Chapter 10, para 10.1.1)	Swaziland/Man zini Matsapha Airport Associated MET Office	Provision of MET reports to ATS units deficient. No wind displays in control tower	2004	Advice was given on mission	Install a display system for MET data and information at ATS units	DCA and MET Department	As soon as possible	U
TOGO	Requirement to provide meteorological information to ATS units and airport managers in accordance with ICAO Annex 3, App. 9, para. 1.1, 1.2 and 1.3	Togo, Lomé International Airport	Aerodrome and wind shear warnings (AD WRNG and WS WRNG) reports are not displayed at ATS units and at SALT.	08/2010	Advice given during the mission	Display the warning reports AD WRNG and WS WRNG at ATS units and at the SALT premises	ASECNA and SALT	December June 2010	U
	Requirement to provide runway visual range (RVR) assessments at the touchdown and the mid-point zones of the runway at Lomé International Airport, intended for Category II (ILS) instrument approach and landing operations in accordance with Annex 3, Chap. 4, para. 4.6.3.4 b) and Togo AIP	Togo, Lomé International Airport	Although the runway in Lomé is equipped with a Category II ILS, RVR measurements are not provided at the midpoint zone of the runway. In addition, the existing RVR and cloud base height sensors, are not operational	08/2010	Advice given during the mission	Install RVR assessment system at the mid point zone of Lomé runway; And repair existing RVR and cloud base height sensors.	ASECNA	Before December 2011 Before June 2011	A U

	Identification		Carences			Action Corrective			
ETAT	**Besoins**	**Etat/ Installations**	**Description de la Carence**	**Date d'identi-fication**	**Observa tions sur la carence**	**Description de la mesure corrective**	**Organe exécutif**	**Date de Mise en Œuvre**	**Priorité**
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
TOGO	Requirement to report and issue surface wind observation period averaging in accordance with Annex 3, App. 3 para. 4.1.3.1	Togo, Lomé International Airport	The direct reading of wind at the control tower, provides instantaneous observations of wind and the average speed and wind direction over periods of 10 minutes and 2 minutes	08/2010	Advice given during the mission	Arrange for the calibration of the wind direct display systems in order that the period of surface wind observations averaging is 2 minutes on the displays of the control tower and for MET REPORT/SPECIAL messages, and 10mn in METAR/SPECI	ASECNA	Before June 2011	U
ZAMBIA	1)Implementation of MET facilities and services (Annex 3, para 4.1.6)	Zambia/Lusaka International Airport	Inadequate level of equipment maintenance	2002 and missions of 2004 and 2007	Equipment remain unserviceable for a long time due to lack of spare parts	Provide financial resources including use of air navigation charges which currently is not fully available to the MET Department.	Zambia MET Department and NACL	As soon as possible	U
	2)Requirement to provide MET reports to ATS Units (Annex 3, Chapter 10, para 10.1.1)	Zambia/Lusaka Meteorological Office	Provision of MET reports to ATS Units deficient	2002 and missions of 2004 and 2007	Advice given during mission by correspondence	Install display system of MET data to ATS units	MET Department	As soon as possible	U
	3)Requirement to provide meteorological data and forecasts in form of flight documentation (Annex 3, Chapter 3, para 3.3.2).	Zambia/Lusaka Meteorological Office	Provision of MET reports to ATS Units deficient	2002 and missions of 2004 and 2007	Advice given during mission and by correspondence	Install appropriate telecomms equipment to receive OPMET information and appoint adequate trained personnel	MET Department	As soon as possible	U
	4) Requirements for SIGMET information (Annex 3 para 3.4.2 b, c, d and add para. 7.1.1	Zambia/Lusaka Meteorological watch office (MWO)	SIGMET not issued	2007	Advice given on mission	Immediately provide training and issue SIGMET	MET Department	As soon as possible	U

EXPLANATORY NOTES FOR APPENDICES ON DEFICIENCIES

Requirement identified at a given meeting through a recommendation; name of the meeting and the related recommendation number

Name of the State or States involved and/or the name of the facilities such as name of airport, FIR, ACC, TWR, etc.

1. Brief description of the deficiency :

2. Date deficiency was first reported :

3. Comments.

4. Brief description of the corrective actions to be undertaken.

5. Identification of the executing body.

6. Target date for completion of the corrective action.

7. Priority and classification.

8. Target date for implementation.

9. Priority for Action.
10.

"U" priority = **Urgent** requirements having a **direct** impact on **safety** and requiring i**mmediate** corrective actions.

Urgent requirements consisting of any physical, configuration, material, performance, personnel or procedures specifications, the application of which is urgently required for air navigation safety.

"A" priority = **Top priority** requirements **necessary** for air navigation **safety**.

Top priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation safety.

"B" priority = **Intermediate** requirements **necessary** for air navigation **regularity**.

Intermediate priority requirement consisting of any physical, configuration, material, performance, personnel or procedures specification, the application of which is considered necessary for air navigation regularity and efficiency.

DRAFT REGIONAL PROVISIONS IN THE ANP/FASID

BASIC ANP

World area forecast system (WAFS)
(FASID Table MET 5)

1. FASID Table MET 5 sets out the [AFI, ASIA/PAC, CAR/SAM, EUR, MID, NAT] Region[s] requirements for WAFS forecasts to be provided by WAFC [London, Washington]. [WAFSOPSG Conclusion 1/2]

2. For back-up purposes, each WAFC should have the capability to produce WAFS forecasts for all the required areas of coverage. [WAFSOPSG Conclusion 5/2]

3. WAFS forecasts should be ~~disseminated~~ made available by WAFC [London, Washington] using the [satellite distribution system for information relating to air navigation (SADIS), international satellite communications system (ISCS1, ISCS2)] covering the reception area shown in FASID Chart CNS [4] or using the satellite and Internet service. [WAFSOPSG Conclusion 5/2]

Editorial Note.— Insert "or using the [SADIS, ISCS FTP WIFS service" in the corresponding CNS procedure contained in Part IV of the ANP.

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4. Each State should make the necessary arrangements to receive and make full use of operational WAFS forecasts made ~~disseminated~~ available by WAFC [London, Washington]. The lists of the authorized users of the [SADIS, WIFS ISCS1, ISCS2] services in the [AFI, ASIA/PAC, CAR/SAM, EUR, MID, NAT] Region[s] and the locations of the operational VSATs and FTPs are available from the following websites:

- www.icao.int/anb/sadisopsg (click "Operational Information" and then "Status of implementation") for SADIS;
- www.weather.gov/iscs (click: "Documents" and then "Status of implementation of ISCS listed by ICAO regions") for ISCS.

[WAFSOPSG Conclusion 5/2]

FASID

World area forecast system (WAFS)
(FASID Table MET 5)

1. FASID Table MET 5 sets out the [AFI, ASIA/PAC, CAR/SAM, EUR, MID, NAT] Region[s] requirements for WAFS forecasts, to be provided by WAFC [London, Washington].

FASID TABLE MET 5 — REQUIREMENTS FOR WAFS FORECASTS

EXPLANATION OF THE TABLE

Column

1 WAFS forecasts required by the [AFI, ASIA/PAC, CAR/SAM, EUR, MID, NAT] States, to be provided by WAFC~~S~~s [London, Washington].

2 Area of coverage required for the WAFS forecasts, to be provided by WAFC [London, Washington].

FORECAST REQUIRED	AREAS REQUIRED
1	2
SWH forecasts (FL 250-630) in the BUFR code form	GLOBAL
SWM forecasts (FL 100-250) in the BUFR code form	[NIL or ASIA SOUTH, EUR, MID, NAT]
Forecasts of upper-air wind, temperature and humidity, cumulonimbus clouds, icing, and clear-air and in-cloud turbulence, and of altitude of flight levels in the GRIB code form	GLOBAL

Note 1.— SWM forecasts are provided for limited geographical areas as determined by regional air navigation agreement. Areas "ASIA SOUTH", "EUR" and "MID" provided by WAFC London; area "NAT" provided by WAFC Washington.

Note 2.— WAFCs will continue to issue forecasts of SIGWX in PNG chart form for back-up purposes for fixed areas of coverage as specified in Annex 3.

` *Note 3.— Forecasts of cumulonimbus clouds, icing, and clear-air and in-cloud turbulence are ~~experimental forecasts which are expected to become available by the end of 2009~~ labelled as "trial forecasts" and are currently distributed through the internet-based services.*

Terms of Reference, Work programme and composition of the Meteorology Sub-Group (MET/SG)

Terms of Reference

a. To keep under review, the adequacy of meteorological facilities and services to meet new technological developments in the air navigation field and make proposals as appropriate for implementation by States to APIRG.

b. To identify, State by State, those specific deficiencies and shortcomings that constitute major obstacle to the provision of efficient and reliable meteorological facilities and services to meet the requirements of air navigation in the AFI Region and recommend specific measures to eliminate them.

Appendix A Future Work Programme

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
1	Establish and maintain detailed lists, State by State of the specific deficiencies of facilities for the provision of atmospheric measurements pertaining to surface wind, pressure, visibility/runway visual range, cloud base, temperature and dew point temperature considered critical for flight safety.	APIRG/13 Con. 13/96	• State by state MET deficiencies have been established and included in APIRG/17 Report • Surveys are in progress	Deficiencies on MET parameters measurements established and compiled
2	Monitor the exchange of OPMET information through the AMBEX scheme in the AFI Region and between the AFI and ASIA/PACIFIC and EUR Regions	APIRG/8 Con. 8/43 c)	• Continuing task • Next monitoring with three events in 2011	Exchange of OPMET information through AMBEX and SADIS, improved
3	Plan for the introduction of efficient inter-regional OPMET exchanges in coordination with the CNS Sub-group as required	AFI/7	Implementation of a new AMBEX Scheme (Handbook 7th Ed.)	Efficient inter-regional OPMET exchanges
4	Monitor the degree of implementation of very small aperture terminals (VSATs) for the reception of WAFS products	AFI/7 Rec. 14/12	• A large number of AFI States have implemented SADIS2G VSATs with others using the SADIS FTP Service	Information on the implementation of SADIS VSAT and FTP established and compiled
5	Monitor the quality of WAFS high and medium level significant weather charts in the AFI Region, provide feed back to WAFC, London as appropriate	APIRG/12 Con. 12/34	• Continuing task • Monitoring is in progress	Improvement of the quality of WAFS high and low level significant weather charts in the AFI Region
6	Monitor the implementation of regional procedures for the issuance of volcanic ash and tropical cyclone advisories	AFI/7 Rec. 7/3 and 7/4	• Continuing task • SIGMET Tests conducted yearly: Next test scheduled for Nov. 2011	Regional procedures for the issuance of volcanic ash and tropical cyclone advisories Implemented

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
7	Review on a continuing basis the contents of Tables MET 1A and 1B and Tables MET 2A to ensure their validity in light of operational requirements and develop proposals to update them if necessary.	AFI/7	• Continuing task • Tables MET 1A and 2A will be amended from SADISOPSG/16 proposals	The validity of contents of Tables MET 1A, 1B and and Table MET 2A.are to ensured
8	Review the meteorological procedures in the introductory text to Part VI B Meteorology of the Basic AFI Regional Plan/FASID, as well as Meteorological related issues in other sections of the Plan and relevant regional supplementary Meteorology procedures (SUPPs) in the Doc 7030, in the light of procedures employed in other regions and develop amendment proposals as appropriate, coordinating where necessary with other APIRG Sub-Groups.	APIRG/12	• Amendments proposals for WAFS-related meteorological procedures submitted to APIRG for approval	Maintain up to date procedures to improve safety and efficiency of air navigation.
9	Monitor developments in the CNS/ATM Systems with regard to meteorological requirements in the AFI Region and in coordination with AFI ATM Sub-Group.	APIRG/14 Con. 14/43	• A proposal for the establishment of a MET/ATM Task Force has been submitted to APIRG for approval • A draft AFI Volcanic Ash contingency Plan has been also submitted	Consistent provision of meteorological information as an integrated function of the ATM system with improved accuracy and timeliness and increased availability. Performance management will be an important part of the quality assurance of meteorological information.
10	Monitor the implementation in the AFI region of quality management system in the MET field	APIRG/14 Con. 14/40	• Four seminars on QMS in 2008-2009 • Two QMS trainings in 2010 • Two more trainings planned for 2011	AFI region quality management system relating to the MET field, implemented

