INTERNATIONAL CIVIL AVIATION ORGANIZATION
FOURTEENTH MEETING OF THE
AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP

(Yaounde, 23 - 27 June 2003)

Agenda Item 4.5: Review of the Report of the Fourth Meeting of the CNS/ATM/IC Sub-group

Review of the Report of the Fourth Meeting of the CNS/ATM/IC Sub-group

(Presented by the Secretariat)

SUMMARY
The report of the CNS/ATM/IC/SG/4 Meeting is presented for review by APIRG.
Action by the Group is at paragraph 3
References: Report of the CNS/ATM/IC/SG/4 Meeting APIRG/13 Report Report of the CNS/ATM/IC/SG/3 Meeting

1. Introduction

1.1 The Fourth meeting of the CNS/ATM Implementation Coordination Sub-group (CNS/ATM/IC/SG/4) was held in Dakar from 10 to 14 March 2003. It was attended by 48 participants from 14 States and 4 international organizations.

2. Discussions

2.1 Election of a Chairman and Vice Chairman

2.1.1 The Meeting elected Mr. Godwin Makoroma of the United Republic of Tanzania as Chairman, and Mr. Edwin Addo of Ghana as Vice Chairman.

2.2 Terms of reference and work programme as defined by APIRG/13

2.2.1 Under this agenda item, the CNS/ATM/IC Sub-group noted its terms of reference and work programme as adopted by APIRG/13. Amendments to the work programme were agreed. These are shown in the future work programme of the Sub-group.

2.3 Review of the status of implementation of Conclusions/Decisions of the third meeting

2.3.1 The Sub-group reviewed the status of implementation of the conclusions and decisions adopted at its third meeting,. It noted that most of them were either implemented or in progress. The meeting was concerned that few States had published the Aeronautical Information Circular (AIC) on ACAS II as recommended by APIRG Conclusion 13/72. The meeting requested the Secretariat to follow-up with the remaining States and provide an updated status at the APIRG/14 meeting.

2.3.2 With regard to APIRG Conclusion 13/74 - *Establishment of national CNS/ATM bodies and designation of focal points of contact*, the Meeting noted that 21 States had designated their CNS/ATM Focal points. South Africa presented a paper on its National CNS/ATM Coordination Committee. The Secretariat was requested to pursue full implementation of this conclusion with the remaining States. The following draft conclusion was adopted:

Draft Conclusion 4/1: National CNS/ATM Coordination Committees

That States which have not yet done so, implement their national CNS/ATM Coordination Committees in accordance with APIRG Conclusion 12/45, and provide the ICAO Regional Offices with details of their focal points of contact.

Consideration of the NAVISAT satellite system

2.3.3 The meeting reviewed a report of the AFI GNSS Study Group on its consideration of the NAVISAT multi-mission satellite system proposed by Egypt, pursuant to Decision 3/25 of the Third meeting and a paper of Egypt on the same subject.

2.3.4 The services envisaged for the NAVISAT include:

a) aeronautical mobile voice/data communications ;
b) aeronautical fixed voice/data communications;
c) geostationary augmentation to GPS and possibly GLONASS; and
d) non-aeronautical communications.

2.3.5 The meeting noted that the Study Group considered only the navigation component of the NAVISAT. The Study Group advised that the navigation component of the NAVISAT is intended to broadcast SBAS ranging, integrity and error correction data. The AFI SBAS system currently envisaged does not include capacity to generate within the Region the complete set of augmentation data and uplink them to a geostationary satellite. It was envisaged to connect RIMS in AFI to EGNOS Master Control Station in Europe. Therefore the Study Group concluded that the navigation component of the NAVISAT should be addressed to the appropriate SBAS providers.

2.3.6 The meeting further noted that MIDANPIRG had established a working group on the NAVISAT. After discussions, the Sub-group agreed with the conclusion of the Study Group on the navigation component of the NAVISAT and decided to monitor and review, with the assistance of the Communications Sub-group, the work being carried out by MIDANPIRG. The following draft conclusion and draft decision were adopted:

Draft Conclusion 4/2: NAVISAT Project

That feasibility of the navigation component of the NAVISAT Project be addressed to appropriate SBAS providers.

Draft Decision 4/3: Follow up on the NAVISAT Project

That the CNS/ATM Implementation Coordination Group, with assistance from the Communications Sub-Group, monitor and review the work being carried out by MIDANPIRG on the NAVISAT Project.

2.4 **Review of the reports of ICGs and Status of implementation of the AFI CNS/ATM Plan**

2.4.1 Under this agenda item, the CNS/ATM/IC Sub-group reviewed the reports of the Implementation Co-ordination Groups (ICGs) for areas of routing (AR), AR1, AR2, AR6 and AR8, and reviewed in detail the status of implementation of the AFI CNS/ATM Plan.

2.4.2 The meeting noted that the SAT Group agreed to achieve full implementation of RVSM in the South Atlantic (i.e AR2) coincidentally with the CAR/SAM Region in January 2005. The Sub-group further noted that the SAT Group established a study group to carry out studies and preparatory activities in view of the implementation of random RNAV routing in the South Atlantic in 2005.

Status of implementation of the AFI CNS/ATM Plan

2.4.3 The Sub-group reviewed and updated the status of implementation of the AFI CNS/ATM Plan in all ten areas of routing. The results are shown in **Appendix A** to this paper. The meeting recalled APIRG Conclusion 13/72 – *Step by step approach in the CNS/ATM Implementation*, which provides guidance on the order of priority for implementation:

a) VHF coverage;
b) ACAS
c) ATS/DS and AFTN circuits
d) area control service; and
e) 10-minute longitudinal separation.

2.4.4 Based on Conclusion 13/72, the meeting made the following remarks.

2.4.5 The level of implementation of VHF coverage is generally above 70%, reflecting the on-going efforts in several States. This level can be further improved if the projects in FIRs Kinshasa, Lilongwe, Luanda and Lusaka are implemented.

2.4.6 The level of implementation of the mandatory carriage of ACAS is low. By March 2003, only 17 States had published the AIC.

2.4.7 The level of implementation of ATS/DS circuits is very low, generally far below 50%.

2.4.8 The meeting noted that the rationalized AFTN is still not fully implemented. Four tributary centres remain completely isolated from the AFTN and 2 main circuits and 2 inter-regional circuits still remain to be implemented.

2.4.9 The level of level of implementation of area control service in upper airspaces is relatively good, reflecting the recent advances in VHF coverage.

2.4.10 There has been a rather high degree of implementation of 10-minute longitudinal separation.

2.4.11 Following discussions, the meeting agreed that the *Status of implementation of the AFI CNS/ATM Plan* at **Appendix A** to this paper be circulated to States prior to its presentation to APIRG/14. The following draft decision was adopted:

Draft Decision 4/4: Status of implementation of the CNS/ATM Plan

That the document on the status of implementation of the AFI CNS/ATM Plan (Appendix F to Doc 003) be circulated to States and organizations for their inputs.

2.5 Review and update if required of the Surveillance Plan for the AFI Region

2.5.1 Under this agenda item, the meeting reviewed the results of the study assigned to ASECNA and IATA on the criteria to be used for the categorization of TMAs and aerodromes. The meeting also considered a paper on ADS-B.

2.5.2 The meeting reviewed and discussed extensively the proposed criteria. It was agreed to define three categories for TMAs and aerodromes respectively. The surveillance facilities to be associated with TMAs and aerodromes were defined as follows:

a) TMAs and aerodromes of Category 1 would require a secondary surveillance radar;
b) TMAs and aerodromes of Category 2 would require an automatic dependent surveillance mean; and
c) TMAs and aerodromes of Category 3 would not require any surveillance mean.

2.5.3 The meeting agreed on the criteria for the categorization of TMAs and aerodromes as shown in **Appendix B** to this paper, and requested that States, which have not done so, to provide the data on their TMAs and aerodromes, so that this task can be finalized at the CNS/ATM/IC/SG/5. The following draft decision was adopted:

Draft Decision 4/5: Categorization of TMAs and aerodromes

That:

a) ASECNA and IATA finalize the study on the categorization of TMAs and aerodromes using agreed principles and criteria shown in Appendix B to this paper; and

b) In this respect, States which have not done so, provide the Regional Offices with required statistical data on air traffic and their airspace structure and delineation (cf. APIRG Conc. 13/77).

Note: The study on the categorization of TMAs and aerodromes will be reviewed by the next CNS/ATM/IC Sub-group meeting.

Automatic Dependent Surveillance Broadcast (ADS-B)

2.5.4 The meeting was provided with information on Automatic Dependent Surveillance Broadcast (ADS-B), which has fast developed into a promising cost-effective and operationally beneficial surveillance technology. ADS-B is a surveillance technology for ATC. It also supports the provision of additional information direct to the pilot such as Cockpit Display of Traffic Information (CDTI). Thus it enhances situation awareness for both ATC controller and pilots.

2.5.5 The meeting agreed to take into account of the development of ADS-B in its future work programme.

2.6 **Briefing on CNS/ATM trials in the AFI Region and other regions**

2.6.1 Under this agenda item, the Meeting was briefed on the implementation of RNAV (GNSS) approach and landing procedures in South Africa, on the trials of APV 1 approaches at Dakar by ASECNA, on the implementation of B-RNAV in Tunisia, and reviewed the report of AFI GNSS Study group on its activities.

Report of the AFI GNSS Study Group

2.6.2 The Sub-group reviewed the report of the Study Group on the implementation of the GNSS test bed in the AFI Region, and of the GNSS strategy.

2.6.3 The meeting was informed that two options had been considered for the implementation of the GNSS test bed:

Option 1: Direct contributions from the European Space Agency (ESA) and AFI States

ESA would make available a number of RIMS and AFI States would make contributions in kind (installation, communications costs, transport).

Option 2: Contribution from ACP - EC Cotonou Agreement

A project document would be presented through the Regional Authorizing Officers representing ECOWAS, CEMAC, COMESA and SADC for funding through contributions of the Africa/Caribbean/Pacific - European Commission Cotonou Agreement. In this case, the project should not be limited to the test bed only, but should aim also at the pre-operational system.

2.6.4 The Study Group first pursued Option 2 and prepared a project document. In accordance with APIRG Conclusion 12/48, ASECNA, on behalf of the AFI Region, submitted the project document to the Regional Authorizing Officers of ECOWAS, CEMAC, COMESA and SADC in April 2002. The submitted project document is shown at **Appendix C** to this paper.

2.6.5 The meeting was informed that, in view of the administrative delays in processing the project document, the fourteenth meeting of the Study Group pursued Option 1 above. Thus, the European Space Agency has made available to the AFI test bed programme four RIMS. Three areas have been defined to evaluate the performance of the EGNOS signals:

Area A (Central Africa), with RIMS installed at Bangui, Brazzaville, Lome and Ndjamena;

Area B (Southern Africa), with RIMS installed at Cape Town, Durban, Harare and Windhoek; and

Area C (Eastern Africa), with RIMS installed at Addis Ababa, Bangui, Brazzaville and Nairobi.

2.6.6 The schedule of the tests is in Area A is from April to May 2003. The preliminary planning target date for the start of installation of the RIMS in Area B was estimated to be mid August 2003, and the tests to be conducted in the period October/November 2003. It was estimated that the trials in Area C would take place during

the first quarter 2004.

2.6.7 Following discussions, the meeting encouraged States to participate in the test bed programme, and agreed to the membership in the GNSS Study Group of Cameroon, Nigeria and Tunisia. It adopted the following Draft Conclusions and Draft Decisions:

Draft Conclusion 4/6: States support for the funding of the GNSS implementation

That States request their regional organizations (CEMAC, COMESA, ECOWAS, SADC) to support the funding request submitted to European Union (EU) for the GNSS implementation in the AFI Region.

Draft Decision 4/7: Amendment to the GNSS Funding Project Document submitted to EU

That the GNSS Funding Project Document submitted to European Union be amended (before APIRG/14) to include user segment for aviation and other transport modes.

Draft Conclusion 4/8: Support for the GNSS Test Bed

That States provide full support of the activities related to the implementation of the GNSS Test Bed in the AFI Region.

Draft Conclusion 4/9: GNSS Test Bed in Area A (Central Africa)

That, as a matter of urgency, Nigeria and ASECNA make necessary arrangements for the conduct of approach with vertical guidance (APV-I) flight trials at suitable airports within Nigeria.

Draft Conclusion 4/10: Communications in GNSS Test Bed Area B (Southern Africa)

That South Africa (ATNS) study the most cost-effective communications set-up for Area B and provide the results to Namibia and Zimbabwe.

Implementation of the AFI GNSS strategy

2.6.8 The meeting then considered the implementation of the AFI GNSS strategy. A proposal was made to request APIRG to proceed to an operational SBAS system in the AFI Region. After extensive discussions, the meeting agreed to formulate the following Draft Conclusion:

Draft Conclusion 4/13: Implementation of a GNSS SBAS operational system

That a GNSS SBAS operational system be implemented in the AFI Region as an extension of the EGNOS, starting with the deployment of a pre-operational system.

2.6.9 The meeting reviewed and approved a proposal from the GNSS Study Group to amend Table CNS-3 of the AFI FASID. The following draft conclusion was adopted:

Draft Conclusion 4/14: Inclusion of GNSS planning elements in the AFI FASID

That the AFI FASID Table CNS-3 be amended to include GNSS planning elements as per Appendix D to this paper.

2.6.10 The Sub-group was informed of the outcome of the thirteenth meeting of Obstacles Clearance Panel (OCP/13) regarding the development of PANS-OPS provisions for operations based on GNSS. The meeting adopted the following draft conclusions:

Draft Conclusion 4/15: Assistance with GNSS procedures design

That ICAO contact the following organizations: Eurocontrol , FAA, French DGAC, ASECNA, ATNS, Dutch RLD in order:

a) they continue their support and organize seminars /Workshops on the PANS-OPS provisions for GNSS - based operations; and
b) provide assistance to States in GNSS-based approach procedures design.

Draft Conclusion 4/16: GNSS Legislation

That States in the AFI Region be reminded of the need to review their national regulations so as to include provisions relating to aircraft and operators approval/certification as well as operating procedures for GNSS en-route and non –precision approach (NPA) operations.

2.7 Review and update of the AFI CNS/ATM Implementation Plan, Doc 003

2.7.1 Under this agenda item, the meeting reviewed a proposal from the Secretariat amending the AFI CNS/ATM Implementation Plan (Doc 003). In doing so, the Sub-group agreed to reduce the number of areas of routing in the plan from ten to six. The routing areas are:

Routing areas	Description
AR1	Europe - South Atlantic (EUR/SAT) oceanic routes
AR2	Atlantic Ocean interface between AFI, NAT and SAM
AR3	Europe - Eastern Africa routes including the area of the Indian Ocean (EUR/AFI East)
AR4	Europe - Southern Africa routes (EUR/AFI South) including Continental Southern Africa routes
AR5	Continental Western Africa routes including coastal areas
AR6	Trans-Indian Ocean area interface with ASIA/PAC Region

2.7.2 The meeting agreed to three Implementation Coordination Groups as follows:

a) SAT Group: AR1and AR2
b) Continental AFI ICG: AR3, AR4 and AR5
c) Indian Ocean ICG: AR6

2.7.3 The meeting further agreed that the existing AFI/EUR Interface meetings should continue and provide the Sub-group with their inputs.

2.7.4 The meeting discussed and agreed to amend Doc 003 as shown in **Appendix E** to this paper. The meeting also agreed that the timelines at Appendix F of Doc 003 should be published separately as Volume II of Doc 003 and be titled *Status of implementation of the AFI CNS/ATM Plan*. The following draft conclusion was adopted:

Draft Conclusion 4/17: Update of the AFI CNS/ATM Implementation Plan (Doc 003)

That:

a) the AFI CNS/ATM Implementation Plan (Doc 003) be amended as per Appendix E to this paper; and

b) Appendix F of Doc 003 be published separately as Volume II of Doc 003 - *Status of implementation of the AFI CNS/ATM Plan*.