	Task	Source	Recent Progress Next milestone and its deadline	Final Result (completion)
11	Monitor training and qualification of aeronautical MET personnel	APIRG/15 Dec. 15/94	• Training and qualification monitored in 15 States during 2009-2010	Information on training and qualification of aeronautical MET personnel established and compiled

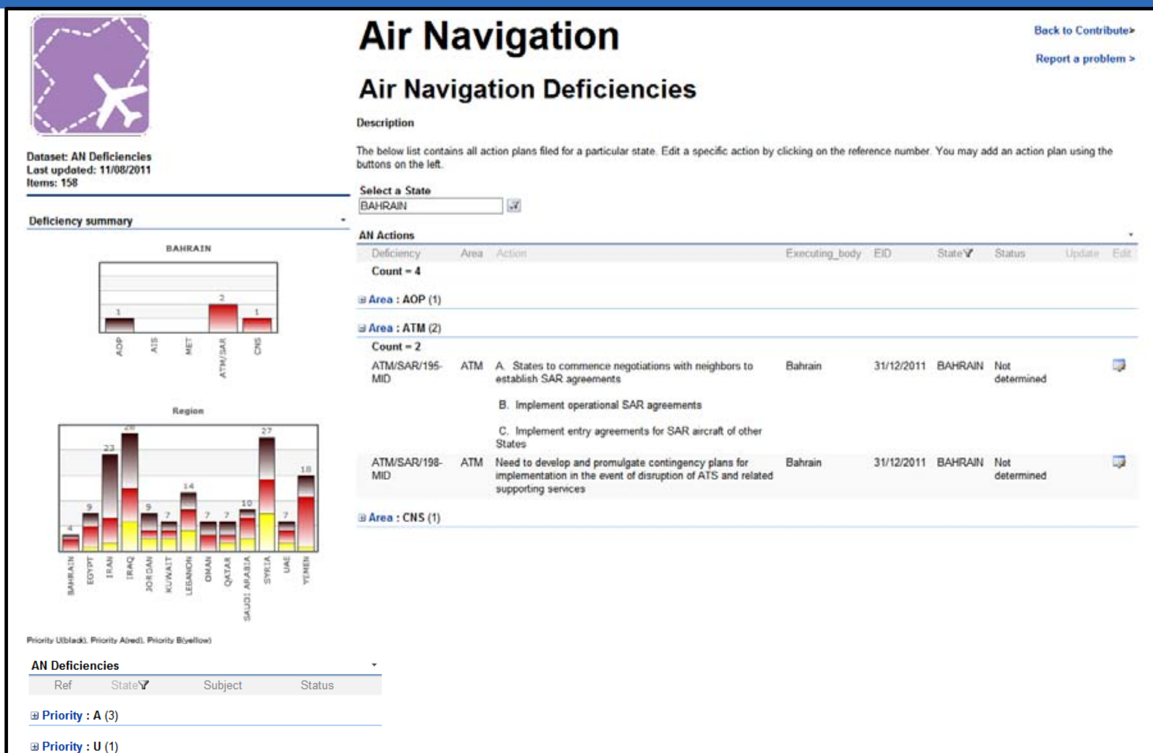
3. **Composition**

Algeria, Burkina Faso, Cameroon, Congo, Côte D'Ivoire, Egypt, Eritrea, Ethiopia, France, Gabon, The Gambia, Ghana, Guinea, Kenya, Madagascar, Malawi, Morocco, Niger, Nigeria, Senegal, South Africa, Spain, Tunisia, United Kingdom, United Republic of Tanzania, Zambia, ASECNA, IATA and WMO.

TABLE TO REPORT ENVIRONMENTAL BENEFITS OF OPERATIONAL IMPROVEMENTS

Region	State	Current fuel burn (Kg)	Current CO2 emissions (Kg)	Op. Improvement	Savings-Fuel (Kg)	Savings-CO2 (Kg)	Savings-Fuel-%	Savings CO2-%	Tool
AFI	Kenya	1	3.16	RNAV FIR and TMA	7182902	22697970.32	7182902	7182902	IFSET
AFI	Senegal	1	3.16		6182902	19537970.32	6182902	6182902	AEM

iSTARS:
Air Navigation Deficiencies Page



Appendix C

ICAO
Air Navigation Deficiencies
ANDEF

User Guide

Table of Contents

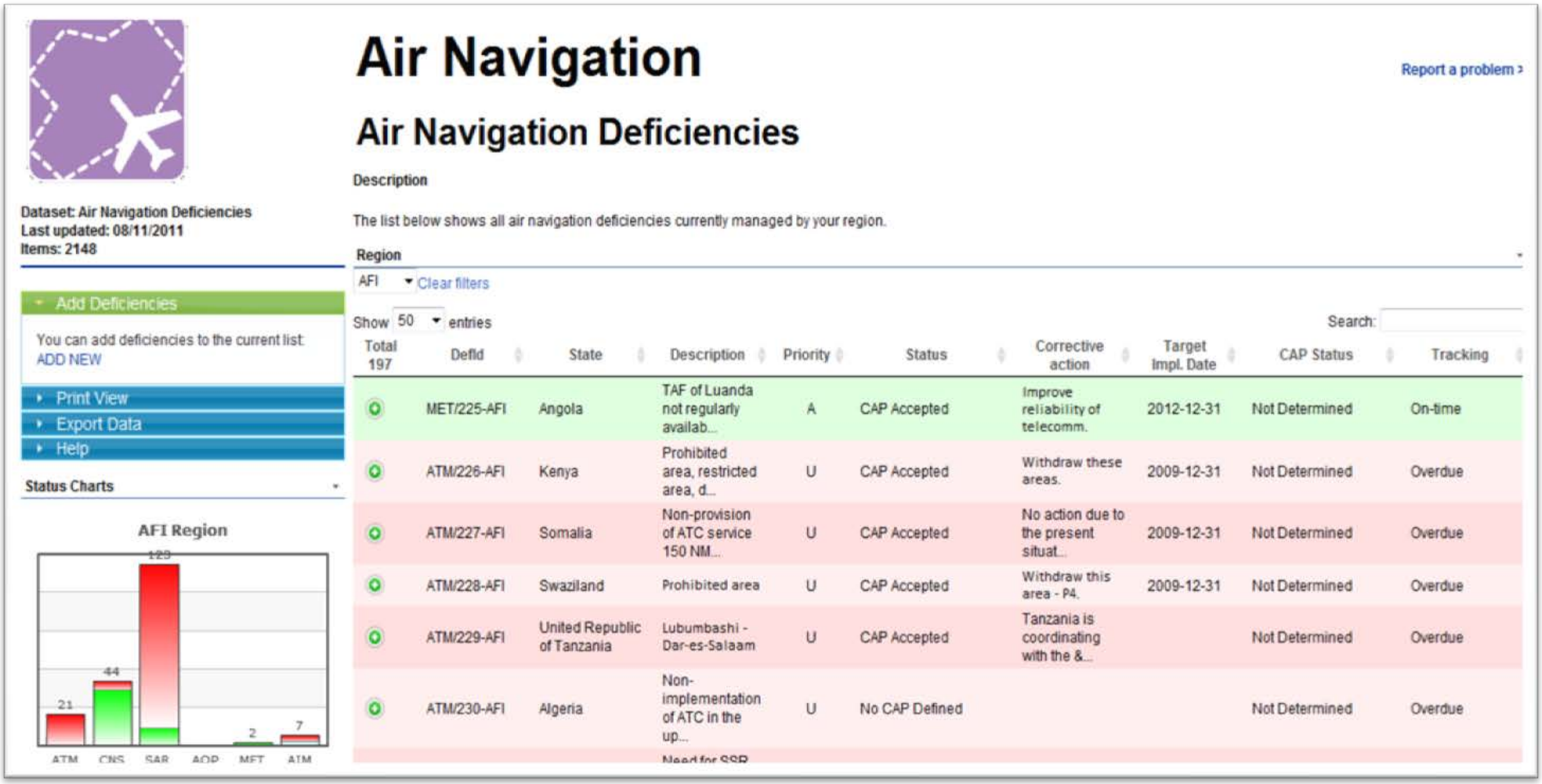
ANDEF- Access

Click on ANDEF Link on the right hand side on iStars home pa


ICAO INTEGRATED SAFETY
Stars
TREND ANALYSIS AND REPORTING SYSTEM
iSTARS Usability Survey
Please take a few minutes to participate in our online survey.
News
Title
Date
Accident and incident reporting
05/11/2011
Occurrences
Compliance
Risks
Accident and Incidents Reporting
Trends
Statistics
Implementation (LEI)
USOAP Questions
Action plans
Traffic
Integrated analysis
Geographical distributions
SECURE - ANDEF
Name
ANDEF

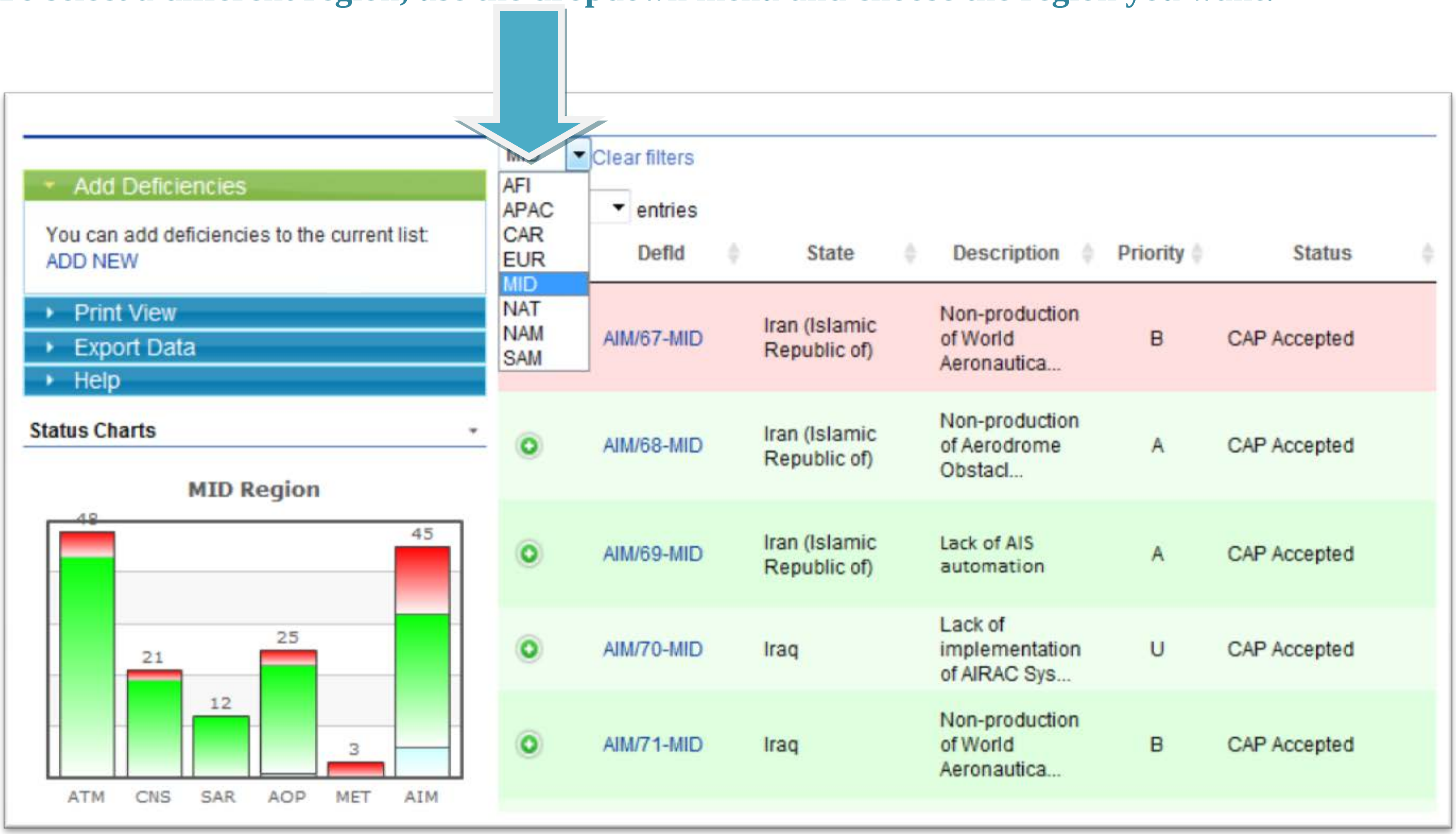
ANDEF- Initial View

When you login to ANDEF this is your home page. By default the deficiencies listed will be for the AFI Region…



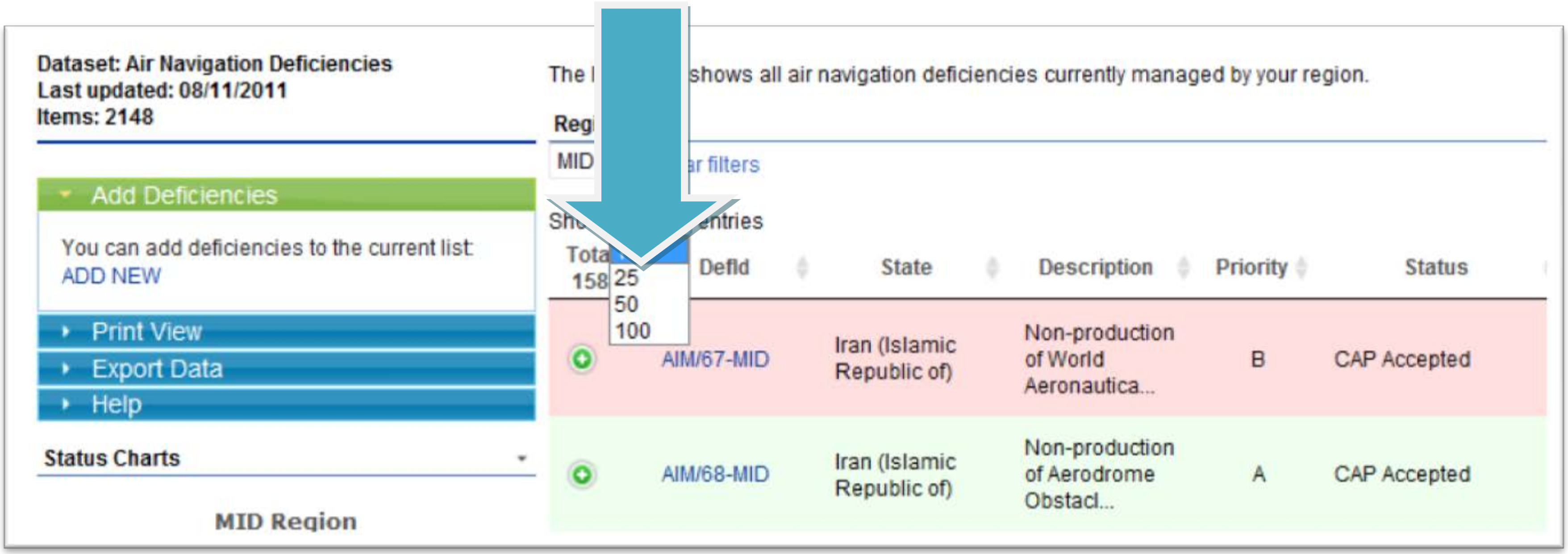
ANDEF- Select Region View

To select a different region, use the dropdown menu and choose the region you want:



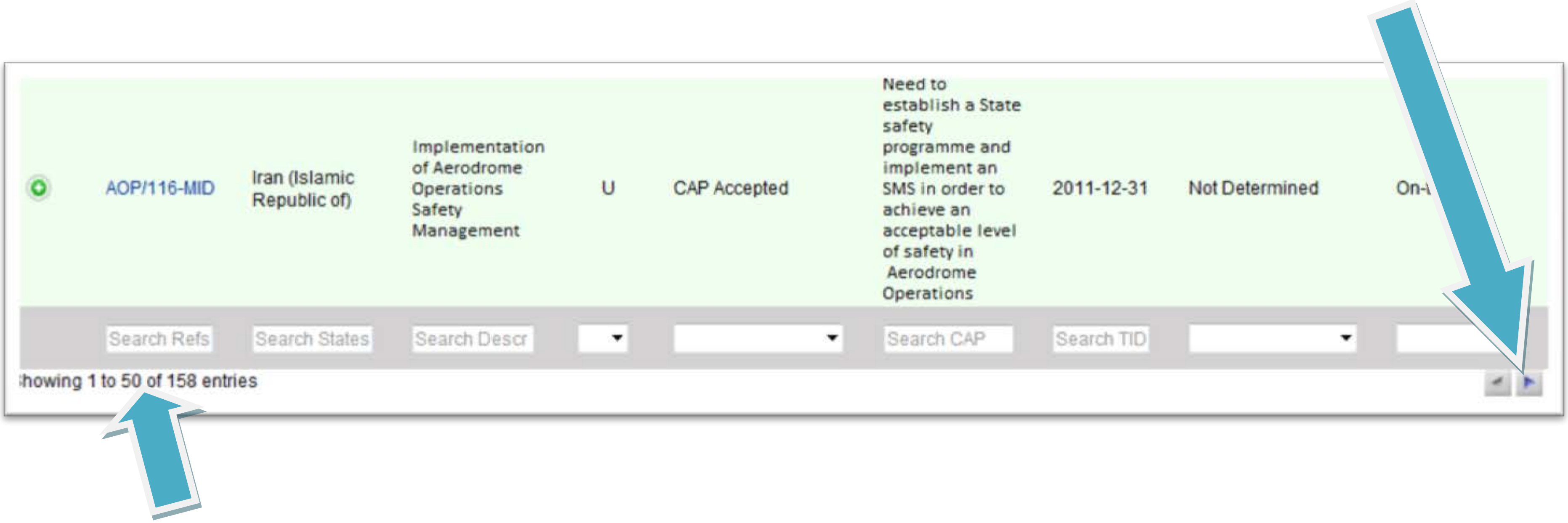
ANDEF- List Deficiencies

To increase the number of entries listed you can select the number of entries you prefer from the drop down menu (Options available are: 10, 25, 50 or 100 deficiencies displayed per page).



ANDEF- Scroll Deficiencies

To scroll for more deficiencies listing press the arrow at the bottom of the page to go right and left



The information bar at the bottom will display the number of deficiencies listed and total number of entries.

ANDEF- Expand view

By selecting a region you will have a list of all deficiencies reported in that region.
Click on the Green button to display the full deficiency listing for that specific deficiency

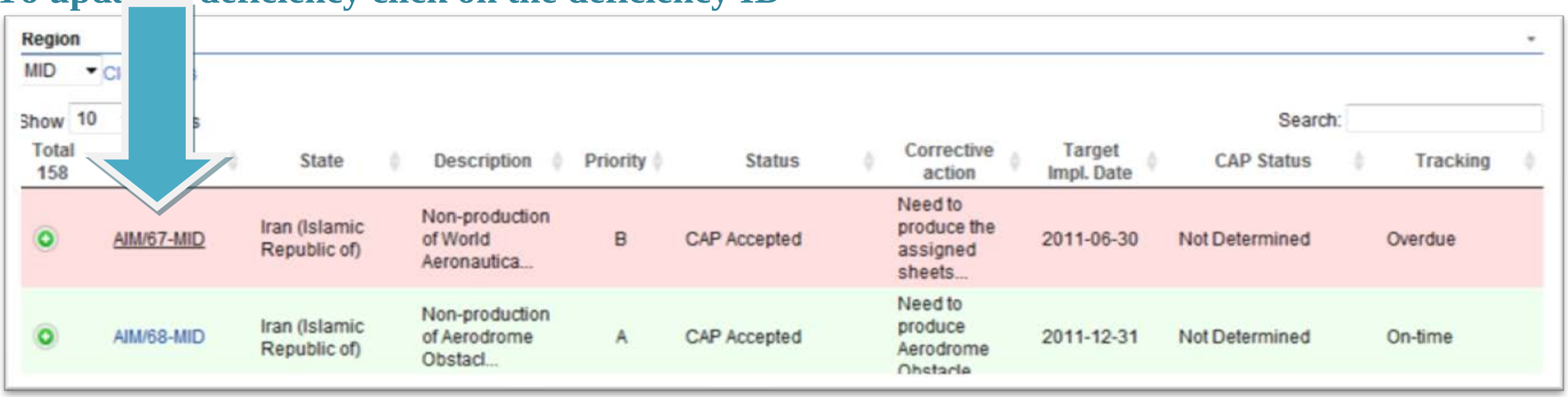
⊕	AOP/1279-SAM	Colombia	A deep V-shaped channel 80-100 m fr...	B	CAP Accepted	Deviate that channel "PENDING ACTION PLAN" CORRECTED (AEROCIVIL 2002-1272, 23 NOV 2004)	2009-02-28	Not Determined	Overdue

⊖	AOP/1279-SAM	Colombia	A deep V-shaped channel 80-100 m fr...	B	CAP Accepted	Deviate that channel "PENDING ACTION PLAN" CORRECTED (AEROCIVIL 2002-1272, 23 NOV 2004)	2009-02-28	Not Determined	Overdue

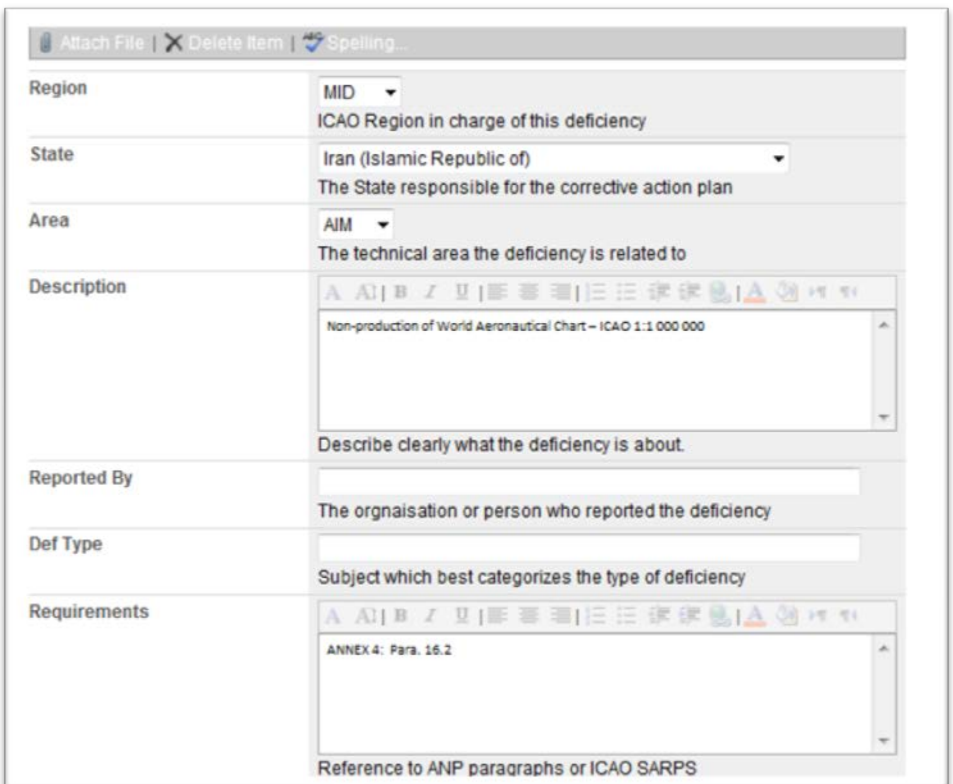
Reference:	
Date reported:	1996-01-01
Reported by:	
Deficiency type:	
Description:	A deep V-shaped channel 80-100 m from threshold RWY 30 potentially dangerous in event of RTO
Requirements:	RWY end safety area (Annex 14, Vol. I. Chap. 3)
Location:	Colombia, SANTAFE DE BOGOTA/Eldorado Aerodrome
Remarks:	IFALPA CAR/SAM Meeting, 98REG049, Buenos Aires, 9/10 Dic. 1997, ICAO Mission to Bogotá and Rio Negro from 16 to 19 July 2001 and ICAO Regular Mission (15/16 MAY 2003, Recommended Action AGA/17 of its respective Report) ASBE: StateLetter sent Results:No results Difficulties:
Rational:	
Recommendation:	Deviate that channel "PENDING ACTION PLAN" CORRECTED (AEROCIVIL 2002-1272, 23 NOV 2004)
Corrective action:	Deviate that channel "PENDING ACTION PLAN" CORRECTED (AEROCIVIL 2002-1272, 23 NOV 2004)
Executing body:	COLOMBIA/AEROCIVIL
Target implementation date:	2009-02-28