RVSM Implementation Planning

2.7.5 The meeting expressed its concern at the slow pace of work towards the implementation of RVSM in the AFI Region. The following draft conclusion was adopted:

Draft Conclusion 4/18: RVSM implementation planning

That:

a) as a matter of urgency, ICAO circulate the AIC and relevant information about RVSM planning and implementation to States; and

b) **the RVSM Task Force expedite its work for the timely implementation of RVSM in the AFI Region.**

2.8 **Future work programme**

2.8.1 The Meeting reviewed its future work programme and adopted the following draft decision.

Draft Decision 4/19: Terms of Reference and Future Work Programme of the CNS/ATM/IC Sub-Group

That the terms of reference and future work programme of the CNS/ATM Implementation Coordination Sub-group be as shown in Appendix F to this paper.

3. **Action by the APIRG**

3.1 The APIRG is invited to:

a) Note the report of the CNS/ATM/IC/SG/4 Meeting;

b) Note that the Secretariat has initiated follow up action on Draft Conclusions 4/1, 4/9, 4/10, 4/15 and on Draft Decision 4/4;

c) Review and adopt Draft Conclusions 4/1, 4/2, 4/6, 4/8, 4/9, 4/10, 4/13, 4/14, 4/15, 4/16, 4/17, and Draft Decisions 4/3, 4/5, 4/18 and 4/19.

Status of Implementation of the AFI CNS/ATM Plan

Explanations

1. **Attachement I: AFI CNS/ATM Objectives Implementation - Summary**

This appendix shows in summary form the percentage implementation of each objective in the plan for every area of routing. The percentage is calculated by the ratio of States that have actually implemented over the total number of States comprising the area of routing.

2. **Attachment II: Status of implementation by States**

2.1 The target year is indicated by a black band.

2.2 When an objective is implemented, it is shown on screen as a blue band or in print as:

2.3 When an objective is not implemented, the row is left blank.

2.4 When a State had indicated that it plans to implement an objective at a certain date, this is shown in bracket after the State name:

Eg. Chad (2003).

2.5 For WGS-84, when a State has implemented only aerodrome coordinates, this is shown on screen in tan or in print as:

2.6 When a target year has not yet been selected this is indicated by (TBD) (i.e. to be determined). The rows are left blank.

APPENDIX A

Attachment I
Status of Implementation of the AFI CNS/ATM Plan

Summary

Target Year	Objective	Percentage implementation – March 2003									
		AR1	AR2	AR3	AR4	AR5	AR6	AR7	AR8	AR9	AR10
	Number of AFI States	4	4	17	16	13	2	5	11	11	6
1999	Uniform application of 10 minutes longitudinal separation in the upper airspace	100	NA	82	81	100	100	80	90	90	83
1999	Provision of area control service in upper airspaces	100	0	82	75	100	100	80	90	72	83
1999	Pursue the implementation of fixed RNAV routes contained in the AFI ANP*	100	NA	66	70	NA	100	80	33	85	NA
1999	Implementation of WGS-84	100	50	76	62	72	100	60	63	72	83
1999	Data exchange between Flight Data Processing Systems in selected Air Traffic Control Centres	0	0	0	0	0	0	0	0	0	0
1999	Progressive introduction of Controller pilot data link communications (CPDLC) with full capacity in 2005	25	25	17	6	0	50	20	9	0	50
1999	Complete implementation of all AFTN circuits	75	50	64	62	76	100	80	82	63	83
1999	Complete implementation of all ATS/DS circuits	75	25	23	25	38	100	40	54	9	83
1999	Extension of VHF coverage at all operationally significant altitudes	100	25	88	81	92	100	60	72	90	100
1999	Progressive provision of SSR in selected airspaces*	NA	NA	66	33	66	100	80	50	0	NA
2000	Progressive reduction of lateral separation minima in selected airspaces from 100 NM to 50 NM (in RNP 10 environment)) as dictated by operational requirements	100	NA	NA	NA	NA	NA	0	0	0	0
TBD	Progressive reduction of lateral separation minima in selected airspaces from 50 NM eventually to 30 or 25 NM (in RNP 5 environment) as dictated by operational requirements						NA				
2000	Progressive introduction of Automatic Dependent Surveillance Service with full ground capability by 2005	25	25	11	6	0	50	20	9	0	80

* Requirement does not apply to all States in AR

APPENDIX A

Target Year	Objective	Percentage implementation – March 2003									
		AR1	AR2	AR3	AR4	AR5	AR6	AR7	AR8	AR9	AR10
	Number of AFI States	4	4	17	16	13	2	5	11	11	6
2000	Continuation of introduction of Random RNAV routes in oceanic airspaces	0	NA	NA	NA	NA	NA	NA	NA	NA	100
2000	Progressive introduction of random RNAV routes above FL 350 in continental airspaces	NA	NA	NA	NA	NA	NA	NA	NA	0	NA
2000	Progressive introduction of GNSS-based procedures;	75	75	41	56	30	50	20	100	54	66
2000	Progressive introduction of RNP 5 in selected upper airspaces	NA	NA	0	6	0	50	40	9	0	NA
2001	Progressive introduction of Longitudinal RNAV/RNP separation minima of 10 minutes and / or 80NM RNAV derived distance in selected airspaces	0	0	0	0	0	NA	NA	0	0	16
2001	Progressive introduction of AIDC with completion by 2005	0	0	0	0	0	0	0	0	0	0
2002	Progressive Implementation of 1000 ft Vertical Separation Minima (RVSM) between FL290 and FL410 in selected airspaces	100	NA	NA	NA	NA	100	40	NA	NA	NA

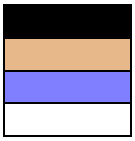
NA: not applicable
TBD: to be determined

APPENDIX A

Attachment II

Status of implementation by States

Legend:



Target year
WGS-84 aerodromes coordinates only implemented
Implemented
Not implemented

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-1	AFI Region	10 min longitudinal separation using Mach Number technique																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		
AR-1	AFI Region	50NM lateral separation																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		
AR-1	AFI Region	30NM lateral separation (TBD)																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-1	AFI Region	Distance-based separation 80NM																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		
AR-1	AFI Region	RVSM																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-1	AFI Region	Extension of VHF coverage																	
	Brasil[1]																		
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		
AR-1	AFI Region	DCPC (data)																	
	Brasil[1]																		
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		
AR-1	AFI Region	Gradual introduction of BOP between AFTN main centres																	
	Brasil[1]																		
	Morocco																		
	Senegal																		
	Spain																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-1	AFI Region	RNP 10																	
	Cape Verde																		
	Senegal																		
AR-1	AFI Region	WGS-84																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-1	AFI Region	GNSS en-route																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		
AR-1	AFI Region	GNSS TMA/NPA																	
	Cape Verde																		
	Morocco																		
	Senegal																		
	Spain																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-1	AFI Region	ADS in RNP airspace																	
	Brasil[1]																		
	Cape Verde (2004)																		
	Morocco																		
	Senegal (2004)																		
	Spain																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-2	AFI Region	10 min longitudinal separation (TBD)																	
	Angola																		
	Ghana																		
	Senegal																		
	South Africa																		
AR-2	AFI Region	Random routing																	
	Angola																		
	Ghana																		
	Senegal																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-2	AFI Region	Extension of VHF coverage																	
	Angola																		
	Ghana																		
	Senegal																		
	South Africa																		
AR-2	AFI Region	DCPC (data)																	
	Angola																		
	Argentina[1]																		
	Brasil[1]																		
	Ghana																		
	Senegal (2004)																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-2	AFI Region	Gradual introduction of BOP between AFTN main centres																	
	Argentina[1]																		
	Brasil[1]																		
	Senegal																		
	South Africa																		
AR-2	AFI Region	AFTN																	
	Angola																		
	Argentina[1]																		
	South Africa																		
AR-2	AFI Region	ATS/DS																	
	Argentina[1]																		
	Brasil[1]																		
	Angola																		
	Ghana																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-2	AFI Region	RNP10																	
	Angola																		
	Ghana																		
	Senegal																		
	South Africa																		
AR-2	AFI Region	WGS-84																	
	Angola	Aerodromes only																	
	Ghana																		
	Senegal																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-2	AFI Region	AIC GNSS en-route																	
	Angola																		
	Ghana																		
	Senegal																		
	South Africa																		
AR-2	AFI Region	GNSS TMA/NPA																	
	Angola																		
	Ghana																		
	Senegal																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-2	AFI Region	ADS																	
	Angola																		
	Ghana																		
	Senegal (2004)																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Fixed RNAV routes																	
	Egypt																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	10 min longitudinal separation																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan (April 2003)																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Lateral separation: progressive introduction of 30 NM / RNP 5 in upper airspace (TBD)																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Introduction of RVSM between FL 350 and FL 390 (TBD)																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt (27/11/2003 > FL 290)																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Introduction of RVSM between FL 290 and FL 410 (TBD)																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt (27/11/2003)																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Area control service																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Gradual implementation of random RNAV above FL 350 (TBD)																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	VHF coverage extension																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	DCPC (data)																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	AFTN																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	ATS/DS																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Gradual introduction of BOP between AFTN main centres																	
	Egypt																		
	Ethiopia																		
	Kenya																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Gradual Introduction of AIDC																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	RNP 10																	
	AFI Region	RNP 5																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius	RNP 10																	
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	WGS-84																	
	Burundi	Aerodromes only																	
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	GNSS en-route																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	GNSS TMA/NPA																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt (2005)																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Gradual introduction of ADS																	
	Burundi																		
	Comoros																		
	Djibouti																		
	Egypt (2004)																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Rwanda																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	SSR in selected airspaces																	
	Egypt																		
	Kenya																		
	Sudan (2003)																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																		
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-3	AFI Region	Progressive introduction of computer assisted conflict detection and resolution																	
	Egypt																		
	Eritrea																		
	Ethiopia																		
	France (Reunion)																		
	Kenya																		
	Libya																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	Somalia																		
	Sudan																		
	Tanzania																		
	Uganda																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	Fixed RNAV routes																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Libya																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	10 min longitudinal separation																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	Area control in upper airspace																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	Lateral separation: gradual introduction of 50 NM (TBD)																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	RVSM: between FL 350 and FL 390 (TBD)																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia (FL290-410)																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)

AREA OF ROUTING	REGIONS/STATES AFFECTED	SYSTEM COMPONENTS	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	VHF coverage extension																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	Data links (DCPC)																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	AFTN circuits																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	ATS/DS circuits																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	Introduction of BOPs between AFTN main centres																	
	Algeria																		
	Congo																		
	Niger																		
	South Africa																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	Gradual introduction of AIDC																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	RNP 5																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	WGS-84																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	GNSS en-route																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	GNSS TMA/NPA																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	ADS																	
	Algeria																		
	Angola																		
	Botswana																		
	Cameroon																		
	Central African Republic																		
	Chad																		
	Congo																		
	D.R. of Congo																		
	Gabon																		
	Libya																		
	Namibia																		
	Niger																		
	Nigeria																		
	South Africa																		
	Tunisia																		
	Zambia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-4	AFI Region	SSR radar in en route airspace over TMA's																	
	Angola: Luanda																		
	Chad: N'Djamena																		
	Congo: Brazzaville																		
	D.R. of Congo: Kinshasa																		
	South Africa																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	10 min longitudinal separation																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	Area control service in upper airspace																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	Lateral separation of 25 NM in RNP 5 environment (TBD)																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	RVSM between FL 350 and FL 390 (TBD)																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	Random routing above FL 350 (TBD)																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	VHF coverage																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	AFTN circuits																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	ATS/DS circuits																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	Progressive introduction of DCPC (data)																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		
AR-5	AFI Region	Gradual introduction of ATN compatible BOP between AFTN main centres																	
	Congo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	VOR/DME (TMAs)																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	RNP 5																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome & Principe																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	WGS-84																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	GNSS en-route																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	GNSS TMA/NPA																	
	Benin																		
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Equatorial Guinea																		
	Gabon																		
	Ghana																		
	Guinea																		
	Liberia																		
	Nigeria																		
	Sao Tome																		
	Sierra Leone																		
	Togo																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-5	AFI Region	SSR along Abidjan/Accra/Lagos																	
	Côte d'Ivoire																		
	Ghana																		
	Nigeria																		
AR-5	AFI Region	ADS/CPDLC Full ground capability by 2005																	
	Cameroon																		
	Congo																		
	Côte d'Ivoire																		
	Gabon																		
	Ghana																		
	Nigeria																		
	Roberts FIR																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-6	AFI Region	Fixed RNAV routes																	
	Morocco																		
	Portugal[1]																		
	Spain																		
AR-6	AFI Region	30NM longitudinal separation with radar surveillance																	
	Morocco																		
	Portugal[1]	(10NM longitudinal separation with radar surveillance)																	
	Spain	(10NM longitudinal separation with radar surveillance)																	
AR-6	AFI Region	25NM lateral separation with radar surveillance																	
	Morocco																		
	Portugal[1]	(10NM lateral separation with radar surveillance)																	
	Spain	(10NM lateral separation with radar surveillance)																	
AR-6	AFI Region	RVSM																	
	Morocco																		
	Portugal[1]																		
	Spain																		

Note: 1: Outside AFI. Indicated for coordination

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-6	AFI Region	Gradual introduction of BOP between AFTN main centres																	
	Morocco																		
	Portugal[1]																		
	Spain																		
AR-6	AFI Region	DCPC (data)																	
	Morocco																		
	Portugal[1]																		
	Spain																		

Note: 1- Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-6	AFI Region	RNP 5																	
	Morocco																		
	Portugal[1]																		
	Spain																		
AR-6	AFI Region	WGS-84																	
	Morocco																		
	Spain																		
AR-6	AFI Region	GNSS en-route																	
	Morocco																		
	Spain																		
AR-6	AFI Region	GNSS TMA/NPA																	
	Morocco																		
	Spain																		

Note: 1- Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-6	AFI Region	ADS Bpa																	
	Morocco																		
	Portugal[1]																		
	Spain																		
AR-6	AFI Region	Mode S																	
	Morocco																		
	Portugal[1]																		
	Spain																		

Note: 1- Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-7	AFI Region	10 min longitudinal separation along specific itineraries																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	Fixed RNAV routes																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	Area control in upper airspace																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-7	AFI Region	RVSM																	
	Algeria (2003)																		
	Egypt (2003)																		
	Libya																		
	Morocco																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-7	AFI Region	Extension of VHF voice																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	DCPC (data)																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	Gradual introduction of ATN between selected ACCs																	
	Algeria																		
	Egypt (2007)																		
	Libya																		
	Morocco																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-7	AFI Region	RNP 5 in selected upper airspaces																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	WGS-84																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	GNSS en-route																	
	Algeria																		
	Egypt (2005)																		
	Libya																		
	Morocco																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-7	AFI Region	GNSS TMA/NPA																	
	Algeria																		
	Egypt (2005)																		
	Libya																		
	Morocco																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-7	AFI Region	SSR in high density airspaces																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		
AR-7	AFI Region	Mode S in TMA type 1																	
	Algeria																		
	Egypt																		
	Libya																		
	Morocco																		
	Tunisia																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	10 min longitudinal separation																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	Fixed RNAV routes																	
	Angola	UM731; UM998																	
	Botswana	UM731; UM998																	
	South Africa	UM731																	