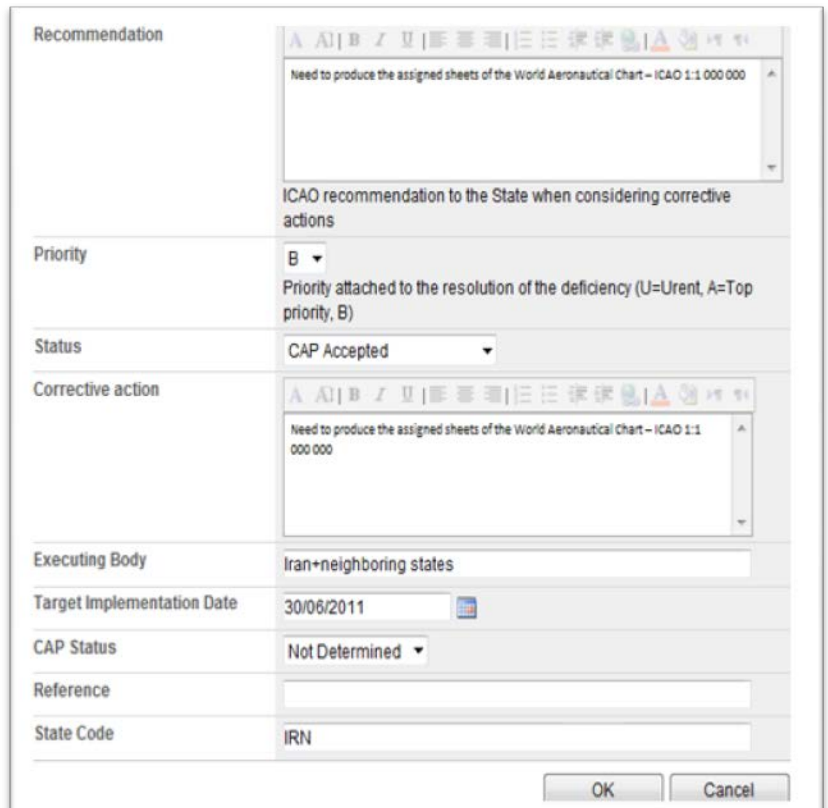
ANDEF- Edit/ Update Deficiency

To update a deficiency click on the deficiency ID



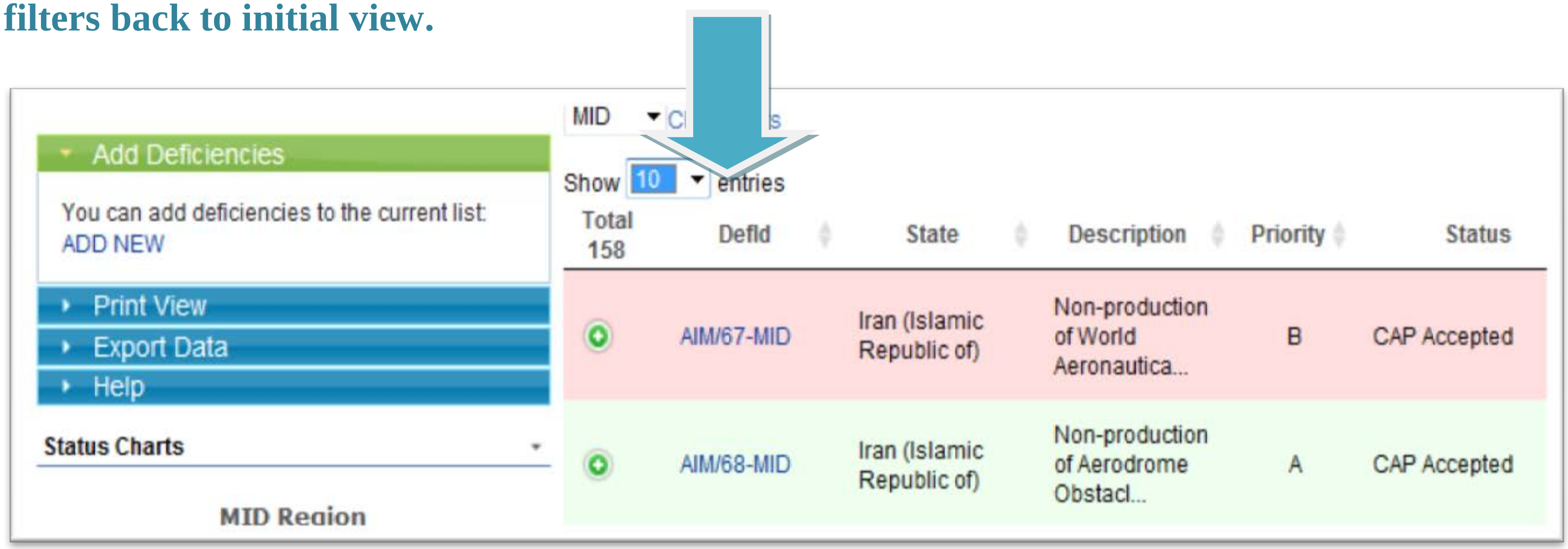
A new window will open to perform all required updates





ANDEF- Clear Filters

To clear all previously applied filters just press on the "clear filters" text and it will reset all your filters back to initial view.



ANDEF- Search Feature

Use the Search box to search by any keyword in the deficiencies list
For example to search for all deficiencies in APAC region that has the keyword WGS-84
Select APAC from the drop down region list, and type in the search field the keyword WGS-84

Regio...
APAC ...r filters

Show 10 entries

Search: WGS-84

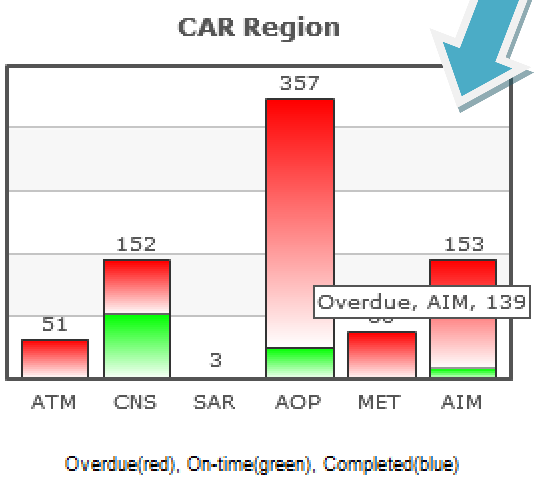
Total 9	DefId	State	Description	Priority	Status	Corrective action	Target Impl. Date	CAP Status	Tracking
	ATM/423-APAC	Solomon Islands	WGS-84 - Not implemented	A	No CAP Defined			Not Determined	Overdue
	ATM/431-APAC	Vanuatu	WGS-84 - Implemented at main airpor...	A	CAP Accepted	Implemented at main airports		Not Determined	Overdue
	ATM/434-APAC	Bhutan	WGS-84 - Not implemented	A	No CAP Defined			Not Determined	Overdue
	ATM/438-APAC	China	WGS-84 - Not implemented * implemen...	A	CAP Accepted	china advised APANPIRG/19 that WGS ...	2010-12-01	Not Determined	Overdue
	ATM/447-APAC	Democratic People's Republic of Korea	WGS-84 - Not implemented	A	CAP Accepted	DPR Korea advised ATM/AIS/SAR/SG/18...		Completed	Completed
	ATM/449-APAC	Kiribati	WGS-84 - Not implemented	A	No CAP Defined			Not Determined	Overdue
	ATM/460-APAC	Nauru	WGS-84 - Not implemented	A	No CAP Defined			Not Determined	Overdue
	ATM/470-APAC	Solomon Islands	WGS-84 - Not implemented	A	No CAP Defined			Not Determined	Overdue
	ATM/475-APAC	Vanuatu	WGS-84 - Implemented at main airpor...	A	CAP Accepted	Implemented at main airports		Not Determined	Overdue
	Search Refs	Search States	Search Descr			Search CAP	Search TID		

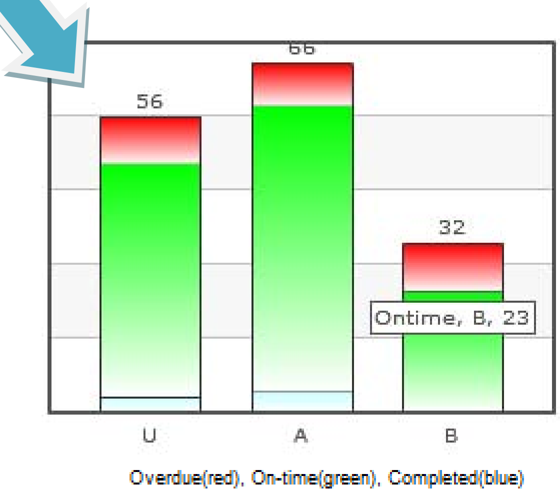
Showing 1 to 9 of 9 entries (filtered from 80 total entries)

The information line at the bottom will indicate the total number of deficiencies that matched your search criteria.

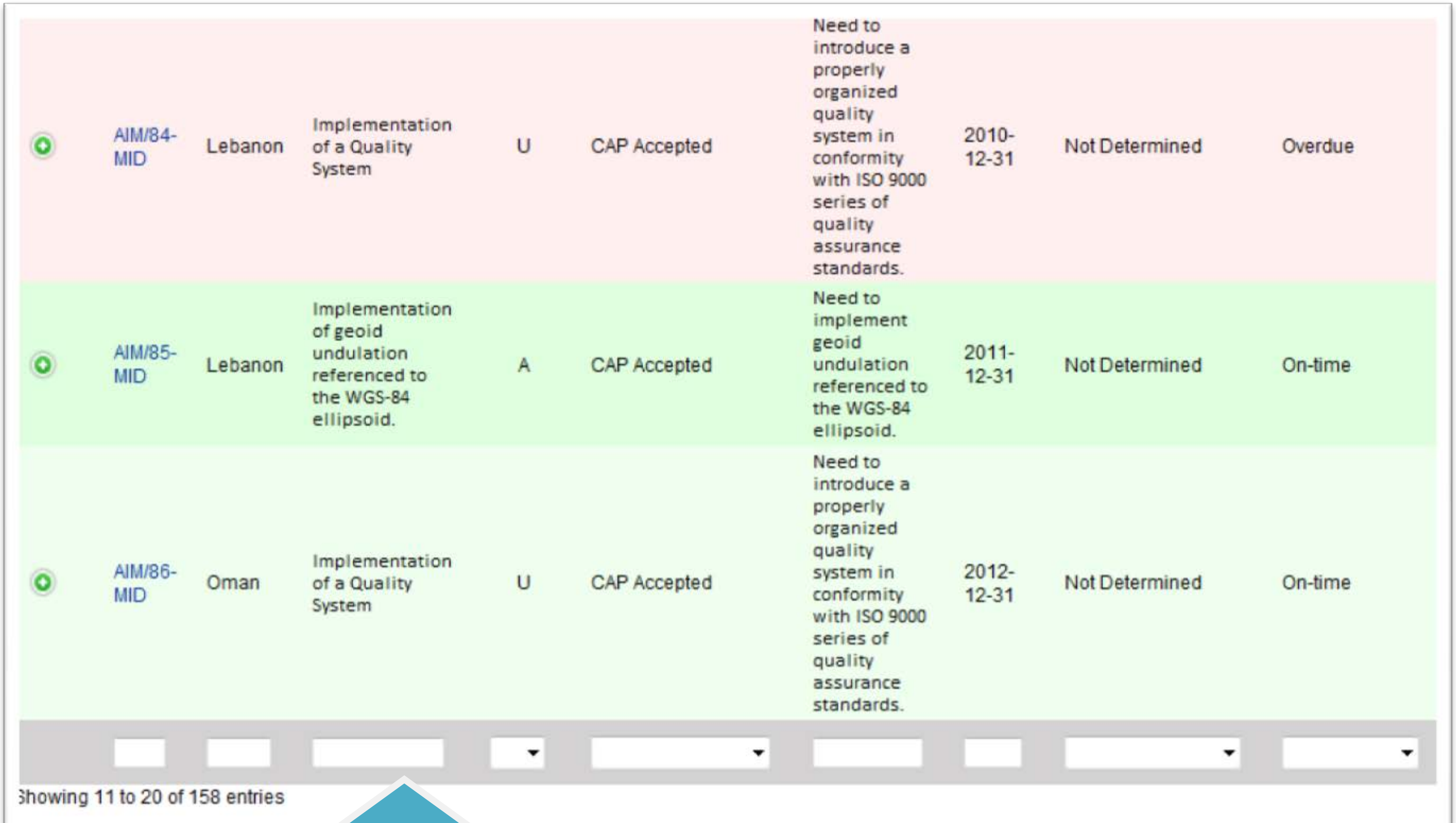
ANDEF- Filtering data: Using Graphs

Click on the graph to filter data and display: completed deficiencies, on-time or overdue. Data on the graphs is sorted by Area or by Priority.





ANDEF- Filtering Data: Using Filtering box



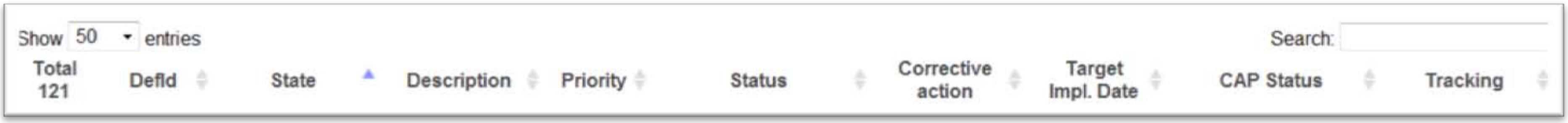
	AIM/84-MID	Lebanon	Implementation of a Quality System	U	CAP Accepted	Need to introduce a properly organized quality system in conformity with ISO 9000 series of quality assurance standards.	2010-12-31	Not Determined	Overdue
	AIM/85-MID	Lebanon	Implementation of geoid undulation referenced to the WGS-84 ellipsoid.	A	CAP Accepted	Need to implement geoid undulation referenced to the WGS-84 ellipsoid.	2011-12-31	Not Determined	On-time
	AIM/86-MID	Oman	Implementation of a Quality System	U	CAP Accepted	Need to introduce a properly organized quality system in conformity with ISO 9000 series of quality assurance standards.	2012-12-31	Not Determined	On-time

Showing 11 to 20 of 158 entries

Filtering text boxes type a value in the appropriate field or choose a value from the list to filter your data, accordingly

ANDEF- Sorting Data

You can sort deficiencies using any of the fields in the display bar just press the arrow up/ down to sort data ascending or descending.



Data will be automatically sorted accordingly

Region

APAC Clear filters

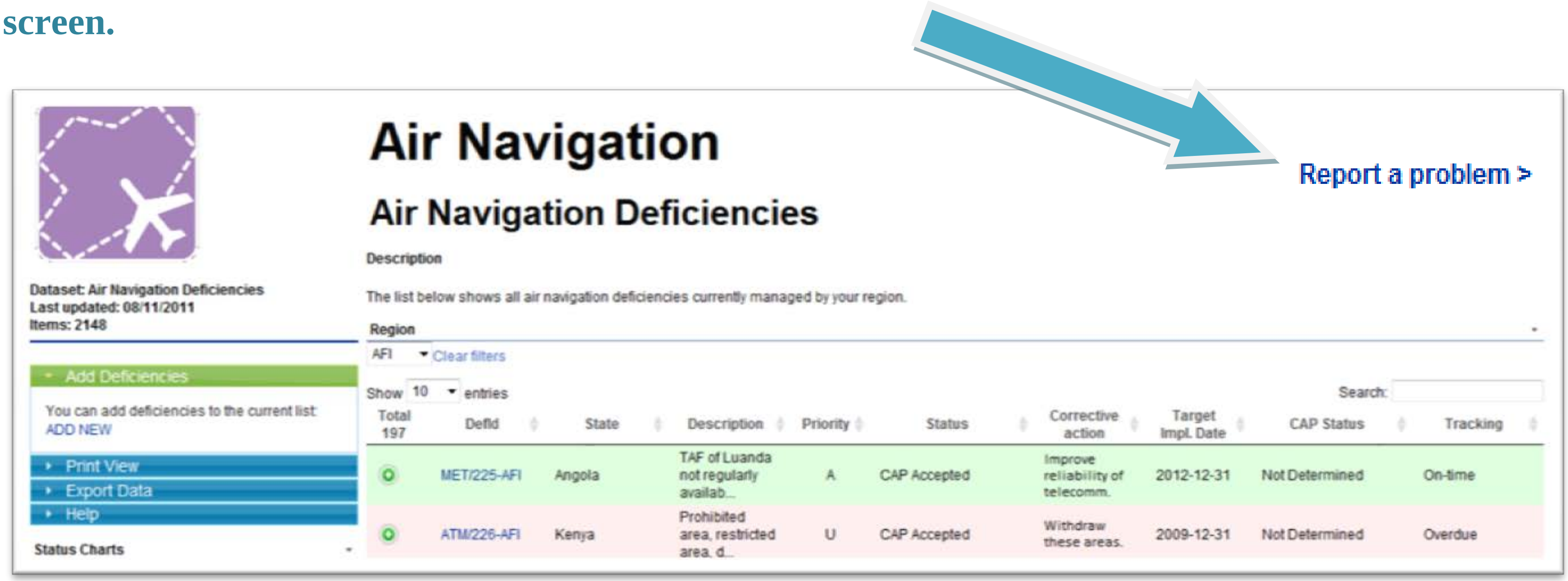
Show 10 entries

Search:

Total 80	DefId	State	Description	Priority	Status	Corrective action	Target Impl. Date	CAP Status	Tracking
	ATM/437-APAC	Bhutan	Annex 6 requirement not implemented...	U	No CAP Defined			Not Determined	Overdue
	ATM/439-APAC	Bhutan	Annex 6 requirement not implemented...	U	No CAP Defined			Not Determined	Overdue
	MET/481-APAC	Cambodia	Requirements for meteorological watch office (MWO) to be established at Phnom-Penh international airport have not been met.	U	CAP Accepted	Bilateral agreement Cambodia-China became effective on 1 June 2009. ATC project proposal submitted to SSCA Cambodia. In process of establishing MWO with target date of 2011.		Not Determined	Overdue

ANDEF- Report a Problem

Facing any technical difficulty with the system, you need help with any system component or you have a general comment/ request just press the "Report a Problem" on the right hand side of the screen.



— END —

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
CLASSIFICATION OF AIRSPACES [Annex 11, 2.6]								
1.	[Annex 11 Para 2.3] [AFI/7 Rec. 5/21] GPI-4	**Lack of provision of area control service**		**Inefficient and unsafe provision of ATS**				
PERFORMANCE-BASED NAVIGATION [Annex 11, 2.7] [A37 Resolution]								
2.	[Annex 11, Para 2.7] AFI/7 Rec. 6/9	**Lack of implementation of PBN**		Will not achieve targets set as part of Global PBN implementation goals				
3.	[A37 Resolution] [AFI/7 Conc. 5/7] GPI-5, GPI-11, GPI-21	**Implementation of RNAV and RNP operations**						

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
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4.	[A37 Resolution] GPI-5, GPI-14, GPI-21	**Implementation of approach procedures with vertical guidance (APV)**						
5.	[A37 Resolution] GPI-5, GPI-14, GPI-21	**Implementation of LNAV only procedures**						
6.	[AFI/7, Rec 5/16] GPI-5	**State database of approval status**						
7.	[Annex 11, 2.27.1]	**States Safety Plan (SSP)**						
8.	[Annex 11, 2.27.3] [PANS-ATM, Chapter 2]	**Safety management system (SMS)**		Cannot achieve or guarantee acceptable level of safety in the provision of ATS				
LANGUAGE PROFICIENCY [Annex 11, 2.29]								

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
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9.	[Annex 1 Annex 11] [A37-10 Resolution] [AFI/7 RAN]	**Language proficiency**						
10.	[PANS-ATM Chapter 12]	**Non use of appropriate language for ATS provision**		Can result in confusion and misinterpretation of instructions which can impact on safety of air navigation				
AIRSPACE MANAGEMENT (ASM)								
11.	[AFI/7, Rec. 5/1] GPI-7	**Cooperative approach to airspace management**		Lack of safe, orderly and expeditious flow of air traffic Lack of efficiency in upper airspace management				
12.	[Annex 11 Para 2.12]	**Non standard use of ATS Route designators**		Confusion/misinterpretation of ATC requirements for position reports that can affect situation awareness and lead to provision of non standard separation minima by ATC Units.				

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	Description	Date first reported	Remarks/ Impact of non-implementation	Action by States	Action taken/planned by State (including timelines/target dates)	Identified implementation impediment and action thereon	Status
13.	[PANS-ATM Chapter 2]	**Uncoordinated use of waypoints (5LNCs)**		Conflicting waypoints (having same name but different coordinates Similar pronunciation of waypoints located within close proximity				
14.	[AFI/7, Rec. 5/3] [Annex 11 Para 2.17, 2.30] GPI-1	**Civil/military coordination**		Lack of effective civil/military coordination resulting in unsafe and inefficient use of airspace				
15.	[Annex 11 Para 2.12]	**Non implementation of Table of ATS 1**		Lack of route continuity across the region Inefficient use of airspace				
16.	[AFI/7, Rec. 5/2] [Annex 11]	**Contingency planning**		Uncoordinated and unsafe operation of aircraft during disruption of ATS within affected airspace(s).				