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	ATC in upper airspace																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	Lateral separation [TBD]																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	Random routing initially above FL 350 [TBD]																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	RVSM initially between FL 350 and FL 390 [TBD]																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	Full VHF coverage																	
	Angola (2004)																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	DCPC (data)																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	AFTN circuits																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	ATS/DS circuits																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	AIDC																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	Gradual introduction of BOP between AFTN main centres																	
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	VOR/DME (TMAs)																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	RNP 10																	
	AFI Region	RNP 5																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa	RNP 5																	
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																		
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	WGS-84																	
	Angola	Aerodromes only																	
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE- (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	GNSS en-route																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE- (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	GNSS TMA/NPA																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	SSR coverage (High density airspaces) Mode S in TMA Type 1																	
	Angola (Luanda)																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-8	AFI Region	ADS/CPDLC																	
	Angola																		
	Botswana																		
	Lesotho																		
	Malawi																		
	Mozambique																		
	Namibia																		
	South Africa																		
	Swaziland																		
	Tanzania																		
	Zambia																		
	Zimbabwe																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	10 min longitudinal separation																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	Fixed RNAV routes																	
	Chad																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	Area control in upper airspace																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	Lateral separation of 25 NM in RNP 5 environment																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	RVSM between FL 350 and FL 390																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	Extension of VHF coverage																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	DCPC (data)																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	AFTN																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	ATS/DS																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	Gradual introduction of BOP between AFTN main centres																	
	Niger																		
	Senegal																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	RNP 10																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	Evolution to RNP 5																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	WGS-84																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	GNSS en-route																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	GNSS TMA/NPA																	
	Burkina Faso																		
	Chad																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-9	AFI Region	ADS/CPDLC																	
	Burkina Faso																		
	Chad (2003)																		
	Eritrea																		
	Gambia																		
	Guinea Bissau																		
	Mali																		
	Mauritania																		
	Niger																		
	Nigeria																		
	Senegal																		
	Sudan																		
AR 9	AFI Region	SSR N'Djamena sector																	
	Chad (2003)																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	10 min longitudinal separation																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1: Outside AFI. Indicated for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	Random routing in selected portions of the airspace																	
	Australia[1]																		
	Madagascar																		
	Mauritius																		
	South Africa																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	Fixed RNAV routes																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	ATC in upper airspace																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	Reduction of lateral separation to 50 NM coinciding with RNP 10																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**ATM OBJECTIVE**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	RVSM along selected itineraries between FL 350 and FL 390 evolving towards FL 290/410 from 2005																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	VHF coverage																	
	Comoros																		
	France (Reunion)																		
	Madagascar																		
	Mauritius[2]																		
	Seychelles[1]																		
	South Africa[1]																		
AR-10	AFI Region	DCPC (data)																	
	Australia[3]																		
	Comoros																		
	France (Reunion)																		
	India[3]																		
	Madagascar																		
	Maldives[3]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Notes: 1: Maximum technically possible range of 250 NM attained
2: Coverage extension in progress. To be completed in 2001.
3: Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	AFTN circuits																	
	Comoros																		
	France (Reunion)																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	ATS/DS circuits																	
	Comoros																		
	France (Reunion)																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (COMMUNICATIONS COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	AIDC																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1- Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																				
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	RNP 5 (coastal and oceanic areas)																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	RNP 10 (oceanic areas)																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1- Outside AFI. Added for coordination.

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	WGS-84																	
	Comoros																		
	France (Reunion)																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	GNSS en-route																	
	Comoros																		
	France (Reunion)																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (NAVIGATION COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	GNSS TMA/NPA																	
	Comoros																		
	France (Reunion)																		
	Madagascar																		
	Mauritius																		
	Seychelles																		
	South Africa																		

AFI AIR TRAFFIC MANAGEMENT SYSTEM IMPLEMENTATION BY STATE - (SURVEILLANCE COMPONENTS)																			
AREA OF ROUTING	**REGIONS/STATES AFFECTED**	**SYSTEM COMPONENTS**	1994	95	96	97	98	99	2000	1	2	3	4	5	6	7	8	9	2010
AR-10	AFI Region	ADS																	
	Australia[1]																		
	Comoros																		
	France (Reunion)																		
	India[1]																		
	Madagascar																		
	Maldives[1]																		
	Mauritius																		
	Seychelles																		
	South Africa																		

Note: 1- Outside AFI. Added for coordination.

APPENDIX B

CRITERIA FOR THE CATEGORIZATION OF AERODROMES AND TMAs

Note: *In this document, the following definitions are used:*

- *Number of movements: annual arrival and departure traffic taking into consideration all types of traffic (general aviation, and aerial work, public transport, military ....)*

- *TMA number of movements: annual arrival and departure traffic, including transit traffic for all types of traffic*

1) Aerodromes

Only the number of movements has been retained as the criterion for aerodromes categorization. Based on this criterion:

- Category 1 will include aerodromes with a number of movements exceeding 25000
- Category 2 will include aerodromes with a number of movements between 10000 and 25000
- Category 3 will include aerodromes with less than 10000 movements.

However, traffic corresponding to peak hours should be taken into consideration for category 2 and category 3 when it is equal to 9 or more movements. Those aerodromes meeting such a level of traffic should then be classified in the immediately higher category.

2) TMAs

a) Parameters

For the categorization of TMAs, account should be taken of the weighted number of movements defined hereunder.

Thus, as was done for aerodromes, the following categorization based on the weighted number of movement (WNM):

TMA Category	WNM Value
1	WNM >25000
2	10000< WNM ≤ 25000
3	WNM ≤ 10000

b) Determination of the WNM parameter

The MNM parameter is the sum of four elements :T_0, T_1, T_2 and T_3 .

$$\mathbf{WNM = T_0+T_1+T_2+T_3}$$

- T_0 represents the number of movements in the TMA being considered
- T_1 represents the number of movements in the aerodromes with the TMA
- T_2 represents the number of conflicting movements due to the complexity of adjacent airspaces
- T_3 represents the number of conflicting movements due to restricted, dangerous and prohibited areas

c) Calculation of WNM ELEMENTS

**** Determination of To**

It is derived from statistical data available in the ATS units.

**** Determination of T_1**

T1 is the sum of statistics of movements recorded in TMAS and/or aerodromes within 80NM of the centre of the TMA.

$$T_1 = \sum_{i=1}^{n} T_i$$

n represents the number of aerodromes within 80 NM of the centre of the TMA.
Ti represents the number of movements of the i^{th} aerodrome.

**** Determination of T_2**

T2 is the number of conflicting movements due to the complexity of airspace adjacent to the TMA being considered.

$$T_2 = \sum_{j=1}^{m} (T_j - T_0)$$

$$\text{if} \quad T_j - T_0 > 0$$

m represents the number of aerodromes
T_j is the number of movements of the j^{th} aerodrome.

**** Determination of T_3**

T3 is the number of conflicting movements due to the complexity of restricted, dangerous or prohibited areas within the TMA. If V_k represents the volume of the k^{th} restricted, dangerous or prohibited area, and V_0 is the volume of the TMA being considered, then

$$T_3 = \frac{\sum_{k=1}^{p} V_k}{V_0} \bullet T_0$$

p is the number of restricted, dangerous or prohibited areas within the TMA
V_k is the volume of the k^{th} restricted, dangerous or prohibited area.

PROJECT PROFILE

1. SUMMARY

Provision of support for transport reliability and safety and contributing towards a global navigation satellite system (GNSS) are specific co-operation objectives in the transport policy strategy of the EU-ACP Partnership Agreement. EC and the African Authorities have entertained positive contacts in this sector in the recent years. Various studies have been conducted under EC financing on the feasibility of extending GNSS services to Africa.

The International Civil Aviation Organization (ICAO) has adopted a concept for a future air navigation system that would meet the needs of the civil aviation community well into the 21st century.
Within this concept, the global navigation satellite system (GNSS) is envisaged as the future navigation system. This system will replace gradually existing terrestrial facilities. The system will provide multimodal capabilities and all other modes of transports will benefit from its availability.

The Africa and Indian Ocean (AFI) Regional Implementation Plan adopted by AFI States and approved by ICAO, contains a strategy plan for the implementation of GNSS. The first phase of the strategy envisions, within the time frame 2001-2005, the implementation of a GNSS test bed as an extension of the European Geo-stationary Navigation Overlay Service (EGNOS) system and a conditional deployment of an operational system, the later being funded by the Air Navigation Services Providers (ANSP) and others sponsors or partners.

The test bed activities will be carried out in two steps,

- step 1 : deployment of a small and mobile test bed covering small regions, to validate correction algorithms; carry-out system design, and agree on institutional issues
- step 2: Following adoption of Step 1 report, deployment of an AFI pre- operational system.

The **overall objective** of the project is to implement the necessary equipment and services of an EGNOS African component and its integration with EGNOS Europe. To that end, the following actions will be undertaken:

- validate the GNSS performances; and define the architecture of the operational system,
- sensitise all the potential users and operators about the benefits to be gained from this system,
- produce all studies (including cost/benefit, system certification, system ownership, and cost-recovery mechanisms) necessary for a go-ahead decision by the AFI Region.

The **specific objective** which is an efficient transition process of the African navigation and positioning from terrestrial systems to satellite based systems is reflected in its basic components:

- Supply and installation of satellite data receiving and communication equipment,
- Training for ANSP staff to maintain and use equipment,
- User involvement: actions to widen user involvement, including user forums.

Participation: All the 47 African countries in 4 Sub-Saharan Africa (SSA) regions are expected to be involved by the project. This financing proposal covers equipment for the 4 regions.

Organisational structure: One single financing agreement shall be signed by the Regional Authorising Officers – RAO, representing ECOWAS, CEMAC, SADC and COMESA/IGAD/IOC. A Delegated Regional Authorising Officer (DRAO) will be designated for the duration of the project. The DRAO will be guided by a Steering Committee and supported by a Project Management Unit (PMU).

Project cost and Duration: The cost of the project is estimated at **€ 15,600,000** which will come from the Regional Indicative Programs of the beneficiary regions, as well as intra-ACP funds. In-Kind contributions from ANSP and states are expected. The project duration is estimated at 3 ½ years.

1. INTERVENTION

1.1 Legal base for co-operation

The legal basis for EU-ACP co-operation is found in the EU-ACP Partnership Agreement (Cotonou Agreement). Article 30 in the section of Transport co-operation strategy says that:
" *At the regional level, particular attention should be given to:*
-Provision of support for improving the reliability and safety of maritime and air transport, as well as contributing to a global navigation satellite system interoperable with the European Geostationary Navigation Overlay System.

Further, the paragraphs 65-71 give more detail on maritime transport and aviation objectives to which EGNOS can contribute.
" *Encouraging regional programme of maritime transport and trade development..."*
" The parties recognises the importance of a strong, safe and efficient air transport for economic, social development and the development of trade..."
" Emphasise the importance of ensuring safety in the air transport sector and the need to introduce and implement relevant international standards. To That end EU shall assist ACP (...) to implement air navigation safety systems, (...) develop infrastructures and human resources, taking care that any measures taken in this field are based on advice from relevant international organisations..."

1.2 Consistency with global objectives

1.2.1 EC aid policy objectives and priorities

The objective of Community development co-operation policy is to foster sustainable development designed to eradicate poverty in developing countries and to integrate them into the world economy. This can only be achieved by pursuing policies that promote consolidation of democracy, the rule of law, good governance and the respect for human rights. Community Development co-operation is to be co-ordinated with Member States policies and, as far as possible, with major international donors (such, as for instance, the World Bank,, and member organisations of the UN family, like ICAO or IMO).

1.2.2 Objectives of Regional Indicatives Programmes

Under the 9th EDF, regional co-operation with the 4 African beneficiary regions and the Indian Ocean focuses *inter alia* on:

- Strengthened regional economic integration,
- Improved regional co-operation in the field of sustainable development, including poverty alleviation, human resources development and environment protection.

Through improvement in the quality, quantity, pertinence and timeliness of basic information available at appropriate scales from local to continental, the project will contribute to the implementation of an operational system. This operational system should in return contribute to regional networking, to transport safety and security (economic integration) and cost reduction.

1.3 Sectorial analysis

The International Civil Aviation Organization (ICAO) has since its inception sought to develop and adopt improved and more reliable navigation methods for the world as a whole. The progress achieved in this regard has contributed immensely to the phenomenal growth of air transport and its related industries in the last fifty years.

The progress achieved has allowed aircraft in many parts of the world to be in continuous and clear communications with air traffic controllers on the ground as well as between ground stations and has enabled aircraft to use fairly sophisticated and accurate navigational facilities and approach aids and benefit from radar surveillance of the airspace (where available).

However the more sophisticated communications, navigation and surveillance facilities have not been available usually over oceans and sparsely populated areas and in many developing countries with limited resources and little air traffic.

The AFI Region which has large deserts and other sparsely populated areas and where countries do not have often the necessary financial, material and human sources, has made the availability and serviceability of such communications, navigation and surveillance services patchy, unreliable or totally absent in many areas.

The adoption by ICAO in recent years of the satellite technology has opened wider possibilities for civil aviation. It would allow civil aircraft the prospect of flying precisely all over Africa by receiving accurate navigational guidance. The availability of such capability would allow greater flexibility to air traffic management with the capability of choosing the most economic routes.

A major advantage of this system for the AFI Region is that it requires much fewer and less costly ground installations than is required by present conventional systems and allows for full coverage of navigational services over sparsely populated, desert and forest areas. It must be highlighted that there is no technical requirement for the implementation of EGNOS ground stations in each African country. In other words, this means that EGNOS service provision scale is at regional (i.e. sub-continental) supra-national level.

1.4 Background and justification

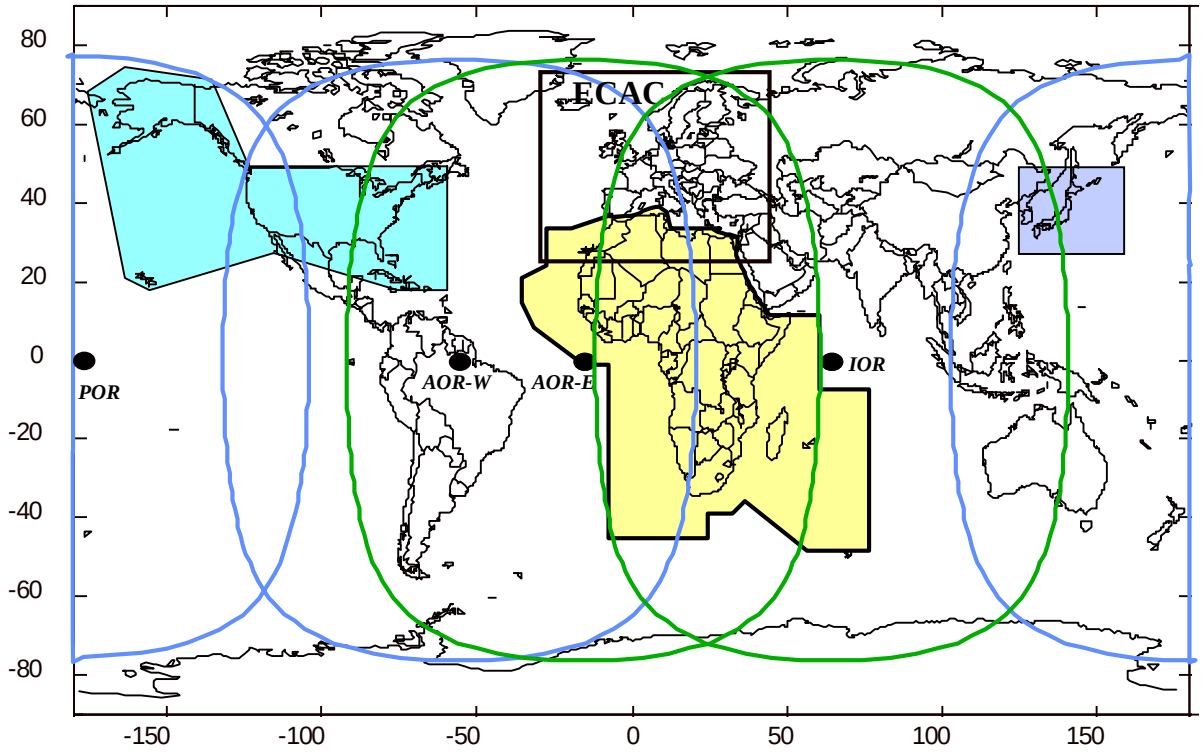
Current navigation aids: in the AFI region, aircraft navigation is currently achieved through the use of a multiplicity of terrestrial-based navigational aids (VOR, DME, NDB, ILS) and aircraft-based systems (inertial navigation). In addition many regions in AFI have large oceanic or desert areas, where no ground-based navigation aids exist or are difficult to install and maintain. Most remote airports are not equipped for economic reasons. As regards the rates of failure of conventional ground radio-navigation equipment, the situation in Africa is dramatic. Information is derived form the ICAO navigation aids database and the AFI Air navigation Plan 7474, which shows that only 70.5% are available of the ground radio-navigation equipment needed today. The missing 29.5% is constituted by a 12% of unserviceable equipment and a 17.55% which is not implemented according to plans.

Satellite Navigation systems: two constellations of satellite navigation system are already in place and operational, i.e. the United States Global Positioning System (GPS) and the Russian Federation's Global Orbiting Navigation Satellite System (GLONASS). Both are

military systems, each based on a constellation of 24 operational satellites, orbiting at 20, 000 km above the earth. Because GPS and GLONASS continue to be operated under military control of their respective countries, their unrestricted availability to civilian users is not guaranteed. GPS signals with best navigation and positioning accuracy of up to 16 meters are continuously encrypted, allowing their use only by receivers delivered to US military forces and to other approved users. Non-encrypted signals are made available to the public. However the accuracy, integrity, availability and continuity of GPS and GLONASS do not fully meet civil aviation requirements.

Satellite-based Augmentation System (SBAS): To satisfy the stringent requirements of civil aviation, augmentation for the existing systems is under development and implementation by industry and civil aviation. Three systems are currently implemented: the US Wide Area Augmentation System (WAAS), the European Geo-stationary Navigation Overlay Service (EGNOS) and the Japanese MTSAT. These systems are based on a network of ground reference stations, which receive and monitor the GPS and GLONASS signals. Data from these reference stations are transmitted to a master station where the validity of the signals from each satellite is assessed and corrections are computed. These integrity messages and corrections are broadcast over a wide area to aircraft via geostationary communication satellites (INMARSAT), which also serve as additional sources of GPS ranging signal.

The EGNOS system is already broadcasting messages over Europe with the Inmarsat Atlantic Ocean Region-East (AOR-E) and Indian Ocean Region (IOR) satellites. Because of the large footprints of these satellites covering the African continent, AFI based correction data generated by EGNOS would be accessible almost over the whole Region with a redundant coverage. Figure 1 below shows the INMARSAT geostationary satellite footprints.



Safety and economic benefits: the benefits of satellite-based navigation system were early recognised by civil aviation. The high accuracy and availability of satellite navigation will

allow optimisation of airspace use and increased traffic capacity on critical air routes. Optimisation of flight profiles and more direct routes will produce fuel savings thus enhancing the environment, and reduce flight times. Precision approach capabilities could be offered at all international airports. Furthermore, precision instrument guidance would allow better access to remote areas contributing for their development. The availability of satellite-based approach capabilities will contribute to the reduction of accidents due to controlled-flight into terrain. The transition to satellite navigation will permit the use of a single type of navigation receiver on board all aircraft compared to the current requirement for carriage of a multiplicity of receivers for different phases of flight. It will be possible to phase out ground-based equipment.

Multimodal benefits and capabilities: the applications of satellite-based navigation extend to other modes of transport. Companies operating transport services by road, sea, inland waterway or rail need to know where their vehicles are at all times. So do various other services such as police, ambulances or taxi services. Position reporting can be developed to monitor fishing vessels and follow the movement of ships carrying dangerous goods. Satellite-based navigation and positioning technology is valuable to agriculture, meteorology, land transport, surveyors, etc… This has such practical environmental and economic consequences that its use is expected to increase dramatically in the coming years.

EGNOS: The European Geostationary Navigation Overlay Service (EGNOS) is the European contribution to GNSS. EGNOS was launched in 1994 by the European Civil Aviation Conference (ECAC) and is managed by the European Tripartite Group (ETG) formed by the European Commission, European Space Agency and Eurocontrol. EGNOS aims at delivering positioning and navigation services to all categories of users (air, land and maritime). As the most stringent user needs are civil aviation requirements, EGNOS specifications aim at meeting performances required for all phases of flight from en-route up to approach and precision landing. EGNOS will be fully operational in Europe in 2004.

1.5 The AFI GNSS Strategy

Within the framework of the preparation of the 7th Air Navigation Africa and Indian Ocean Regional meeting (AFI7), held at Abuja in May 1997, a working group (GNSS WG) was created in order to propose a strategy for the introduction and implementation of satellite base navigation system in the AFI region.

This group, composed with representatives from ICAO (International Civil Aviation Organization), IATA (International Air Transport Association), ASECNA (Agency for the Safety of Air Navigation in Africa) and ATNS (South African Civil Aviation).

The working group conducted two studies, partially funded by the European Commission (DG VII) for 228,000 ECUS and 396,000 ECUS respectively. The basic navigation service to be offered will allow the aeronautical user to use satellite navigation for all phases of flight from en-route to approach with vertical guidance, with an accuracy of 20 m. An extension of EGNOS in AFI would contribute to the realisation of the objectives set out in Articles 23, 24, 30 and 42 of the ACP-EC Cotonou Agreement.

The output of these studies was the proposal of a strategy to the 11th meeting of the African Planning and Implementation Regional Group or APIRG (constituted by all the AFI states and Air Traffic services providers). APIRG adopted the strategy which was modified at the

two following APIRG meetings to take into account the latest developments in the satellite based navigation domain. The presently agreed strategy foresees a phased introduction of GNSS navigation along the following lines:

Phase I (Short term), up to 2004:

This phase will allow the use of GPS 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.

Phase I-A (up to 2003)

An AFI GNSS test bed will be implemented to validate the objectives and differential correction algorithms of the operational EGNOS system to be implemented during Phase I.

Phase I-B (up to 2004)

This phase will consist on the deployment of a network of RIM stations through the AFI Region.
To prepare for EGNOS operational implementation, numerous activities will be carried out in parallel during this phase: final system, design, specification development, costing and funding, agreement on the institutional and operational framework and programmatic issues.
This phase will end with EGNOS validation in the AFI Region.

Phase II (Medium term) 2005-2011:
*During this phase**, o**perational applications meeting a 20m vertical accuracy will be implemented everywhere in the AFI Region. This phase will allow for:*

a. *En-route phase: sufficient capability to meet en-route navigation requirements everywhere in the AFI Region; GNSS is approved as a sole-means system for en-route navigation, taking into account technical and legal developments, and institutional aspects. En-route navigation aids will be progressively withdrawn accordingly in consultation with 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 be progressively withdrawn in consultation with users during Phase II.*
d. *Approach and landing phase: sufficient capability for APV-1 in the whole AFI Region. ILS will continue to be provided at aerodromes. Where the requirement for approach and landing can be met by APV-I, the withdrawal of ILS CAT-I should be considered.*

Phase III (Long term) 2012 onwards:
It is assumed that at least two constellations of navigation satellites will be available. Sole-means navigation services 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).

1.6 Preliminary activities, the Dakar RIMS project

Through the ECUREV contract, EC has acquired one portable reference station necessary for EGNOS testing in the field.

ASECNA is willing to contribute to a test action in West Africa by offering for free the transport of this station to test sites in Africa and hosting it in Dakar, Senegal in the meantime. ASECNA will also take in charge the communication, ground testing, calibration aircraft equipment installation, flight trials and demonstration costs. DG TREN, ESA and ASECNA are preparing and arrangement for this project to be conducted during the year 2002.

1.7 Target groups, beneficiaries and stakeholders

While the participating African Air Navigation Service Providers (ANSP) are the principal direct beneficiaries, the broader community of user of precise positioning and navigation capabilities - transport, airlines, shipping industry, geographic information management...- is the target for the project.

Four regional organisations, ECOWAS, CEMAC, SADC, COMESA/IGAD/IOC will need to be assisted to meet the specific needs of the 47 ACP countries of the SSA. Regional centres with important links to the user community shall be included for support.

Other interested stakeholder includes the Republic of South Africa, for which arrangements has to be made with other donors.

1.8 Issues to be addressed

Identification of potential users/beneficiaries (policy makers; technical ministries and department, formal and informal non governmental sector, etc..) and the set-up of appropriate institutional structures to facilitate their coming together and to ensure long-term sustainability,
Identification of private sector partners with direct interest in positioning and navigation information that could be direct stakeholders in the program,
Identification of appropriate intermediary outreach organisations like national mapping agency, fishing and transportation agencies or services,
Identification of international partner/relief agencies/development donors that could support substantially and financially the AFI GNSS operational system implementation.

2. IMPLEMENTATION

2.1 Physical and non physical means

The physical project inputs comprise the supply and installation of new ground stations along with associated software and application modules, and the execution of related developmental and dissemination activities.

Non-physical inputs include the Project Management and other Technical Assistance Services, some studies (e.g. final operational architecture), the basic and complementary training, the mid-term review and final evaluation.

The project is divided in two steps, which cover the Phase I-A and the first part of Phase I-B of the AFI GNSS strategy.

Step 1: Implementation of a mobile SBAS test bed

The performance of the EGNOS extended to the AFI Region is assessed under all environmental conditions by means of a test bed consisting of five (5) mobiles reference stations linked by satellite to EGNOS centre in Europe. The mobile system will be deployed in western and central Africa, then in southern and eastern Africa for a total period of one year. The main goal of the mobile test bed is to validate the performances of the system over some critical areas.

Validation will be carried out by static tests, data collection and flight trials using dedicated calibration aircraft from organisations like ASECNA or RSA ATNS.

The outputs of this first step will contribute to define the baseline architecture and design of the AFI pre-operational SBAS system. A detailed system design and costing will end this step. This result, following its endorsement by APIRG, will be adopted by the Steering Committee before Step 2 is initiated.

Concurrently, AFI States, air navigation service providers and users will decide on institutional issues, namely ownership of the system, management, cost recovery, and multilateral agreement with European organisation and EGNOS service providers etc.

Step 2: Implementation of the AFI pre-operational SBAS system

A set of 16 operational reference stations will be deployed in the AFI Region and connected to the European Test-Bed Central Processing Facilities.

User evaluations will be carried out, mainly by flight trials using dedicated calibration aircraft from organisations like ASECNA or RSA ATNS. Multimodal evaluations will also be carried out, i.e. maritime and harbour docking, fishing boat precise tracking.

2.2 Organisation and implementation procedure

DRAO: Due to the specific nature of the project, with its continental scope and operational complexity, a sole Delegated Regional Authorising Officer (DRAO) will be designated by the Regional Authorising Officers of the four regions concerned. He will be responsible for managing the performance of the project as the only legal representative of the four regional organisations (ECOWAS, CEMAC, SADC, COMESA/IGAD/IOC).

Steering committee: A Steering Committee will be established to guide and supervise of the DRAO, and meet at least twice a year. It will, inter-alia, review and agree the work programmes submitted by the DRAO. The steering committee will consist of:

- A representative of each Regional Intergovernmental (ECOWAS, CEMAC, SADC, COMESA/IGAD/IOC).
- A representative(s) of the International Civil Aviation Organization (ICAO)
- A representative of International Air Transport Association (IATA)
- The Chairman of APIRG

- The Chairman of the AFI GNSS study Group, acting as an observer
- A representative(s) ANSP from each of the 4 sub-regions (e.g. ASECNA, RSA ATNS, East AFI.)
- A representative(s) of European Commission (EC), acting as an observer.
- A representative(s) of European Space Agency (ESA), acting as a technical adviser.

PMU: A Project Management Unit will be set up with technical assistance to support the DRAO in project implementation. It will be hosted by (TBD) and will assist with management of day-to-day project activities by providing expertise of oversight of the technical installations and facilitating the training component and user orientation activities. The PMU will be in charge of the day-to-day project management under the authority of the DRAO and the Steering Committee.

A firm of Consultants shall be recruited to provide these services, following usual EDF procedures for service contracts, i.e. selection after restricted tendering. The first activity of the PMU will be the evaluation of the tenders for the supply of envisaged equipment. The PMU shall prepare and manage Annual Work Programmes for implementation of project activities; including the Steering Committee meetings, training and user orientation elements. Usual EDF regulations for execution of Work Programme shall be followed.

The supply, installation, set-up and commissioning of the equipment and software shall be made on the basis of EDF procedures for open international tenders. Two tenders (mobile test-bed and AFI operational test bed), with the appropriate number of lots are envisaged.

Independent experts shall be commissioned, following relevant EDF procedures for service contracts, for the execution of the mobile test bed (phase 1/A) review, the pre-operational system validation review (phase 1/B) and the Final Evaluation of the project. The Final Evaluation document should be used for the APIRG/15 meeting to allow the start of implementation of the operational system (second part of the phase 1/B).

An important joint function of the Steering Committee, the DRAO and PMU and beneficiaries will be to network with pertinent projects of member states and other donors. An active web site maintained by the PMU will assist this process of communication.

2.3 Appropriate technology

The project will use technology that can be managed and maintained by the ANSP themselves, with limited assistance from technicians available in the African countries and ESA. Equipment will be of robust design and thoroughly tested to ensure sustained operation on the African continent. Standard commercially sustained software packages will be supplied where appropriate.

2.4 Timetable cost and financing plan

It is envisaged that the project will be implemented over a 3 1/2 years period. The start up event shall be the launching of the technical assistance tender.

The project cost is estimated at **€ 15,6 millions**, to be funded from the 9th EDF all-ACP resources and from RIP of the 4 beneficiary regions, broken down as follows:

Step 1: mobile SBAS test bed

- Supply, transport, installation and commissioning of equipment and software	2,150,000
- Basic Training, logistic	240,000
- User involvement activities	140,000
- Supporting measures (PMU, Steering Committee)	340,000
- Review, Evaluation	200,000
- Contingencies	280,000
- Studies (including final system design and costing)	1,200,000
- **TOTAL**	**€ 4,550,000**

Step 2: AFI pre-operational SBAS implementation

- Supply, transport, installation and commissioning of equipment and software	6,400,000
- Basic and complementary Training	740,000
- User involvement activities	310,000
- Supporting measures (PMU, Steering Committee)	1,600,000
- Review, Evaluation	300,000
- Contingencies	900,000
- Complementary Studies	800,000
- **TOTAL**	**€ 11,050,000**

Initiation of Step 2 will be dependent on the prior approval of the system design and cost by the Steering Committee. Institutional arrangements including system management and supervision, and cost-recovery will also be adopted in advance.

2.5 Special conditions and accompanying measures to be taken by governments

As a condition for project submission, the beneficiary countries should, through their respective regional organisations, mandate the (TBD) as DRAO. They will subsequently have to appoint their representatives on the Steering Committee and facilitate their effective involvement in its activities.

The (TBD) who accepts the responsibilities of the DRAO for the project will agree to host the PMU, with provision of office space, communication facilities and technical support.

The National Authorising Officers in the few eligible countries, which do not belong to any of the 4 regional groupings, will have to notify the Director General for Development of their desire to participate in the project and have delegated one of the 4 regional organisations to sign the Financing Agreement and act on their behalf on the Steering Committee.

As condition for the project implementation, all participating countries shall ensure that appropriate facilities, as required for the proper housing, and functioning of the new equipment shall be provided. In addition, they shall also ensure that adequate funding and staffing of the ANSP shall be achieved and maintained. Provision of the equipment will be without further specific condition, but in the consideration of the needs of the weaker beneficiaries, the PMU will assist in institutional building, supported by regional network and user orientation activities.