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	Description	Date first reported	Remarks/ Impact of non-implementation	Action by States	Action taken/planned by State (including timelines/target dates)	Identified implementation impediment and action thereon	Status
17.	[LIM AFI, Rec. 2/1] GPI-3, GPI-4	**Plane of division between the lower and upper airspace**		Non applicability of uniform division between lower and upper airspace across FIRs and ICAO Regions				
18.	[AFI/7, Rec. 5/5]	**Publication of interception of civil aircraft information in aeronautical information publications**		Lack of clear procedures applicable for interception of civil aircraft				
19.	[AFI/7, Rec. 5/10] [Annex 11] [Doc 9426] GPI-11	**Establishment of standard departure and arrival routes**		Lack of safe, orderly and expeditious flow of air traffic				
20.	[AFI/7, Rec. 5/4]	**Ratification of Article 3 *bis* of the Convention on International Civil Aviation**						
AIR TRAFFIC SERVICES (ATS)								

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
21.	[Annex 11 Chapter 3,4&5]	**Implementation of ATS provisions**		Unsafe provisions of ATS				
22.	[Annex 11 Para 2.3] [AFI/RAN Rec 5/21]	**Lack of provision of area control service**		Inefficient and unsafe provision of ATS				
23.	[AFI/7 RAN Rec 14/7] [Annex 1]	**Lack of trained and competent personnel in the provision of ATS**		Unsafe provision of ATS				
24.	[PANS ATM Chapter 10]	**Operational Letters of Agreements between ATS units**		Unsafe operation of traffic due to outdated LOAs Unsafe operation of traffic due to lack of LOAs				
25.	[AFI/7, Rec. 5/6]	**Operational Letter of Agreement between ATS and military units**		Lack of uniformity in application of ICAO standards relating to interception of civil aircraft				

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
26.	[PANS-ATM Chapter 4]	**Poor ATC proficiency and lack of proper ATC procedures**		Inconsistent and unsafe provision of ATS				
27.	[AFI/7, Rec. 5/22]	**Repetitive flight plans**						
28.	[AFI/7, Rec. 5/26]	**Reporting and analysis of ATS incidents**						
29.	GPI-2	**RVSM approvals and monitoring**		Lack of updated information on RVSM approved aircraft				
30.	[APIRG Conc.17/43]	**Application of strategic lateral offset procedures (SLOP)**		Lack of direct routings Lack of efficiency in aircraft operations				
31.	[PANS-ATM] [Doc 7030]	**RVSM flight levels restriction**		Non-efficient use of RVSM airspace				

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	Description	Date first reported	Remarks/ Impact of non-implementation	Action by States	Action taken/planned by State (including timelines/target dates)	Identified implementation impediment and action thereon	Status
32.	[AFI/6, Rec. 7/11]	**Compliance with standard radiotelephony phraseologies and procedures**		Lack of applicability of standard radiotelephony phraseologies and procedures can create confusion and impact on safety of air navigation				
33.	[PANS-ATM Chapter 5]	**Use of non- standard separation minima**		Increased potential for air traffic incidents including accidents				
34.	[SP/RAN] [Annex 11 Para 3.3.5.1]	**Non provision of RMA data**		Insufficient data results in incomplete safety assessment by ARMA				
35.	[Annex 11 Chapter 7]	**Non provision of Met information at ATS units**		Lack of provision of timely and accurate met information to pilots can affect operational decisions and safety of operations				
REDUCED VERTICAL SEPARATION MINIMA (RVSM)								
36.	AFI/RAN 8 Rec. 5/21	**No safety data**		No contribution to CRA	CAAs/ACCs to periodically submit data to ARMA	Target date: 1/8/2011		

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
37.	Annex 6	**No records of Approvals/ Withdrawals**	2006	RVSM safety reduction in separation	RVSM Approvals/Withdrawals to be submitted to ARMA (F2, F3)	Target date: 1/8/2011		
38.	Annex 6	**No or limited Height Monitoring**	2006	No monitoring of ASE	CAAs to comply with Height Monitoring Plan	Target date: 1/8/2011		
FLIGHT INFORMATION SERVICE (FIS)								
39.	[AFI/6, Rec. 6/12]	**Provision of aerodrome flight information service**		Lack of AFIS can impact on safety of air navigation				
40.	[AFI/7, Rec. 5/12] GPI-22	**Implementation of VHF radio coverage**		Non availability of two-way communication between ATS units and aircraft				
41.	[AFI/6, Rec. 6/15] GPI-4	**Air traffic advisory service**						
ATS REQUIREMENTS FOR AERONAUTICAL FIXED SERVICE COMMUNICATIONS								

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
42.	[LIM AFI, Rec. 10/36] GPI-22	**Implementation of ATS direct speech circuits**						
43.	[AFI/7, Rec. 5/24] GPI-22	**Improvement of communications**						
ATS REQUIREMENT FOR OPERATIONAL FLIGHT INFORMATION								
44.	[AFI/7, Rec. 5/14] GPI-19, GPI-22	**HF and VHF VOLMET broadcasts**						
COMMUNICATIONS								

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
45.	[AFI/7, Rec. 9/7] GPI-22	**Aeronautical fixed telecommunication network (AFTN)**						
46.	[AFI/7, Rec. 9/5] GPI-22	**AFTN COM centre management**						
47.	[AFI/7, Rec. 9/4] GPI-22	**AFTN circuits/performance**						
48.	[AFI/7, Rec. 9/3] GPI-22	**AFTN efficiency**						
49.	[AFI/6, Rec. 12/26] GPI-22	**AFS personnel training**						
50.	[LIM AFI, Rec. 7/13] GPI-22	**Liaison visits by communication centre personnel**						

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	Description	Date first reported	Remarks/ Impact of non-implementation	Action by States	Action taken/planned by State (including timelines/target dates)	Identified implementation impediment and action thereon	Status
51.	[AFI/7, Rec. 9/10] GPI-19, GPI-22	**Satellite broadcast**						
52.	[AFI/6, Rec. 13/4] GPI-22, GPI-23	**Provision of SELCAL**						
53.	[LIM AFI, Rec. 8/5] GPI-22, GPI-23	**Elimination of interference on AMS frequencies**						
54.	[LIM AFI, Rec. 8/6] GPI-22, GPI-23	**Measures to reduce harmful interference from carrier systems**						
55.	GPI-22, GPI-23	**VHF frequency utilization list**						

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
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56.	[AFI/6, Rec. 13/13] GPI-22, GPI-23	**Notification of frequency assignments**						
57.	[AFI/6, Rec. 13/14] GPI-22, GPI-23	**VHF channels for aerodrome and approach control**						
58.	[Annex 11, Chapter 6]	**Lack of essential communication facilities to support the provisions of ATS (internal and external)**		Lack of coordination of flights Unsafe operation of flights with increased risks of incidents				
59.	[APIRG Conc. 13/18] GPI-22, GPI-23	**Frequency stability and effective adjacent channel rejection characteristic in the VHF mobile**						
60.	[AFI/6, Rec. 13/3]	**Improved use of the aeronautical mobile service (HF)**						

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
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61.	[APIRG Conc.17/25] GPI-17, GPI-22	**Implementation of controller-pilot data link communications (CPDLC)**		Congestion in communication No assurance of two-way communications between ATS and aircraft where VHF/HF communication is not available or unreliable				
62.	[AFI/6, Rec. 13/12, FASID Table ATS 2] GPI-19, GPI-22	**HF VOLMET broadcasts**						
NAVIGATION (FASID Table CNS 3)								
63.	GPI-21, GPI-23	**Planning principles for radio navigation aids**						
64.	[AFI/6, Rec. 14/1] GPI-21	**Testing of radio navigation aids**						
65.	[AFI/6, Rec. 14/3] GPI-21	**Reliability of operation of radio navigation aids**						

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	Description	Date first reported	Remarks/ Impact of non-implementation	Action by States	Action taken/planned by State (including timelines/target dates)	Identified implementation impediment and action thereon	Status
66.	[AFI/6, Rec. 14/4] GPI-21, GPI-23	**Notification of frequency assignments to radio navigation aids**						
67.	[AFI/7, Conc. 10/1] GPI-21	**Flight checking of radio navigation aids**						
68.	[AFI/7, Rec. 10/2] GPI-21, GPI-23	**Geographical separation criteria for VOR and/or VOR/DME installations in the AFI region**						
69.	[AFI/7, Rec. 10/3] GPI-21, GPI-23	**Geographical separation criteria for ILS installations in the AFI region**						
70.	[LIM AFI, Rec. 9/3] GPI-23	**Frequency utilization lists LF/MF, 108 MHz to 117.975 MHz and 960 MHz to 1 215 MHz bands**						

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
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71.	GPI-23	**Geographical separation criteria for VHF air-ground communications**						
SURVEILLANCE (FASID Tables CNS 4A and 4B)								
72.	[APIRG Conc.17/31] GPI-9, GPI-17	**Implementation of automatic dependent surveillance (ADS-C)**						
73.	[AFI/7, Conc. 11/2] GPI-9, GPI-17	**Application of procedures for 24-bit aircraft address assignment**						
74.	[PANS-ATM Chapter 8]	**Lack of essential surveillance facilities to support the provisions of ATS**		Ineffective and inefficient surveillance facilities can impact on outcome of emergencies				
SEARCH & RESCUE (SAR)								

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
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75.	[Annex 12, Chapter 3] AFI/7 Rec. 6/3	**Lack of Search and Rescue Agreements between neighboring States**		Lack of SAR agreements can be detrimental to safety of persons in distress where searches overlap national boundaries.				
76.	[Annex 12, Section 4.3]	**Search and rescue units**		Lack of adequately equipped and trained search and rescue units and adequate survival and medical supplies can seriously affect the conduct and outcome of SAR operation				
77.	AFI/7 Rec. 6/5	**Search and Rescue Training**		Lack of formal training for SAR personnel can hinder the effectiveness of SAR operation				
78.	[Annex 12, Section 4.4]	**Search and rescue exercises**		Lack of regular training of search and rescue personnel and conduct of regular search and rescue exercises can prevent achievement of maximum efficiency in search and rescue operation.				

MINIMUM REPORTING AREAS

Item No	Deficiencies				Corrective Action			
	ICAO Reference Document & GPIs	**Description**	**Date first reported**	**Remarks/ Impact of non-implementation**	**Action by States**	**Action taken/planned by State (including timelines/target dates)**	**Identified implementation impediment and action thereon**	**Status**
79.	AFI/7 Rec. 6/1 AFI/7 Rec. 6/2	**Satellite aided search and rescue**		Lack of implementation will result in difficulty in detection, identification and location of activated 406 Mhz ELTs and loss of valuable time for SAR				

Note: ICAO Council definition of a Deficiency:

'A deficiency is a situation where a facility, service or procedure does not comply with a regional air navigation plan approved by the Council, or with related ICAO Standards and Recommended Practices, and which situation has a negative impact on the safety, regularity and/or efficiency of international civil aviatio'.