Organisations like ASECNA will sign Memorandum of Understanding with the relevant regional organisations committing themselves to ensure the maintenance of the new equipment on behalf of their Member States.

The PMU will apply guidelines and recommendations as developed by ICAO to ensure that applicants applying for training have predefined objectives for the trainers to work towards, and that both the students and their ANSP want the specific training on offer.

3. MONITORING AND EVALUATION

3.1 Monitoring arrangements and follow-up

Responsibility for reports monitoring progress and assessing impact of the project will lie with the PMU, which will be assisted by all the participants in a self-help network including the beneficiaries, the DRAO and the Steering Committee. A set of key objectively Verifiable Indicators for the project will be provided after its launch.

3.2 Review, Evaluation, audits

Mid term reviews for each step of the project are scheduled after the equipment installation is complete. Independent consultants according to the rules of the service contracts will undertake this. An additional evaluation of the effectiveness and impact of the overall project components will be taken towards the end of the project.

ANNEX 1 : AVAILABLE DOCUMENTATION

1. ICAO’s AFI CNS/ATM Implementation Plan 1995-2005 (AFI DOC.OO3).
2. ICAO APIRG/13 REPORT
3. "Phase 1 of the Study for the Introduction and Implementation of GNSS in the African and Indian Ocean Region ", partly funded by EC, performed by ICAO, ASECNA, ATNS and IATA prepared for APIRG 11 (April 1997).
4. "Phase 2 of the Study for the Introduction and Implementation of GNSS in the African and Indian Ocean Region ", partly funded by EC, performed by ICAO, ASECNA, ATNS and IATA prepared for APIRG 12 (June 1999).
5. "EGNOS Multimodal costs and benefits, a study of aviation case in Africa, issue 0.2" performed by Eurocontrol and IATA (October 2000)
6. "AFI EGNOS test bed expansion, Technical notes TN1 through TN5, EC/ESA/AFI GNSS Working Group, May 2001, amended February 2002.

ANNEX 2: ACRONYMS

ACP	Africa, Caribbean and Pacific States belonging to the Cotonou Convention
APV	Approach with vertical guidance
ANSP	Air Navigation Service Providers
ASECNA	Agence pour la Sécurité de la navigation Aérienne en Afrique et à Madagascar
CEMAC	Communauté Economique et Monétaire de l'Afrique Centrale
DME	Distance Measuring Equipment
DRAO	Delegated Regional Authorising Officer
ECAC	European Civil Aviation Conference
ECOWAS	Economic Community of West African States
EDF	European Development Fund
EGNOS	European Geostationary Navigation Overlay System
GBAS	Ground Based Augmentation System
IGAD	Inter-Governmental Authority on Development in Eastern Africa
ILS	Instrument Landing System
IMF	International Monetary Fund
IOC	Indian Ocean Commission
GLONASS	Global Orbiting Navigation Satellite System
GPS	Global Positioning System
OVI	Objectively Verifiable Indicator(s)
PMU	Project Management Unit
RAO	Regional Authorising Officer
SADC	Southern African Development Commission
SBAS	Satellite Based Augmentation System
SSA	Sub Saharan Africa
VOR	VHF Omni Directional Radio (Beacon)

APPENDIX D

TABLE CNS 3 - RADIONAVIGATION AIDS
Phases I and II of the AFI GNSS Strategy
EXPLANATION OF THE TABLE

Column

1 Name of the country, city and aerodrome and, for en-route and terminal area aids, the location of the facility.

2 Type of runway:

NINST	-	non-instrument
NPA	-	non-precision approach runway
PA1	-	precision approach runway, Category I
PA2	-	precision approach runway, Category II

3 The function served by the aids shown in columns 4 to 8:

A/L	-	approach and landing
E	-	en-route
T	-	terminal

4 ILS - Instrument landing system. The designation number of the runway to be served by an ILS is indicated together with a Roman numeral I or II to indicate a facility performance Category I or II ILS, respectively.

*Note: - The symbol *" indicates that the ILS requires a Category II signal quality but without the reliability and availability provided by redundant equipment and automatic changeover.*

5 Locator, either associated with an ILS or for use as an approach aid to an aerodrome.

6 Distance measuring equipment. Aligned with the ILS shown in column 4 when the DME is required to serve as a substitute for a marker beacon component of ILS. When aligned with the VOR in column 7, indicates a requirement for the DME to be collocated with the VOR.

7 Recommended VOR.

8 NDB.

Note I:- New requirements for NDB are discouraged. En-route navigation requirements are to be met by VOR/DME facilities.

Note II:- A plus sign (+) indicates that the NDB should be withdrawn when the recommended VOR or VOR/DME is implemented.

Note III:- The LF/MF NDB annoted with the symbol #" are, with few exceptions, existing national facilities which are not protected from interference to the extent required by the international planning provisions of Annex 10.

9 The distance and altitude to which signal protection of the VOR or VOR/DME is required, indicated in nautical miles (NM) and in hundreds of feet, or recommended rated coverage of NDB expressed in nautical miles.

Note: - Rated coverage is defined as the area surrounding an NDB within which the strength of the vertical field of the ground wave exceeds the minimum value specified for geographical area in which the radio beacon is located.

10 to 13 GNSS - global navigation satellite system (including GBAS and SBAS).

GBAS (ground-based augmentation system) implementation planned to be used in precision approach and landing CAT-I, CAT-II, CAT-III.

Note: CAT-I by GBAS or SBAS will be available at those locations where analysis of historical MET data or traffic characteristics justifies the requirement.

SBAS (satellite-based augmentation system) planned to be used for route navigation, for terminal, for non precision approach and landing. An "X" indicates service availability; exact location of ground reference installation will be determined.

NPA:	requirement of GNSS-based NPA procedures
APV-1:	requirement for APV-1 procedures
RIMS:	requirement for a ground-based reference station RIMS

12 Remarks

TABLEAU CNS 3 - AIDES DE RADIONAVIGATION

EXPLICATION DU TABLEAU

Colonne

1 Nom du pays, de la ville et de l'aérodrome et, dans le cas des aides de route et de région terminale, emplacement de l'installation.

2 Type de piste:

NINST	-	piste à vue
NPA	-	piste avec approche de non-précision
PA1	-	piste avec approche de précision, catégorie I
PA2	-	piste avec approche de précision, catégorie II

3 Fonction des aides indiquées dans les colonnes 4 à 8:

A/L	-	aide d'approche et d'atterrisage
E	-	aide de route
T	-	aide terminale

4 ILS - Système d'atterrisage aux instruments. Le numéro d'identification de la piste qui doit être desservie par un ILS est indiqué et accompagné du chiffre romain I ou II pour indiquer une installation ILS de catégorie de performance I ou II, respectivement.

Note: - Le symbole « » indique que l ILS doit émettre des signaux d assez bonne qualité pour la catégorie II, sans la fiabilité et la disponibilité procurées par un équipement redondant et le passage automatique sur équipement de secours.*

5 Radiobalise associée à un ILS ou utilisée comme aide d'approche sur un aérodrome.

6 Équipement de mesure de distance. En regard de l'ILS de la colonne 4: le DME doit être utilisé à place d'une radioborne faisant partie de l'ILS. En regard du VOR de la colonne 7: le DME doit être coïmplanté avec le VOR.

7 VOR recommandé.

8 NDB recommandé.

Note I:- Le signe plus (+) indique que le NDB devra être mis hors de service lorsque l'installation VOR ou VOR/DME aura été mis en oeuvre.

Note II:- Presque tous les NDB LF/MF identifiés par le symbol «# » sont des aides nationales existantes non protégées contre le brouillage autant que l exigent les dispositions de l Annexe 10 relatives à la planification internationale.

9 La distance et l'altitude jusqu'auxquelles les signaux du VOR ou du VOR/DME doivent être protégés sont respectivement indiquées en milles marins (NM) et en centaines de pieds, et la couverture nominale recommandée pour le radiophare non directionnel NDB est donnée en miles marins.

Note: - Par définition, la couverture nominale est la zone entourant le NDB dans laquelle le champ vertical de l'onde de sol dépasse la valeur minimale spécifiée pour la région où se trouve ce radiophare.

10 à 13 GNSS Système mondial de navigation par satellite (comprend le GBAS et le SBAS).

Implantation du GBAS (système de renforcement par stations au sol) destiné à être utilisé pour les approches de précision et les atterrissages CAT I, CAT II, CAT III.

Note: Le GBAS ou SBAS de CAT-I sera disponible aux emplacements où l anlyse des données MET historiques ou bien les caractéristiques de trafic en justifient le besoin.

Implantation du SBAS (système de renforcement par satellite) destiné à la navigation en route, pour la navigation en région terminale et pour les approches et atterrissages conventionnels. Un X » indique que le service est assuré; l emplacement exact de la station de référence au sol sera déterminé ultérieurement.

NPA:	besoin pour des procedures NPA fondées sur le GNSS
APV-1:	besoin pour des procedures APV-1
RIMS:	besoin pour une station de référence au sol RIMS

12 Observations

- - - - - -

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ALGERIA													
ADRAR/Taouat	04 NPA 22 NINST	A/L		X	X	X	X	200/250		X X	X X		
ALGER/Houari Boumediene		E			X	X		200/500					
	05 NPA	A/L		X	X	X				X	X		
	23 PA2	A/L	23-II	X	X	X				X	X		
	09 PA1	A/L	09-II*	X						X	X		
	27 NPA	A/L								X	X		
ANNABA/EL Mellah		E			X	X	X	200/250					
	01 NPA	A/L		X	X	X	X			X	X		
	19 PA1	A/L	19-II	X	X	X				X	X		
	05 NPA	A/L								X	X		
	23 NINST	A/L								X	X		
BEJAIA/Bejaia		E					X						
	08 NPA	A/L								X	X		
	26 NPA	A/L								X	X		
BENI ABBES		E					X	200/500					
BENI AMRANE		E					X	200/170					
BORDJ MOKHTAR		E				X		100					
BORDJ OMAR DRISS		E			X	X	X	200/500					
BOU-SAADA		E			X	X		200/500					
CHERCHELL		E			X	X	X	100					
CONSTANTINE/Mouhamed Boudiaf		E			X	X	X	200/500					
	14 NPA	A/L			X	X	X			X	X		
	32 PA1	A/L	32-II*		X	X	X			X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	16 NPA 34 PA1	A/L A/L	 34-II*		X X	X X				X X	X X		
DELLYS		E					X	50					
DJANET		E E			X	X	 X+#	200/500 100					
EL BAYADH		E				X	 X	150/100 100					
EL GOLEA		E E			X	X	 X+	200/500 100					
EL OUED		E			X	X	X	200/400					
GHARDAIA/Noumérate	 12 NPA 30 PA1	E A/L A/L	 30-I		X X X	X X X	X X X	200/500		 X X	X X		
HASSI-MESSAOUD/Oued Irara	 01 PA1 19 NPA	E E A/L A/L	 01-I		X X X	X X X	 X+#	200/500 50		 X X	 X X		
ILLIZI		E				X		200/500					
IN GUEZZAM		E				X	 X	200/170 100					
IN SALAH/In Salah	 05 NPA 23 NPA	E E A/L A/L	 	 X X	X X X	X X X	 X	200/400 100		 X X	 X X		
JIJEL/Ferhat Abbas		E			X	X	 X	200/500 50					
MECHERIA		E					X	50					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
MOSTAGANEM		E			X	X		200/500					
ORAN/Es Sénia		E			X	X		200/400					
	07 NPA	A/L		X	X	X				X	X		
	25 PA2	A/L	25-II	X	X	X				X	X		
REGGAN		E					X	80					
TAMANRASSET/Aguennar		E			X	X		200/500					
	02 NPA	A/L		X	X	X				X	X		
	20 NPA	A/L		X	X	X				X	X		
	08 PA1	A/L	08-II*	X						X	X		
	26 NPA	A/L		X						X	X		
TEBESSA/Tébessa		E			X	X		200/500					
	11 NPA	A/L		X	X	X				X	X		
	29 NPA	A/L								X	X		
TIARET		E			X	X		200/500					.
TIMIMOUN		E			X	X	X	200/400					
TINDOUF		E			X	X		200/400					
							X	125					
TLEMCEN/Zénata	07 NPA	A/L			X	X	X	20/500					
	25 NPA						X	180					
TOUGGOURT		E			X	X		200/500					
							X	50					
ZARZAITINE/In-Amenas		E			X	X		200/400					
	05 NPA	A/L			X	X	X	~~200/400~~		X	X		
	23 NPA	A/L								X	X		
							X	135					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ZEMMOURI		E			X	X	X	200/500 135					
ANGOLA													
CUITO CUANAVALE		E			X	X		200/500					
HUAMBO/Albano Machado	11 NPA 29 NPA	A/L			X	X		200/500		X X	X X		
KUITO		E			X	X		200/500					
LUANDA/4 de Fevereiro		E			X	X		200/500					
	05 NPA	A/L		X	X	X				X	X		
	23 PA1	A/L	23-II*	X	X	X				X	X		
LUENA		E			X	X		200/500					
SAURIMO		E			X	X		200/500					
		E					X+#	50					
BENIN													
COTONOU/Cadjehoun		E			X	X		200/500					
	06 NPA	A/L		X	X	X				X	X		
	24 PA1	A/L	24-II*	X	X	X				X	X		
BOTSWANA													
FRANCISTOWN		E		X	X	X		200/500					
	11 NINST	A/L								X	X		
	29 NINST									X	X		
GABORONE/Sir Seretse Khama Intl		E			X	X		200/500					
	08 PA1	A/L	08-I							X	X		
	26 NPA	A/L			X	X				X	X		
KASANE/Kasane	08 NPA	A/L			X	X		200/500		X	X		
	26 NINST									X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
MAUN/Maun		E			X	X		200/500		X	X		
	08 NINST	A/L				X				X	X		
	26 NINST												
KANG		E				X		200/500					
SELEBI-PHIKWE/Selebi Phikwe	12 NINST	A/L					X						
	30 NINST									X	X		
										X	X		
BURKINA FASO													
BOBO-DIOULASSO/Bobo-Dioulasso		E			X	X		200/500					
	06 PA1	A/L	06-I	X	X	X				X	X		
	24 NPA	A/L		X	X	X				X	X		
OUAGADOUGOU/Ouagadougou		E			X	X		200/500					
	04L PA1	A/L	04L-II*	X	X	X				X	X		
	22R NPA	A/L		X	X	X				X	X		
BURUNDI													
BUJUMBURA/Bujumbura		E			X	X		200/500					
	18 PA1	A/L	18-II*	X	X	X				X	X		
	36 NPA	A/L			X	X				X	X		
CAMEROON													
DOUALA/Douala		E		X	X	X		200/500					
	12 NPA	A/L		X	X	X				X	X		
	30 PA2	A/L	30-II	X	X	X				X	X		
FOUMBAN		E				X		200/500					
GAROUA/Garoua		E			X	X		200/500					
	09 PA1	A/L	09-II*	X	X	X				X	X		
	27 NPA	A/L		X		X				X	X		
MAMFE		E				X		200/500					
		E				X		200/500					
MAROUA/Salak	13 NPA	A/L				X	X			X	X		
	31 NINST									X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
M_BANGA		E					X	200					
N_GAOUNDERE/N_Gaoundéré		E				X		200/500					
	03 NPA	A/L		X		X				X	X		
	21 NINST									X	X		
YAOUNDE/Nsimalen		E		X	X	X		200/500					
	01 NINST									X	X		
	19 PA2	A/L	19-II*	X	X	X				X	X		
CAPE VERDE													
PRAIA/Francisco Mendes	04 NPA	A/L		X						X	X		
	22 NINST									X	X		
SAL I./ Amilcar Cabral		E			X	X		200/500					
	01 PA1	A/L	01-II		X	X				X	X		
	19 NPA	A/L			X	X				X	X		
		E					X	400					
CENTRAL AFRICAN REPUBLIC													
BANGUI/M_Poko		E			X	X		200/500					
	17 NPA	A/L		X	X	X				X	X		
	35 PA1	A/L	35-II*	X	X	X				X	X		
BERBERATI/Berberati		E				X		200/500					
	17 NPA	A/L		X		X		200/500		X	X		
	35 NINST									X	X		
CHAD													
ABECHE		E				X		200/500					
N_DJAMENA/N_Djamena		E			X	X		200/500					
		E					X	250					
	05 PA1	A/L	05-II*	X	X	X				X	X		
	23 NPA	A/L		X	X	X				X	X		
MOUNDOU		E				X		200/500					
COMOROS													

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ANJOUAN/Ouani	10 NPA	A/L		X						X	X		
	28 NPA									X	X		
DZAOUDZI/Pamanzi, Mayotte I.	16 NINST									X	X		
	34 NPA	A/L		X	X	X		40/250		X	X		
MORONI/ Prince Said Ibrahim		E			X	X		200/500					
	02 PA1	A/L	02-II*	X	X	X				X	X		
	20 NPA	A/L	X	X	X	X				X	X		
CONGO													
BRAZZAVILLE/Maya-Maya		E			X	X		200/500					
	06 PA1	A/L	06 -II*	X	X	X				X	X		
	24 NPA	A/L		X	X	X				X	X		
MAKOUA		E				X		200/500					
POINTE-NOIRE/Agostino Neto		E			X	X		200/500					
	17 NPA	A/L		X	X	X		200/500		X	X		
	35 NPA	A/L		X	X	X				X	X		
							X	150					
COTE D_IVOIRE													
ABIDJAN/Félix Houphouet Boigny		E			X	X		200/500					
	03 NPA	A/L		X	X	X				X	X		
	21 PA2	A/L	21-II	X	X	X				X	X		
BOUAKE/Bouaké		E			X	X		200/500					
	03 NPA	A/L		X	X	X				X	X		
	21 PA1	A/L	21-I	X	X	X				X	X		
DEMOCRATIC REPUBLIC OF CONGO													
BUNIA		E				X		200/500					
GOMA/Goma		E			X	X		200/500					
	18 NINST									X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	36 NPA	A/L			X	X				X	X		
KALEMIE		E				X		200/500					
KANANGA		E				X		200/500					
KINDU		E				X		200/500					
KINSHASA/N_Djili		E			X	X		200/500					
	06 NPA	A/L		X	X	X				X	X		
	24 PA1	A/L	24-II*	X	X	X				X	X		
KISANGANI/Bangoka		E				X		200/500					
	13 NPA	A/L		X		X				X	X		
	31 NPA	A/L		X		X				X	X		
LUBUMBASHI/Luano		E			X	X		200/500					
	07 PA1	A/L	07 -II*	X	X	X				X	X		
	25 NPA	A/L		X	X	X				X	X		
MBUJI MAYI/Mbuji Mayi	17 NPA	A/L		X		X				X	X		
	35 NINST	A/L								X	X		
DJIBOUTI													
DJIBOUTI/Ambouli		E			X	X		200/500					
	09 NPA	A/L		X	X	X				X	X		
	27 PA1	A/L	27-II*	X	X	X				X	X		
EGYPT													
ABU SIMBEL/Abu Simbel		E			X	X		200/500					
	15L NPA	A/L			X	X				X	X		
	33R NPA	A/L			X	X				X	X		
	15R NPA	A/L				X				X	X		
	33L NPA	A/L				X				X	X		
ALEXANDRIA/Alexandria		E			X	X		200/500					
	04 NPA	A/L			X	X				X	X		
	22 NPA	A/L			X	X				X	X		
										X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	18 NPA	A/L			X	X				X	X		
	36 NPA	A/L			X	X							
ASWAN/Aswan		E			X	X		200/500					
	17 NPA	A/L			X	X				X	X		
	35 PA1	A/L	35-II*		X	X				X	X		
ASYUT		E			X	X		200/500					
BALTIM		E			X	X		200/500					
CAIRO/Cairo Intl	05L PA2	A/L	05L-II		X	X					X		
		E			X	X		200/500					
		T			X	X							
	23R PA2	A/L	23R-II		X	X					X		
		E			X	X		200/500					
		T			X	X							
	05R PA2	A/L	05R-II		X	X					X		
		E			X	X		200/500					
		T			X	X							
	23L PA2	A/L	23L-II		X	X					X		
	16 NPA	A/L			X	X				X	X		
	34 NPA									X	X		
		E			X	X		200/500					
		T			X	X							
EL ARISH		E			X	X		200/500					
	NPA	A/L			X	X				X	X		
FAYOUM		E			X	X		200/500					
HURGHADA/Hurghada		E			X	X		200/500					
	16 NPA	A/L				X	X			X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	34 PA1	A/L	34-II*		X	X				X	X		
		E			X	X		200/500					
LUXOR/Luxor	02 NPA	A/L		X	X	X				X	X		
	20 PA1	A/L	20-I	X	X	X				X	X		
MERSA MATRUH/Mersa Matruh	15 NPA	A/L								X	X		
	33 NPA	A/L								X	X		
NUWEIBAA		E					X	200					
SAINTE CATHERINE/Sainte Catherine ~~Intl~~		E					X	200					
	17 NPA	A/L					X			X	X		
	35 NINST	A/L								X	X		
SHARM EL SHEIK/Sharm El Sheik		E			X	X		200/500					
	04L PA1	A/L	04L-II*		X	X	X+						
	22R NINST	A/L								X	X		
TABA/Taba		E					X	200/500					
	04 NINST	A/L								X	X		
	22 NPA	A/L					X			X	X		
EQUATORIAL GUINEA													
BATA		E					X	200					
MALABO/Malabo		E				X		200/500					
		E					X+	150					
	05 PA1	A/L	05-I	X		X				X	X		
	23 NPA	A/L		X		X				X	X		
ERITREA													
ASMARA/Asmara Intl		E			X	X	X	200/500					
	07 PA1	A/L	07-II*	X	X	X				X	X		
	25 NPA	A/L		X		X	X			X	X		
ASSAB/Assab	12 NPA	A/L					X	150		X	X		
	30 NINST	A/L								X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ETHIOPIA													
ADDIS ABABA/Bole Intl		E			X	X		200/500					
	07 NPA	A/L		X	X	X				X	X		
	25 PA1	A/L	25-II*	X	X	X				X	X		
Makele		E			X	X		200/500					
DIRE DAWA/Dire Dawa Intl		E			X	X		200/500					
		E					X#	150					
	15 NINST	A/L								X	X		
	33 NPA	A/L		X	X	X				X	X		
GAMBELA		E					X	200/500					
LALIBELA		E					X	200/500					
FRANCE													
SAINT-DENIS/Gillot (La Réunion)		E			X	X		200/500					
	14 PA1	A/L	14-II*	X	X	X				X	X		
	32 NINST	A/L								X	X		
	12 NINST	A/L								X	X		
	30 NPA	A/L		X	X	X				X	X		
GABON													
FRANCEVILLE/M Vengue		E			X	X		200/500					
	15 PA1	A/L	15-II*	X	X	X				X	X		
	33 NPA	A/L		X	X	X				X	X		
LIBREVILLE/Léon M Ba		E			X	X		200/500					
	16 PA1	A/L	16-II*	X	X	X				X	X		
	34 NPA	A/L		X	X	X				X	X		
PORT GENTIL/Port Gentil		E				X		200/500					
	03 NPA	A/L		X		X				X	X		
	21 PA1	A/L	21-I	X		X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
GAMBIA													
BANJUL/Banjul Intl		E			X	X		200/500					
	14 NPA	A/L		X	X	X				X	X		
	32 PA1	A/L	32-I	X	X	X				X	X		
GHANA													
ACCRA/Kotoka Intl		E			X	X		200/500					
	03 NPA	A/L		X	X	X				X	X		
	21 PA1	A/L	21-II*	X	X	X				X	X		
KUMASI/Kumasi		E			X	X		200/500					
	02 NPA	A/L		X		X		25/100		X	X		
	20 NPA	A/L					X	100		X	X		
PAMPA/Pampa		E			X	X		200/500					
TAMALE/Tamale		E			X	X		200/500					
	05 NPA	A/L		X	X	X				X	X		
	23 NPA	A/L								X	X		
GUINEA													
CONAKRY/Gbessia		E			X	X		200/500					
	06 PA1	A/L	06-II*	X	X	X				X	X		
	24 NPA	A/L		X	X	X				X	X		
KANKAN/Diankana		E					X	150					
	10 NPA	A/L		X		X				X	X		
	28 NINST	A/L								X	X		
LABE/Tata	06 NINST	A/L		X		X				X	X		
	24 NINST	A/L								X	X		
N ZEREKORE/Konia	18 NPA	A/L		X		X				X	X		
	36 NINST	A/L								X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
GUINEA-BISSAU													
BISSAU/Osvaldo Vieira Intl		E			X	X		200/500					
	03 NPA	A/L		X	X	X				X	X		
	21 PA1	A/L	21-I	X	X	X	X			X	X		
KENYA													
ELDORET/Eldoret Intl	08 PA2	A/L	08-II	X	X	X		200/500		X	X		
	26 NPA	A/L		X	X	X				X	X		
GARISSA		E			X	X		200/500					
LODWAR		E			X	X		200/500					
		E					X	350					
MANDERA		E			X	X		200/500					
MOMBASA/Moi Intl		E			X	X		200/500					
	03 NPA	A/L		X	X	X				X	X		
	21 PA1	A/L	21-I	X	X	X				X	X		
NAIROBI/Jomo Kenyatta Intl		E			X	X		200/500					
	06 PA-2	A/L	06-II	X	X	X				X	X		
	24 NPA	A/L		X	X	X				X	X		
NAKURU		E			X	X		40/250					
LESOTHO													
MASERU/Moshoeshoe I Intl		E			X	X	X	200/500					
	04 NINST	A/L								X	X		
	22 PA1	A/L	22-I	X	X	X				X	X		
LIBERIA													
MONROVIA/Roberts Intl		E			X	X		200/500					
	04 PA2	A/L	04-II	X	X	X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	22 NPA	A/L		X	X	X				X	X		
LIBYAN ARAB JAMAHIRIA													
BENGHAZI/Benina		E			X	X		200/500					
	15 L PA1	A/L	15L-II*	X	X	X				X	X		
	33R NPA	X		X	X	X				X	X		
	15R NPA	A/L								X	X		
	33L PA1	A/L	33L-II*							X	X		
BENI WALID		E				X		150/500					
GHADAMES		E			X	X		200/500					
		E					X+	160					
KUFRA		E				X		200/500					
SARIR		E			X	X		200/500					
		E			X	X		200/500					
SEBHA/Sebha	13 PA1	A/L	13-I		X	X				X	X		
	31 NPA	A/L			X	X				X	X		
TRIPOLI/Tripoli Intl		E			X	X		50/250					
	09 PA1	A/L	09-I							X	X		
	27 PA2	A/L	27-II	X						X	X		
ZAWIA		E				X		200/500					
MADAGASCAR													
ANKAZOBE		E					X	200/500					
ANTANANARIVO/Ivato		E		X	X	X		200/500					
	11 PA1	A/L	11-II*	X	X	X				X	X		
	29 NPA	A/L		X	X	X				X	X		
ANTSIRANANA/Arrachart		E		X	X	X		200/500					
	13 NPA	A/L		X	X	X				X	X		
	31 NINST	A/L								X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
MAHAJANGA/Amborovy		E			X	X		200/500					
	14 NPA	A/L		X	X	X				X	X		
	32 NINST	A/L								X	X		
MAINTIRANO		E				X		200/500					
MORAMANGA		E					X	200/500					
MORONDAVA		E				X		200/500					
NOSY-BE/Fascène		E			X	X		200/500					
	05 NPA	A/L		X	X	X				X	X		
	23 PA1	A/L	23-I	X	X	X				X	X		
SAINTE-MARIE/Sainte-Marie		E		X		X		200/500					
	01 NPA	A/L				X				X	X		
	19 NPA	A/L				X				X	X		
TOAMASINA/Toamasina		E				X		200/500					
	01 NPA	A/L		X		X				X	X		
	19 PA1	A/L	19-I	X						X	X		
TOLAGNARO/Tolagnaro		E			X	X		200/500					
	07 NPA	A/L			X	X							
	25 NPA	A/L			X	X				X	X		
TOLARIA		E				X		200/500					
MALAWI													
BLANTYRE/Chileka		E			X	X		200/500					
	10 PA1	A/L	10-I	X	X	X				X	X		
	28 NPA	A/L								X	X		
LILONGWE/Lilongwe Intl		E			X	X		200/500					
	14 PA1	A/L	14-I	X	X	X				X	X		
	32 NPA	A/L		X	X	X				X	X		
MALI													