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP (APIRG)

Work Programme

In order to meet the terms of reference, the Group shall perform the following tasks:

a. review, and propose when necessary, the target dates for implementation of facilities, services and procedures to ensure the coordinated development of the Air Navigation System in the AFI Region;

b. assist the ICAO Regional Offices providing services in the AFI Region in their task of fostering implementation of the AFI Regional Air Navigation Plan;

c. in line with the Global Aviation Safety Plan (GASP), ensure the conduct of any necessary systems performance monitoring, identify specific deficiencies in the air navigation field, especially in the context of safety, efficiency and continuity and propose corrective action;

d. facilitate the development and implementation of an action plan by States to resolve identified deficiencies, where necessary;

e. develop amendment proposals to update the AFI Regional Air Navigation Plan necessary to satisfy any changes in the requirements, thus removing the need for regular regional air navigation meetings;

f. monitor implementation of air navigation facilities and services and where necessary, ensure interregional harmonization, taking due account to organization aspects, economic issues (including financial aspects) of cost/benefit analysis, business case studies and, environmental matters;

g. review the Statement of Basic Operational Requirements and Planning Criteria (BORPC) and recommend to the Air Navigation Commission such changes to them as may be required in the light of developments in the air navigation field;

h. invite financial institutions, as required, on a consultative basis as appropriate to provide advice in the planning process;

i. maintain close cooperation with relevant organizations and State grouping to optimize the use of available expertise and resources;

j. conduct the above activities in the most efficient manner possible with a minimum of formality and documentation and call meetings of the APIRG when deemed appropriate;

k. promote the concept of performance-based approach to planning and implementation of air navigation services;

l. foster and facilitate integration of the provision of air navigation services including SAR services and to optimise the use of available resources;

m. promote the application of the ICAO Global ATM Operational Concept in order to optimise the use of airspace and available technologies;

n. promote the application of operational improvements that take into consideration environmental protection and establish mechanisms for measuring the benefits;

o. follow-up on the 12th Air Navigation Conference; and

p. coordinate with RASG AFI on safety issues;

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Conc/Dec. No. Strategic Objective*	**Title of Conclusion**	**Text of Conclusion**
1	**2**	**3**
Decision 18/01 A, C	**Review and Update of APIRG Conclusions and Decisions**	That APIRG Sub-Groups: a) review all APIRG Conclusions and Decisions from APIRG/13 to APIRG/17 and identify those which are no longer valid; b) adopt a system of reviewing the validity of Conclusions and Decisions every two successive APIRG meetings; and c) transfer Conclusions and Decisions which have reached maturity and still relevant to appropriate guides, handbooks and manuals for the AFI Region.
Conclusion 18/02 A, C	**Activities of ICAO Regional Office Safety Teams (ROSTs)**	That, States in the AFI Region take advantage of the assistance made available under the ROSTs in order to support the implementation of their respective Corrective Action Plans (CAPs).
Conclusion 18/03 A	**Training Needs and Resources in Africa**	That: a) training organizations in the AFI Region participate in the Constitutive Assembly of the Association of African Aviation Training Organizations (AATO) to be held in Nairobi, Kenya, from 2 to 4 April 2012 and join the AATO; and b) States, training organizations, and aviation services providers in the AFI region participate in the activities of the envisaged framework for the harmonization of aviation training in the AFI Region and contribute towards the implementation of the ICAO SP AFI RAN/08 Recommendation 5/8.
Conclusion 18/04 A, C	**Coordination of Activities Between APIRG and RASG-AFI**	That: a) Accidents and Incidents Analysis; and State Safety Programme (SSP) be addressed within the framework of RASG-AFI; b) RVSM safety monitoring, Quality Management System (QMS), Civil-military coordination and SAR continue to be part of APIRG Work Programme; c) English Language Proficiency (ELP), Safety Management System (SMS) implementation, Runway Safety, Unsatisfactory Condition Reports(UCRs) and Airspace contingencies issues remain in the Work Programme of both RASG-AFI and APIRG, until further notice; and d) The two Groups agree on the mechanism to be used to ensure that the safety issues addressed by both APIRG and RASG-AFI are fully coordinated.

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Conclusion 18/05 **A, C**	**Implementation of Cooperative Type Global and Regional Projects**	That States: a) include in their Civil Aviation Regulations public health emergency related provisions of ICAO Annexes and guidance material; b) establish an Aviation Public Health Emergency Plan which is integrated in the National Public Health Emergency Plan; c) which are not members of the Cooperative Arrangement for the Prevention of Spread of Communicable Disease through Air Travel (CAPSCA) project are encouraged to join, request assistance visits and contribute to the funding of the Project; and d) nominate candidates to be trained as Technical Advisors.
Decision 18/06 **A, C**	**Performance – Based Approach – Metrics**	That: a) APIRG sub-groups develop indicators that are specific, measurable, achievable, realistic and time bound and attach them to the performance framework forms (PFFs) in the appropriate box, using the metrics recommended under SP AFI RAN/08 Recommendation 3/3 and/or others determined to be appropriate indicators for the AFI Region; b) States use the regionally agreed indicators; and c) ICAO organizes regional workshops on performance-based approach to assist States in the development and implementation of performance-based approach related processes.
Conclusion 18/07 **A**	**Aerodrome Inspector Training Requests to AFI Plan**	That States who may wish to get more training under the ICAO AFI Plan (Integrated Safety Management Course, Aerodrome Inspector's Courses and Aerodrome Certification Course) should send requests to ICAO regional offices, and where possible coordinate such requests with other States for region-wide benefit, and that when such courses are organized, States should include participants from both the "regulator" and "aerodrome operator".
Decision 18/08 **A, C**	**Aerodrome operations planning/Sub-Group Terms of Reference**	That the AOP SG Terms of Reference be amended to include "obstacle surfaces control", "runway safety" and "aerodrome planning and design".
Conclusion 18/09 **A, C**	**National PBN Implementation Plans**	That in accordance with Assembly Resolution A37-11 on PBN implementation, States: a) That have not already done so, complete preparation of their national PBN implementation plans as a matter of urgency, using the template provided by the PBN GNSS Task Force; b) Consider the use of planning tools provided by the PBN/GNSS Task Force, as well as project management software; and c) Provide updates to Regional offices.
Conclusion 18/10 **A, C**	**Lowering of RNAV/RNP Routes UM214 and UM215**	That, States that have not already done so, be urged to establish the lowest usable flight level on the RNAV routes UM214 and UM215 as flight level 250 for operational reasons.

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		(This Conclusion is to supersede APIRG Conclusions 17/51)
Conclusion 18/11 **A, C**	**AFI PBN Regional Performance Framework Forms**	That the AFI PBN Regional Performance Framework Forms are updated as at Appendix 3.2A1 to 3.2A3 to the report on agenda item 3.2.
Conclusion 18/12 **A, C**	**AFI ATS Route Catalogue Template**	That, in order to support the process of ATS route development in the AFI Region, including the keeping of a record of ATS routes proposed for development and facilitating follow- up on the actions pertaining to the routes' development: a) the AFI ATS Route Catalogue (AARC) template is adopted as at Appendix 3.2C to the report on agenda item 3.2; and b) AFI States and concerned international organizations are urged to periodically review the Catalogue once completed, note developments and take action as applicable.
Decision 18/13 **A, C**	**Establishment of the AFI ATM/MET Task Force**	That the Core Team of experts established under APIRG Decision 17/84 is dissolved, and the AFI ATM/MET Task Force be established with the terms of reference and work programme as at Appendix 3.2I to the report on agenda item 3.2.
Conclusion 18/14 **A, C**	**Establishment of the AFI Volcanic Ash Contingency Plan**	That: a) the ATM/AIM/SAR and the MET Sub-Groups finalize development of the AFI Volcanic Ash Contingency Plan; b) the Plan be provided to States for implementation, without awaiting the next meeting of APIRG.
Conclusion 18/15 **A**	**Strategy for Implementation of New ICAO Flight Plan Form**	That, in order to implement the new flight plan form in a progressive and harmonized manner: a) The AFI Strategy for Implementation of new ICAO Flight Plan form is adopted as at Appendix 3.2J to the report on agenda item 3.2; and b) States and users are urged to continue their implementation planning based on the Strategy.
Decision 18/16 **A**	**Revised Terms of Reference of The AFI Flight Plan Transition Task Force (FPLT/TF)**	That, the revised Terms of Reference of the AFI Flight Plan Task Force are revised as at Appendix 3.2K to the report on agenda item 3.2.
Conclusion 18/17 **A, C**	**Addressing missing flight plans**	That AFI States should: a) address the loss of ATS messages using AFTN, including missing flight plans, as a matter of urgency; b) continuously monitor missing flight plans through: i) the AFI Tactical Action Group (TAG); and ii) conduct regular surveys on missing flight plans for a longer period (e.g. 30 days), or at regular intervals, under the coordination of the ICAO Regional offices; and c) ensure that their ATC systems' clocks are synchronized with the GPS time in order to meet

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		Annexes 2 and 11 relevant provisions.
Conclusion 18/18 A, C	**Training of air operators personnel on airspace organization**	That, in order to reduce risks of missing flight plans, enhance safety and efficiency, States and concerned international organizations including IATA take necessary measures to ensure that flight planning personnel are adequately trained on the tasks for which they are engaged in the processing of flight plans.
Conclusion 18/19 C	**AFI AMHS Implementation Strategy**	That AFI States adopt and implement the AHMS Strategy shown at Appendix 3.4A to this report.
Conclusion 18/20 C	**AFI ATN architecture plan**	That AFI States implement the AFI ATN Architecture Plan shown at Appendix 3.4C to this report.
Conclusion 18/21 C	**Adoption of the global operational data link document (GOLD)**	That in order to ensure regional and global harmonization of data link operations; AFI States adopt the Global Operational Data Link Document (GOLD) in replacement of the previous FANS 1/A Operations Manual.
Conclusion 18/22 A, C	**Implementation of AFI FMG Action Plan**	That AFI States and Organizations implement the Action Plan proposed by the AFI Frequency Management Group as shown at Appendix 3.4D to this report.
Conclusion 18/23 A, C	**Information on Aircraft Equipage In Air Navigation System Planning And Implementation**	That AFI States: a) Support surveys conducted on aircraft equipage and capabilities by providing the ICAO Regional offices with detailed information concerning their registered aircraft; and b) Use the information for planning and implementation of air navigation systems. .
Conclusion 18/24 A, C	**Contingency Planning for AFI VSATVSAT Networks Operations**	That, AFI aeronautical VSAT network managers develops contingency plans in coordination with their space segment provider (Intelsat) to ensure continuity of service in case of disruption or failure of their operated satellites.
Conclusion 18/25 A, C	**Adoption of best practices for AFI VSAT Networks**	That the AFI States and Air Navigation Services Providers (ANSPs) operating aeronautical VSAT Networks adopt the best practices stated at Appendix 3.4G to this report, as well as any other best practices to be developed or adopted by APIRG.
Conclusion 18/26 A, C	**Modernization of VSAT Networks**	That AFI States and Organizations adopt and implement strategies to modernize network continue to meet regionally/inter-regionally agreed performance requirements.
Conclusion 18/27 C	**Arrangements to ensure sustainability of NAFISAT and SADC VSAT/2 networks**	That, based on experience gained and available capabilities NAFISAT and SADC VSAT/2 participating States should establish administrative and funding arrangements in a timely manner to ensure that AFS requirements continue to be met.
Decision 18/28	**Establishment of A Task Force**	That a Task Force be established to address issues related to the

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C	**for The AFI Aeronautical VSAT Networks Regional Project**	development of a regional project aimed to enhance the overall performance of AFI aeronautical VSAT networks, and converge towards a consolidated regional ATN infrastructure, with the terms of reference shown at Appendix 3.4H to this report.
Decision 18/29 **C**	**Multinational facility/service for an integrated AFI aeronautical telecommunication network (ATN) infrastructure.**	That the AFI integrated IP-based regional/interregional digital communication network be established as a multinational facility/service as defined in the Regional Air Navigation Plan (Doc 7474), that embraces a consolidated AFI Aeronautical Telecommunication Network (ATN) infrastructure.
Conclusion 18/30 **C**	**Implementation of resolution COM6/24 (WRC-12)**	That, considering the critical role of VSAT technology in the provision of air navigation services within the AFI Region and its adjacent ICAO regions, AFI States support the implementation of Resolution COM6/24 (WRC-12) aimed at securing international protection of aeronautical frequency spectrum, by participating in related studies, surveys and meetings as may be organized under the coordination of ICAO.
Conclusion 18/31 **C**	**Updated AFI GNSS Strategy**	That AFI States adopt and implement the GNSS Strategy contained at Appendix 3.4K to this report.
Decision 18/32 **C**	**Monitoring of SBAS development in ICAO Regions in the equatorial area**	That APIRG CNS and ATM/AIM/SAR Sub-groups monitor SBAS developments in other ICAO regions in the equatorial area, for consideration as appropriate when developing/updating its strategy for a cost-effective implementation of GNSS in the AFI Region.
Conclusion 18/33 **C**	**Funding of AFI SBAS Cost-Benefit Analysis**	That in coordination with AFCAC, ICAO facilitates the search for funding to support the conduct of an independent cost-benefit analysis on an AFI satellite-based augmentation system (SBAS).
Conclusion 18/34 **C**	**AFI Surveillance Strategy**	That the AFI States adopt and implement the Surveillance Implementation Strategy shown at Appendix 3.4L to this report.
Conclusion 18/35 **C**	**QMS Implementation and Establishment of Service Level Agreements**	That, in order to support the effective implementation of QMS, AFI States are urged to: a) take firm commitment at the level of Directors General of CAA Administrations to implement QMS supported by ISO 9001:2008; b) share their QMS implementation experience and support with other States; and c) establish and maintain formal Service Level Agreements (SLA) between data originators and AIS Providers as per sample template at Appendix 3.5A.
Decision 18/36 **C**	**Proposal for amendment to the AFI ANP/FASID (Doc 7474) related to e-TOD**	That, ICAO circulates and processes the amendment proposal for the AFI ANP/FASID (Part VIII) at Appendix 3.5B and C.
Conclusion 18/37 **C**	**AFI Region e-TOD Implementation Seminar/Workshop**	That ICAO: a) organize regional seminar/workshop for States to promote harmonized implementation of e-TOD and; b) encourage States to send participants to the workshop.