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
BAMAKO/Sénou		E		X	X	X		200/500					
	06 PA1	A/L	06-II*	X	X	X				X	X		
	24 NPA	A/L		X	X	X				X	X		
GAO/Gao		E				X		200/500					
	07 NPA	A/L		X		X		200/500		X	X		
	25 NINST	A/L								X	X		
KAYES/Kayes		E				X		200/500					
		E					X+	200					
	08 NPA	A/L		X		X				X	X		
	26 NINST	A/L								X	X		
KIDAL/Kidal	10 NPA	A/L		X						X	X		
	28 NINST	A/L								X	X		
MOPTI-BARBE/Mopti-Barbe	05 NPA	A/L		X		X		200/500		X	X		
	23 NINST	A/L								X	X		
NIORO/Nioro	08 NPA	A/L		X						X	X		
	26 NINST	A/L					X+	50		X	X		
TESSALIT		E				X		200/500					
		E					X+	200					
		E			X	X		200/500					
TOMBOUCTOU/Tombouctou	07 NPA	A/L		X	X	X				X	X		
	25 NPA	A/L		X	X	X				X	X		
MAURITANIA													
ATAR/Atar		E				X		200/500					
		E					X+	200					
	04 NPA	A/L		X		X				X	X		
	22 NINST	A/L								X	X		
NEMA/Néma	10 NINST	A/L								X	X		
	28 NPA	A/L		X		X		200/500		X	X		
NOUADHIBOU/Nouadhibou		E			X	X		200/500					
										X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	03 PA1	A/L	03-II*	X	X	X				X	X		
	21 NPA	A/L		X	X	X	X	200					
NOUAKCHOTT/Nouakchott		E			X	X		200/500					
	05 PA1	A/L	05-II*	X	X	X				X	X		
	23 NPA	A/L		X	X	X				X	X		
ZOUERATE/Zouérate		E				X		200/500					
	10 NPA	A/L		X		X				X	X		
	28 NPA	A/L								X	X		
MAURITIUS													
MAURITIUS/Sir Seewoosagur Ramgoolam Intl		E			X	X		200/500					
		E					X	450					
	14 PA1	A/L	14-I	X	X	X				X	X		
	32 NPA	A/L		X	X	X				X	X		
MOROCCO													
AGADIR/Al Massira		E			X	X		200/500					
	10 NPA	A/L		X	X	X				X	X		
	28 PA1	A/L	28 -II*	X	X	X	X			X	X		
AL HOCEIMA/CHerif Al Idrissi		E			X	X		100/500					
	18 PA1	A/L	18-II*	X	X	X				X	X		
	36 NPA	A/L		X	X	X				X	X		
CASABLANCA/Mohamed V		E			X	X		150/500					
	17 NPA	A/L		X	X	X				X	X		
	35 PA2	A/L	35-II	X	X	X				X	X		
ERRACHIDA/Moulay Ali Cherif		E			X	X		200/500					
	13 NPA	A/L		X	X	X				X	X		
	31 PA1	A/L	31-II*	X	X	X				X	X		
FES/Saïss		E			X	X		150/500					
	10 NPA	A/L		X	X	X				X	X		
	28 PA1	A/L	28-II*	X	X	X				X	X		
MARRAKECH/Ménara		E			X	X		150/500					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	10 PA1	A/L	10-II*	X	X	X				X	X		
	28 NPA	A/L		X	X	X				X	X		
		E			X	X		200/500					
OUARZAZATE/Ouarzazate	12 NPA	A/L		X	X	X				X	X		
	30 PA1	A/L	30-II*	X	X	X				X	X		
OUJDA/Angads		E			X	X		150/500					
	06 PA1	A/L	06-II*	X	X	X				X	X		
	24 NINST	A/L								X	X		
RABAT/Salé		E			X	X		150/250					
	04 PA1	A/L	04-II*	X	X	X				X	X		
	22 NPA	A/L		X	X	X				X	X		
TANGER/Ibnou Batouta		E			X	X		150/500					
	10 NPA	A/L		X	X	X				X	X		
	28 PA1	A/L	28-II*	X	X	X				X	X		
TAN-TAN/Plage Blanche		E		X		X		150/500					
	14 NPA	A/L				X				X	X		
	22 NINST	A/L								X	X		
TETOUAN/Saniat Rimel		E			X	X		100/500					
	06 NPA	A/L		X	X	X				X	X		
	24 NINST	A/L								X	X		
MOZAMBIQUE													
BEIRA/Beira		E			X	X		200/500					
	12 PA1	A/L	12-II*		X	X							
	30 NPA	A/L			X	X				X	X		
										X	X		
LIMPOPO		E					X	300					
LICHINGA		E			X	X		200/500					
MAPUTO/Maputo Intl		E			X	X		200/500					
	05 NPA	A/L			X	X				X	X		
	23 PA1	A/L	23-II*		X	X	X			X	X		
NAMPULA		E			X	X		200/500					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUELIMANE		E				X		200/500					
TETE		E		X		X		200/500					
NAMIBIA													
KEETMANSHOOP/ Keetmanshoop		E			X	X	X	200/500					
	06 NPA	A/L			X	X	X			X	X		
	24 NPA	A/L								X	X		
WALVIS BAY/Walvis Bay		E			X	X	X	200/500					
	09 NPA	A/L			X	X	X			X	X		
	27 NPA	A/L								X	X		
WINDHOEK/Hosea Kutako		E			X	X	X	200/500					
	08 PA1	A/L	08-II*		X	X	X			X	X		
	26 NPA	A/L			X	X				X	X		
NIGER													
AGADES/Sud		E				X		200/500					
	07 NPA	A/L		X		X				X	X		
	25 NINST	A/L								X	X		
DIRKOU		E				X		200/500					
NIAMEY/Diori Hamani Intl		E		X	X	X		200/500					
	09R PA1	A/L	09R-II*	X	X	X				X	X		
	27L NPA	A/L		X	X	X				X	X		
ZINDER/Zinder		E				X		200/500					
	06 NPA	A/L				X				X	X		
	24 NINST	A/L								X	X		
NIGERIA													
ABUJA/Nnamdi Azikiwe		E			X	X		200/500					
	04 NPA	A/L			X	X				X	X		
	22 PA1	A/L	22-II*	X		X				X	X		
BIDA		E			X	X		200/500					
CALABAR/Calabar		E			X	X		200/500					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	03 NPA	A/L			X	X				X	X		
	21 PA1	A/L	21-II*			X	X	50		X	X		
GWASERO		E			X	X		200/500					
ILORIN/Ilorin	05 PA1	A/L	05-II*		X	X		25/100		X	X		
	23 NPA	A/L			X	X				X	X		
JOS		E			X	X		200/500					
KADUNA/Kaduna		E			X	X		200/500					
	05 PA1	A/L	05-II*	X	X	X				X	X		
	23 NPA	A/L			X	X				X	X		
KANO/Mallam Aminu Kano Intl		E			X	X		200/500					
	06 PA2	A/L	06-II		X	X				X	X		
	24 PA2	A/L	24-III*	X						X	X		
		E			X	X		200/500					
LAGOS/Murtala Muhammed	01L PA2	A/L	01L-II	X	X	X				X	X		
	19R PA2	A/L	19R-II							X	X		
	01R NPA	A/L		X	X	X				X	X		
	19L PA2	A/L	01R-II	X	X	X				X	X		
MAIDUGURI/Maiduguri		E			X	X		200/500					
	05 PA2	A/L	05-II	X	X	X				X	X		
	23 NPA	A/L		X	X	X				X	X		
PORT HARCOURT/Port Harcourt Intl		E			X	X		200/500					
	03 NPA	A/L			X	X				X	X		
	21 PA1	A/L	21-II*		X	X				X	X		
SOKOTO/ Abubakar Saddiq III Intl		E			X	X		200/500					
	08 PA1	A/L	08-II*	X	X	X				X	X		
	26 NPA	A/L		X	X	X				X	X		
RWANDA													

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
KIGALI/Grégoire Kayibanda		E			X	X		200/500					
	10 NPA	A/L		X	X	X				X	X		
	28 PA1	A/L	28-II*	X	X	X				X	X		
SÃO TOMÉ AND PRINCIPE													
SÃO TOMÉ/São Tomé		E			X	X		200/500					
	11 PA1	A/L	11-II*	X	X	X				X	X		
	29 NPA	A/L		X	X	X				X	X		
SENEGAL													
CAP SKIRING/Cap Skiring	15 NINST	A/L								X	X		
	33 NPA	A/L		X				25/100		X	X		
DAKAR/Léopold Sédar Senghor Intl		E			X	X		200/500					
	18 NPA	A/L		X	X	X				X	X		
	36 PA2	A/L	36-II	X	X	X				X	X		
SAINT-LOUIS/Saint-Louis	18 NPA	A/L		X				25/100		X	X		
	36 NINST	A/L		X						X	X		
TAMBACOUNDA/Tambacounda		E				X		200/500					
	06 NPA	A/L		X		X				X	X		
	24 NPA	A/L		X		X				X	X		
ZIGUINCHOR/Ziguinchor		E				X		200/500					
	10 NINST	A/L								X	X		
	28 NPA	A/L		X		X				X	X		
SEYCHELLES													
MAHE/Seychelles Intl		E			X	X		200/500 (N+E)					
		E					X	150					
	13 NPA	A/L			X	X				X	X		
	31 PA1	A/L	31-II*		X	X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
PRASLIN		E			X	X		200/500					
SIERRA LEONE													
FREETOWN/Lungi		E			X	X		200/500					
	12 NPA	A/L			X	X				X	X		
	30 PA1	A/L	30-II*	X	X	X				X	X		
SOMALIA													
BERBERA/Berbera	05 NINST	A/L								X	X		
	23 NINST	A/L								X	X		
BURAO/Burao	13 NINST	A/L								X	X		
	31 NINST	A/L								X	X		
HARGEISA/Hargeisa		E			X	X		200/500					
		E					X+	150					
	06 NPA	A/L			X	X				X	X		
	24 NPA	A/L								X	X		
KISIMAYU/Kisimayu		E			X	X		200/500					
		E					X+#	200					
	05 NPA	A/L			X	X				X	X		
	23 PA1	A/L	23-II*		X	X				X	X		
MOGADISHU/Mogadishu		E			X	X		200/500					
	05 NPA	A/L			X	X				X	X		
	23 PA1	A/L	23-II*		X	X				X	X		
SOUTH AFRICA													
BLOEMFONTEIN/Bloemfontein		E			X	X		200/500					
	02 NPA	A/L		X	X	X				X	X		
	20 NPA	A/L			X	X				X	X		
	12 NINST	A/L								X	X		
	30 NINST	A/L								X	X		
CAPE TOWN/Cape Town		E			X	X		200/500					
	01 PA1	A/L	01-II*		X	X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	19 PA2	A/L	19-III		X	X							
		E			X	X		200/500					
DURBAN/Durban	06 PA1	A/L	06-II*	X	X	X				X	X		
	24 PA1	A/L	24-II*		X	X				X	X		
GREEFSWALD		E			X	X		200/500					
HARTEBEESPOORTDAM		E				X		200/500					
JOHANNESBURG/Johannesburg		E			X	X		200/500					
	03L PA2	A/L	03L-II	X	X	X				X	X		
	21R NPA	A/L		X	X	X				X	X		
	03R PA2	A/L	03R-II	X						X	X		
	21L PA2	A/L	21L-II							X	X		
LANSERIA/Lanseri	06L NPA	A/L		X		X		25/100		X	X		
	24R NINST									X	X		
MAFIKENG/Mafikeng	04 PA1	A/L	04-I	X	X	X				X	X		
	22 NINST	A/L			X	X				X	X		
NELSPRUIT/Nelspruit	04NINST	A/L		X	X	X				X	X		
	22 NINST	A/L			X	X				X	X		
PIETERSBURG/Gateway		E			X	X		200/500					
	01 NINST	A/L		X	X	X				X	X		
	19 NINST	A/L								X	X		
PORT ELIZABETH/Port Elizabeth	08 PA1	A/L	08-II*		X	X				X	X		
	26 PA1	A/L			X	X				X	X		
	17 NINST	A/L								X	X		
	35 NINST	A/L								X	X		
UPINGTON/Upington		E			X	X		200/500					
	17 NINST	A/L								X	X		
	35 NPA	A/L			X	X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
SPAIN													
GRAN CANARIA/Gran Canaria, Canary Is.		E			X	X		200/500					
	03L PA2	A/L	03L-I	X	X	X	X			X	X		
	21R NPA	A/L		X	X	X				X	X		
	03R NINST	A/L								X	X		
	21L NINST	A/L								X	X		
HIERRO/Hierro, Canary Is.		E						200/500					
	16 NPA	A/L		X			X			X	X		
	34 NINST	A/L								X	X		
LA PALMA I./La Palma, Canary Is.		E			X		X	200/500					
	01 NPA	A/L		X	X			40		X	X		
	19 NINST	A/L								X	X		
LANZAROTE/Lanzarote, Canary Is.		E			X	X		200/500					
	04 PA1	A/L	04-I	X	X	X	X			X	X		
	22 NPA	A/L		X	X	X				X	X		
MELILLA/Melilla	15 NPA	A/L			X	X		200/500		X	X		
	33 NINST	A/L								X	X		
FUERTEVENTURA/Fuerteventura, Canary Is.		E			X	X							
	01 PA1	A/L	01-I	X	X	X		200/500		X	X		
	19 NPA	A/L		X	X	X	X	40		X	X		
TENERIFE NORTE/Los Rodeos, Canary Is.		E			X	X		200/500					
		E					X	200					
	12 NPA	A/L		X	X	X				X	X		
	30 NPA	A/L		X	X	X				X	X		
TENERIFE SUR/Reina Sofia, Canary Is.		E			X	X							
	08 PA1	A/L	08-I	X	X	X	X	40/250		X	X		
	26 NPA	A/L		X	X	X				X	X		
SUDAN													
EL FASHER		E			X	X		200/500					
		E					X+	200					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
EL OBEID		E				X		200/500					
GENEINA		E				X		200/500					
		E						200					
JUBA/Juba		E			X	X		200/500					
	13 PA1	A/L	13-II*		X	X				X	X		
	31 NINST	A/L								X	X		
KARINA		E			X	X		200/500					
		E					X+	200					
KASSALA/Kassala		E			X	X		200/500					
		E					X+	100					
	02 NINST	A/L			X	X				X	X		
	20 NINST	A/L								X	X		
KHARTOUM/Khartoum		E			X	X		200/500					
	18 PA1	A/L	18-I	X	X	X				X	X		
	36 NPA	A/L		X	X	X				X	X		
MALAKAL		E			X	X		200/500					
		E					X+	200					
PORT SUDAN/Port Sudan Intl		E			X	X		200/500					
		E					X+	150					
	18 NPA	A/L		X	X	X				X	X		
	36 PA1	A/L	36-I	X	X	X				X	X		
SWAZILAND													
MANZINI/Matsapha		E			X	X		200/500					
	07 NPA	A/L		X	X	X				X	X		
	25 NINST	A/L								X	X		
TOGO													
LOME/Tokoin		E			X	X		200/500					
	05 NPA	A/L		X	X	X				X	X		
	23 PA1	A/L	23-II*	X	X	X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
		E			X	X		200/500		X	X		
NIAMTOUGOU/Niamtougou	03 PA1	A/L	03-II*	X	X	X				X	X		
	21 NPA	A/L		X	X	X							
TUNISIA													
BEN AOUN		E				X		200/500					
CAP BON		E				X		200/500					
DJERBA/Zarzis		E			X	X		200 /500					
	09 PA1	A/L	09-II	X	X	X				X	X		
	27 NPA	A/L		X	X	X				X	X		
EL-BORMA		E				X		200/500					
GAFSA/Ksar		E			X	X		200/500					
	05 NPA	A/L			X	X					X		
	23 NPA	A/L			X	X					X		
MONASTIR/Habib Bourguiba		E			X	X		200/500					
	07 PA1	A/L	07-II	X	X	X					X		
	25 NPA	A/L			X	X					X		
SFAX/Thyna		E				X		200/500					
	15 NPA	A/L				X					X		
	33 NPA	A/L				X					X		
TABARKA/ 7 Novembre		E			X	X		200/500					
	09 NINST	A/L			X	X					X		
	27 PA1	A/L	27-II		X	X					X		
TOZEUR/Nefta		E			X	X		200/500					
	09 PA1	A/L	09-II	X	X	X					X		
	27 NPA	A/L			X	X					X		
TUNIS/Carthage		E			X	X		200 /500					
	01 NPA	A/L		X	X	X				X	X		
	19 PA1	A/L	19-II	X	X	X				X	X		
	11 NPA	A/L			X	X				X	X		
										X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	29 PA1	A/L	29-II	X	X	X							
UGANDA													
ENTEBBE/ Entebbe Intl		E			X	X		200/500					
	17 PA1	A/L	17-II*	X	X	X				X	X		
	35 NPA	A/L		X	X	X				X	X		
UNITED REPUBLIC OF TANZANIA													
DAR-ES-SALAAM/Dar-es-Salaam		E			X	X		200/500					
		E					X	350					
	05 PA1	A/L	05-II*	X	X	X				X	X		
	23 NPA	A/L		X	X	X				X	X		
DODOMA		E			X	X		200/500					
		E					X+	150					
KILIMANJARO/Kilimanjaro Intl		E			X	X		200/500					
	09 PA1	A/L	09-I	X	X	X				X	X		
	27 NPA	A/L		X	X	X				X	X		
MBEYA		E			X	X		200/500					
		E					X+	100					
MWANZA		E			X	X		200/500					
ZANZIBAR/Zanzibar		E			X	X		200/500					
	18 NINST	A/L					X+	100		X	X		
	36 NPA	A/L			X	X				X	X		
WESTERN SAHARA													
EL AAIUN/El Aaiun		E			X	X		200/500					
	04NPA	A/L			X	X				X	X		
	22 PA1	A/L	03-I							X	X		
SMARA/Smara	17 NINST	A/L				X				X	X		
	35 NINST	A/L								X	X		
VILLA CISNEROS/Villa Cisneros		E			X	X		200/500					