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Decision 18/38 **C**	**Amendment of AFI Basic ANP/FASID to Reflect The Transition From AIS to AIM**	That, ICAO circulate and process the AFI ANP/FASID (Doc 7474 Vol.1&2) amendment proposals relating to the Transition from AIS to AIM at Appendix 3.5G and Appendix 3.5F1 to 3.5F9.
Conclusion 18/39 **C**	**Receiving WAFS Products and Related OPMET Information Through SADIS**	That, the following five States in the AFI region: Burundi, Eritrea, Liberia, Sao Tome and Principe and Sierra Leone which have not yet implemented SADIS, endeavor to address this deficiency in accordance with Conclusion 10/31 of the APIRG/10 meeting as a matter of urgency.
Conclusion 18/40 **C**	**Implementation of The WAFS in The AFI Region**	That SADIS Users/States in the AFI Region: a) who have not already implemented Secure SADIS FTP, arrange to obtain Secure SADIS FTP log on credentials from the SADIS Provider State; b) take action to obtain GRIB2 compatible visualization software from their workstation suppliers; c) monitor developments for future requirements of a SADIS satellite broadcast beyond 2015 and respond in a timely fashion to any future surveys/questionnaires on this subject in order to ensure their views are noted; d) apply for WAFS Internet File Service (WIFS) account(s) through the ISCS/WIFS Provider State for use as backup/contingency; e) review the published workstation evaluation reports in order to assess which systems best meet their needs; and f) make all efforts to migrate to Secure SADIS FTP before 30 November 2012 or risk losing access to the Internet-based provision of SADIS.
Conclusion 18/41 **C**	**Implementation of AMBEX Handbook Procedures**	That, Dakar and Pretoria RODB Provider States: a) implement an automatic OPMET data monitoring scheme using procedures in Chapter 12 and Appendix F of the AMBEX Handbook on quarterly basis (March 31, June 30, August, 31 and December 31 of each year); b) perform regular 24 hour simultaneous monitoring starting at 0000 UTC on the first Wednesday of every month; and c) distribute the monitoring statistics to the Chairman of the OPMET Management and the Secretariat with effect from July 2012.
Decision 18/42 **C**	**Development of Back Up Procedures for The AFI RODBs**	That, a Core Team of experts consisting of Members from Kenya, Madagascar, Senegal, South Africa and ASECNA be established to develop back up procedures for the AFI RODBs.
Conclusion 18/43 **C**	**Implementation of an AFTN Circuit between Dakar and Pretoria RODBs to Support**	That Dakar and Pretoria RODBs Provider States, a) investigate the best possible way to implement a backup circuit between the two RODBs for the

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	Back-Up Contingency Capabilities	implementation of the backup procedures between the RODBs, in time for the MTF/4 meeting September 2012 and b) implement reliable telecommunications facilities to support back-up procedures for the AFI RODBs.
Decision 18/44 **C**	**Amendment to the AMBEX Handbook**	That, a) Appendices A and B to the AMBEX Handbook be updated by the MET/SG Secretariat to reflect AFTN addresses for the IROGs Bangkok, Jeddah and Rio de Janeiro; and b) the amended AMBEX Handbook given in Appendix 3.6A to this report, be: *i.* *endorsed as the AMBEX Handbook Seventh Edition, Amendment 2; and published by the MET/SG Secretariat by July 2012.*
Conclusion 18/45 **C**	**SIGMET Monitoring and OPMETOPMET Routing Tables**	That, a) the two AFI RODB Provider States be invited to monitor the reception of SIGMET information during the regular (twice yearly) EUR Region SIGMET tests and report; b) the two AFI IROGs and ROC Toulouse exchange their routing tables and verify the coherency of these tables; and c) the AFI IROGs be invited to review their current routing tables, the status of OPMET reception, and update the routing tables as necessary.
Conclusion 18/46 **C**	**Implementation of AFI OPMET data catalogue**	That, the OPMET data catalogue given in Appendix 3.6B to this report, be expeditiously finalized and implemented by States in the AFI Region.
Decision 18/47 **C**	**Amendment to the AFI Regional SIGMET Guide**	That, the amendment to the SIGMET Guide given in Appendix 3.6C to this report, is approved as the AFI Regional SIGMET Guide Ninth Edition, Amendment 2.
Conclusion 18/48 **C**	**Measures To Improve The Issuance of SIGMET in the AFI Region**	That, the ICAO Dakar and Nairobi Regional offices sensitize meteorological authorities in the AFI Region on the importance of continuous monitoring, by meteorological watch offices (MWOs), of hazardous meteorological conditions that would warrant the issuance of SIGMET information in their respective areas of responsibility.
Conclusion 18/49 **C**	**Revision of OPMETOPMET Data Requirements**	That: a) information related to the requirements of OPMET data from non-AOP aerodromes as given at Appendix 3.6D to this report, be submitted by ICAO Dakar and Nairobi Regional offices to the concerned States for approval, before amending the AFI FASID MET Table 2A and Annex 1 to the SADIS User Guide (SUG); and b) the non-AOP aerodromes as listed in Appendix 3.6E to this report, be deleted from AFI FASID MET Table 2A.

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Conclusion 18/50 **C**	**Improvement of OPMET Availability from AFI States Aerodromes**	That, efforts be made by the concerned States to improve the availability at Dakar RODB, of the required OPMET information from Accra, Conakry, Freetown, Kano, Kinshasa, Lagos and Luanda.
Decision 18/51 **C**	**Preparation of AFI XML Transition Plan**	That, the preparation of the AFI XML Transition Plan be deferred until the adoption of Amendment 76 to Annex 3 (July 2013) at the earliest.
Conclusion 18/52 **C**	**Issuance and Dissemination of SIGMET**	That: a) ICAO Regional offices should make concerted efforts to assist States address shortcomings and difficulties identified; b) the MWO Provider States listed in Appendix 3.6F take the required measures to remove operational shortcomings in SIGMET provision; and c) Roberts field and Kinshasa FIRs MWOs consider bilateral arrangements with adjacent MWOs (i.e. Dakar and Brazzaville MWOs respectively) for the provision of SIGMET information on behalf of the States concerned.
Conclusion 18/53 **C**	**Awareness Seminars on the AFI Air Traffic Management Volcanic Ash Contingency Plan**	That ICAO Dakar and Nairobi Regional offices through the ATM/MET Task Force, conduct regional awareness seminars on the AFI ATM Volcanic Ash Contingency Plan in view of: a) Making all aviation stockholders in the AFI region aware of ATM VACP; b) Supporting its implementation; and c) Proposing further improvements to the plan.
Conclusion 18/54 **C**	**Alternative Funding Sources for the Establishment and Implementation of QMS for the Provision of Aeronautical Meteorological Service and Aeronautical Information Management (AIM)**	That ICAO and WMO investigate as a matter of urgency other possible sources of funding besides cost recovery to assist States willing to enter into a twinning or bilateral arrangements in order to fast-track the implementation of QMS for the provision of aeronautical meteorological (MET) service and aeronautical information management (AIM) .
Conclusion 18/55 **C**	**States Participation In The Cooperative Programme for Operational Meteorology (COMET) Through Safe Skies For Africa (SSFA) Programme**	That: States requiring aeronautical meteorology training material from SSFA in collaboration with COMET to contact the ICAO Regional offices as appropriate.
DECISION 18/56 **C**	**Future work programme of the MET sub-group**	That, the work programme of the MET/SG be updated as shown in Appendix 3.6I.
Conclusion 18/57 **C**	**Development of action plans on CO2 emissions reduction activities**	That States: a) continue to consider environmental issues in the planning and implementation of regional air navigation systems; b) bring to the attention of the ICAO Secretariat specific areas where additional guidance on environmental benefits would be valuable; c) ensure that their national Action Plan focal points

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		collaborate with relevant stakeholders for all the operational measures that States wish to develop, implement and/or include in their action plans; d) promote use of the ICAO IFSET tool for the quantification of environmental benefits from operational measures, as part of the development of States' action plans; and e) e) ensure that civil aviation experts are included in their delegation attending UNFCC meetings where environmental issues are considered.
Conclusion 18/58 **C**	**Estimation and reporting of operational benefits**	That States: a) are urged to use the ICAO Fuel Savings Estimation Tool (IFSET) or a more advanced tool to estimate environmental protection benefits accrued from operational improvements; b) include environmental benefits analysis in their plans to implement operational improvements that may reduce fuel burn at a regional or national levels; and c) report the benefits to ICAO on a quarterly basis using the table to report environmental benefits of operational benefits at Appendix 3.7A to this report .
Decision 18 /59 **A, C**	**Incorporation of Operational Benefits Tasks in the PRND Working Group Terms of Reference**	That the terms of reference of the PRND-WG be amended to include consideration of operational benefits related to environmental protection.
Conclusion 18/60 **A, C**	**Participation of the Africa-Indian ocean (AFI) region at AN-Conf/12**	That, in preparation for the Twelfth Air Navigation Conference (AN-Conf/12) to be held in Montreal from 10 to 30 November 2012: a) AFI States and aviation stakeholders participate in the workshops to be organized by ICAO in Dakar (July 2012) and Nairobi (August 2012); and b) AFCAC coordinate with States and regional organizations the development of a common AFI position at the AN-Conf/12 Agenda items.
Conclusion 18/61 **A, C**	**Single centralized air navigation deficiencies database**	That States and International Organizations: a) test the centralized database on iSTARS platform using the guidance at Appendix 4.1A; b) update the data as necessary in coordination with ICAO Regional offices, Nairobi/Dakar; and c) provide feedback to ICAO Regional office, Nairobi/Dakar by 31 August 2012.
Conclusion 18/62 **A, C**	**Improvement of Deficiency Reporting**	That, in order to encourage reporting of deficiencies, follow up, collection of information on impediments to implementation, and to facilitate identification of solutions, AFI States and other stakeholders are encouraged to use the list of reporting areas at Appendix 4.3A to the report on agenda item 4.3, as a guide to minimum reporting.
Conclusion 18/63 **A, C**	**Measures to Address Human Factors And Infrastructure**	That, among efforts to reduce deficiencies, States addresse the following Haman Factors and aviation infrastructure issues:

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	Deficiencies	**a) Human Factors** i) Undertake training courses to improve the proficiency of controllers on one hand and to assist them in the implementation of runway safety measures on the other hand; and ii) Undertake pilot training on the implementation of runway safety measures, crew discipline onboard and measures preventing loss of control. **b) Infrastructure deficiencies** i) Implement previous APIRG Conclusion on CPDLC implementation to back-up VHF and HF in remote areas; and ii) Implementation and usage of PBN in TMAs.
Conclusion 18/64 **A, C**	**Participation of Stakeholders in the APIRG Meetings**	That States extend invitation to all stakeholders including meteorology and airport operators and Air Navigation Service Operators (ANSPs) to participate in APIRG meetings.

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