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	04 NINST	A/L		X	X	X				X	X		
	22 NPA	A/L		X	X	X				X	X		
ZAMBIA													
MONGU		E					X+	350					
		E				X		200/500					
KAPIRI		E					X+	350					
SOLWEZI		E				X		200/500					
LIVINGSTONE/Livingstone Intl		E			X	X		200/500					
	11 NPA	A/L			X	X				X	X		
	29 NPA	A/L			X	X				X	X		
LUSAKA/Lusaka Intl		E			X	X		200/500					
	10 PA1	A/L	10-II*	X	X	X				X	X		
	28 NPA	A/L		X	X	X				X	X		
MFUWE/Mfuwe		E			X	X		200/500					
	08 NPA	A/L			X	X				X	X		
	26 NPA	A/L			X	X				X	X		
NDOLA/Ndola		E			X	X		200/500					
	10L NPA	A/L			X	X				X	X		
	28R NPA	A/L			X	X				X	X		
ZIMBZABWE													
BULAWAYO/Bulawayo		E			X	X		200/500					
	13 PA1	A/L	13-II*	X	X	X				X	X		
	31 NPA	A/L			X	X				X	X		
GOKWE		E				X		200/500					
HARARE/Harare		E			X	X		200/500					
	05 PA1	A/L	05-II*	X	X	X							
	23 NPA	A/L			X	X				X	X		

Station	RWY Type	Function Fonction	ILS	L	DME	VOR	NDB	Coverage Couverture	GNSS				REMARKS/OBSERVATIONS
									GBAS	SBAS			
										NPA	APV 1	RIMS	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
HWANGE		E				X		200/500					
MASVINGO		E			X	X		200/500					
VICTORIA FALLS/Victoria Falls	12 PA1 30 NINST	E A/L A/L	12-II*	X			X	200/500		X X	X X		

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(CNSTBL_3.DOC)

APIRG/14 - WP/8 - APPENDIX E

AFI Doc 003

INTERNATIONAL CIVIL AVIATION ORGANIZATION

AFI CNS/ATM IMPLEMENTATION PLAN

1995 -– ~~2005~~ 2015

Volume I - Basic Principles, Strategy and Planning Elements

Edition 5.1
~~October~~ March 200~~2~~3 Prepared by the Eastern and Southern African Office

The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of ICAO concerning the legal status of any country, territory, city or area or of its frontiers or boundaries

DOCUMENT CHANGE RECORD

VERSION	DATE	REASON FOR CHANGE	SECTIONS PARAGRAPHS AFFECTED
5.0	15/11/99	Adoption by APIRG/12 of CNS/ATM/SG/2 Report and of the Initial AFI GNSS strategy.	Section II: 2.1.4, 2.2.1.6, 2.2.1.12 (new), 2.2.1.13 (new), 2.2.3.1.4 (new), 2.2.4.1.5 Section III: 3.3.4.2 Appendices A, B, F, G, H (new), I (new)
5.0	15/5/00	Amendment No. 1: Inclusion of Asmara FIR	Appendices A (pages A1, A2), B (pages B3, B9), G (pages G14-G22, G61-G66)
5.1	29/06/01	Adoption by APIRG/13 of CNS/ATM/IC/SG/3 Report	Section I: 1.1.1, 1.1.2 (new), 1.1.3, 1.2.1 b), 1.4.1 Section II: 2.1.2.2 (new), 2.1.2.4 (new), 2.1.2.5 (new), 2.1.4.1, 2.2.1.6 a), 2.2.1.7, 2.2.2.1.1, 2.2.3.1.4, 2.2.3.2.3 Section III: 3.3.3.2; Appendix A (pages A1 and A2); Appendix B (pages B1 to B10); Appendix C, Appendix F, Appendix G, and Appendix I
	27/06/03	Adoption by APIRG/14 of CNS/ATM/IC/SG/4 Report	Cover page Section I: 1.2.1 a), 1.3.1, 1.4.1 a) Section II: 2.1.4.1, 2.2.1.6 a), 2.2.2.2.1 (new), 2.2.2.2.1, delete 2.2.2.2.2 (old), 2.2.2.2.2, 2.2.2.3.2, 2.2.2.3.3, 2.2.3.1.1 c), 2.2.2.3.1.2, 2.2.3.1.4, 2.2.3.2.3, 2.2.3.3.2, 2.2.4.1, 2.2.4.1.1 to 2.2.4.1.4, 2.2.4.2.1, 2.2.4.3.1, 2.2.4.3.4 (new), 2.2.4.3.5 (new), 2.2.4.3.7 Section III: 3.2.1.1, 3.2.1.3, 3.3, 3.3.1, 3.3.3.3, 3.4, 3.4.2.1, 3.4.4.5, 3.4.4.6 Appendix A, Appendix B, Appendix D, new Appendix F, new Appendix G, new Appendix H, Old Appendix F published as Volume II - *Status of Implementation of the AFI CNS/ATM Plan*

History of the versions

- Version 1 was drafted in October 1994 by the second meeting of the CNS/ATM Task Force. It contained Sections I and II.

- Version 2 was drafted in November 1995 by the first meeting of the CNS/ATM Sub-group. It contained Sections I, II and III.

- Version 3 was published in June 1996 consecutive to the adoption of Doc 003 by the Tenth meeting of the AFI Planning and Implementation Regional Group (APIRG) for presentation to the Seventh AFI Regional Air Navigation (AFI/7 RAN) Meeting.

- Version 4 was published in January 1998 following the review and adoption of Doc 003 by the AFI/7 RAN meeting.

- Version 5.0 was published in January 2000 following the adoption by the Twelfth Meeting of the APIRG (Tunis, 21 -25 June 1999) of amendments formulated by the Second meeting of the CNS/ATM/IC/SG.

- Version 5.1 was published in … 2003 following the adoption by APIRG of amendments formulated by:
  - the Third meeting of the CNS/ATM/IC/SG (APIRG/13, Sal, 25 -29 June 2001); and
  - the Fourth meeting of the CNS/ATM/IC/SG (APIRG/14, Yaounde, 23 - 27 June 2003).

TABLE OF CONTENTS

GLOSSARY

AAIM	Aircraft autonomous integrity monitoring
ACC	Area Control Centre
ADS	Automatic Dependent Surveillance
ADS-B	Automatic Dependent Surveillance broadcast mode
ADSP	Automatic Dependent Surveillance Panel
AFI	Africa - Indian ocean area
AFS	Aeronautical Fixed Service
AFTN	Aeronautical Fixed Telecommunication Network
AIDC	ATS Inter-facility data communications
AIREP	Air Report
AIS	Aeronautical Information Service
AMCP	Aeronautical Mobile Communications Panel
AMS(R)S	Aeronautical Mobile-Satellite (R) Service
AMSS	Aeronautical Mobile-Satellite Service
APIRG	AFI Planning and Implementation Regional Group
APR	Automatic Position Reporting
APV	Approach with vertical guidance
AR	Area of routing
ASECNA	Agency for the Security of Aerial Navigation in Africa and Madagascar
ASM	Airspace Management
ATC	Air Traffic Control
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATN	Aeronautical Telecommunication Network
ATS	Air Traffic Services
ATS/DS	Air Traffic Services Direct Speech
CNS	Communications, Navigation, and Surveillance
CNS/ATM	Communications, Navigation, and Surveillance / Air Traffic Management
COM/MET/OPS	Communications/Meteorology/Operations
CPDLC	Controller pilot data link communications
DARPs	Dynamic user preferred re-routes
DCPC	Direct Controller Pilot Communications (voice/data)
DFIS	Data Link Flight Information Services
DGNSS	Differential Global Navigation Satellite System
DME	Distance Measuring Equipment
EUR	European Region
FIR	Flight Information Region
FDPS	Flight Data Processing System
FL	Flight Level
FMS	Flight Management System
GES	Ground Earth Station
GIC	GNSS Integrity Channel
GLONASS	Global Orbiting Navigation Satellite System (Russian Federation)
GNSS	Global Navigation Satellite System
GPS	Global Positioning System (United States)
HF	High Frequency
HFDL	High Frequency Data Link
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICG	Implementation Coordination Group
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INS	Inertial navigation system

ITU	International Telecommunication Union
MASPS	Minimum Aviation System Performance Standards
MET	Meteorological services for air navigation
METAR	Aviation routine weather report
MLS	Microwave Landing System
MMR	Multimode receiver
MNPS	Minimum Navigation Performance Specifications
MNT	Mach Number Technique
MODE S	Mode S - SSR Data Link
MSAW	Minimum Safe Altitude Warning System
NDB	Non-directional beacon
NPA	Non-precision approach
PANS-OPS	Procedures for Air Navigation Services C Aircraft Operations
RAIM	Receiver Autonomous Integrity Monitoring
RNAV	Area Navigation
RNP	Required Navigation Performance
R/T	Radiotelephony
RVR	Runway visual range
RVSM	Reduced Vertical Separation Minimum
SAM	South American Region
SARPs	Standards and Recommended Practices
SAT	South Atlantic
SATCOM	Satellite Communication
SBAS	Satellite-based augmentation system
SIGMET	Information concerning en-route phenomena which may affect the safety of aircraft operations
SIGWX	Significant weather
SITA	Société Internationale de Télécommunications Aéronautiques
SSR	Secondary Surveillance Radar
TAF	Terminal area forecast
TBD	To be determined
TMA	Terminal Control Area
VFR	Visual flight rules
VHF	Very High Frequency
VOR	VHF Omnidirectional Radio Range
WGS-84	World Geodetic Reference System 1984

SECTION I : INTRODUCTION

1.1 GENERAL

1.1.1 The AFI Plan for the implementation of the new ICAO Communications Navigation and Surveillance and Air Traffic Management (CNS/ATM) Concept was initially contained in three documents, namely:

Doc 001	-	Executive Summary
Doc 002	-	System Concept Description
Doc 003	-	AFI CNS/ATM Implementation Plan

1.1.2 Doc 001 and Doc 002 are no longer in publication. The reader should refer to ICAO Global Air Navigation Plan for CNS/ATM Systems (Doc 9750) for a complete description of the CNS/ATM concept.

1.1.3 The present document, Doc.003 - AFI CNS/ATM Implementation Plan, specifies implementation time-frames for the various systems and concepts, gives an operational overview of systems configuration during the transition, and lists activities required for an evolutionary and co-ordinated implementation towards the final objectives as contained in Doc 9750.

1.2 DOCUMENT OVERVIEW

1.2.1 The scope of this document is:

a) To present the implementation strategy for the Future AFI CNS/ATM concept~~. This consists of overlapping terms~~ during the time-frame ~~1995~~ up to 2015~~. namely: mid-term (1995-2005) and long-term (2000 to 2015).~~

b) To present the implementation plan which will enable the national administrations and airspace users to develop their plans so as to meet the conditions and pre-requisites laid down in the ICAO Global Air Navigation Plan for CNS/ATM Systems (Doc 9750), and which takes account of the need to harmonize with plans currently being developed by the regions which interface with the AFI Region. The implementation plan takes into account present facilities that meet the reliability expected in the future CNS/ATM systems.

c) This implementation plan will at the direction of the AFI Planning and Implementation Regional Group (APIRG) progressively address the planning process into long term.

1.2.2 Document 003 is organized in three distinctive sections:

Section I: Introduction

Section II: Implementation Strategy and System Configuration
Details the objectives to be achieved during the planning time-frame; For each system (Communications, Navigation and Surveillance and ATM), specifies which system

components (both of the old and of the new concept) must be in place to support the required level of service in each phase.

Section III: Implementation Plan:
Contains Implementation Sheets detailing:

- objectives;
- actions required to achieve implementation;
- required ground and airborne capabilities;
- provider and user States and Organizations concerned; and
- the target dates for implementation.

1.3 PLANNING CONCEPT

1.3.1 The AFI Implementation Plan is conceived as a rolling ~~ten~~ fifteen-year~~s~~ ~~Plan~~ plan towards the full implementation of the ICAO CNS/ATM Concept throughout the AFI Region and in the interface with adjacent regions, in order to achieve a coherent regional Air Traffic Management (ATM) system fully responsive to the regional needs in a timely and cost-effective manner and adequately integrated with the world-wide air navigation system.

1.3.2 The AFI Implementation Plan will be reviewed and updated periodically by APIRG, based on input from States and International Organizations concerned, in order to ensure it is kept responsive to changing requirements and abreast with worldwide developments.

1.3.3 The implementation, monitoring and co-ordination methodology contained in this document has been adopted by the AFI States.

1.4 GUIDING PRINCIPLES

1.4.1 In defining time-frames in the systems' evolution Tables and for the implementation activities due account was taken of the following general guidelines on transition :

"a) *Careful planning will be necessary to ensure that aircraft of the future are not unnecessarily required to carry a multiplicity of existing and new CNS equipment~~. In addition, as already referred to, T~~there is a close relationship between the required CNS services and the desired level of ATM and, finally, there is, for reasons of both economy and efficiency, a need to ensure that differences in the pace of development around the world do not lead to incompatibility between elements of the system. Particularly, because of the wide coverage of satellite CNS systems, the above considerations call for conscientious worldwide co-ordination of the planning and implementation if such systems are to be optimized.*

b) In developing guidelines for the transition it is useful to consider the type of system (C, N, or S), and the specific problems, or issues affecting its transition to full operational use in a particular type of airspace or phase of flight."

c) Ideally, the transition to new CNS systems should be based in improvements in ATM and accompanied by procedural and structural changes that will provide benefits to ATM and to users. The transition should be carefully planned so as to avoid degradation in system performance."

d) The priority structure of system elements and areas of applicability with regard to implementation has to be established. The priorities in terms of time-scales are then established in response to identified constraints and the perceived view of States as to the systems and areas of applicability providing the most immediate benefits, or for which early implementation may be most likely."

SECTION II - IMPLEMENTATION STRATEGY AND SYSTEM CONFIGURATION

2.1 IMPLEMENTATION STRATEGY

2.1.1 Introduction

a) The provider, user States and Organizations concerned acknowledge that the AFI Region stands to derive great benefits from the introduction of the new integrated ICAO CNS/ATM System. It is recognized that it is only with the full coordination of implementation activities that the complete benefits of CNS/ATM will be realized.

b) Consequently, and in order to ensure a coherent, timely, co-ordinated, cost-effective, operationally oriented implementation of the integrated ICAO CNS/ATM system in the AFI Region, the approach and strategy contained in this document are adopted at the AFI Regional level for use and compliance by provider and user States and Organizations concerned.

c) In deciding the possible introduction at regional level of new elements of the integrated CNS/ATM system requiring the carriage of additional equipment on-board aircraft, APIRG will take into consideration the need of airspace users to be given adequate advance notice for major new equipment fittings.

2.1.2 General Principles

2.1.2.1 The AFI Region shall aim at taking advantage in a timely manner, of those individual elements of the CNS/ATM systems for which positive benefit in relation to overall cost has been demonstrated or recognized by those concerned.

2.1.2.2 It is recognized that the full implementation of all ATM objectives with their CNS requirements will take time. The AFI Region, therefore, will adopt a step by step approach starting with the ATM objectives which can be achieved within the short term with minimum CNS requirements or relatively low cost.

2.1.2.3 The introduction of individual elements of the new integrated CNS/ATM concept in the AFI Region shall be carried out in a co-ordinated and coherent manner, under the aegis of the AFI Planning and Implementation Regional Group (APIRG). In this context it is essential to ensure that:

a) adjacent systems shall interface in such a way that airspace boundaries between control sectors, Flight Information Regions, or Air Navigation Regions, are transparent.

b) systems must remain responsive to operational requirements at every step of development, avoiding to the extent possible, discontinuities in evolution likely to cause disturbances to the operational environment.

2.1.2.4 At least in the short and medium term, the difference in equipage between the domestic and regional operators on the one hand, and the transcontinental operators on the other hand, will be significant.

The transcontinental operators will be fully equipped to operate in regions such as Europe and will certainly value taking advantage of their capabilities to obtain more economic flight profiles. As far as the domestic and regional operators are concerned, because they would not operate in other regions with the new CNS/ATM requirements for equipage/approval, they may not derive a positive cost/benefit from equipping. In light of the foregoing, long haul operators which are adequately certified and/or approved should be given timely full benefit and the domestic and regional operators be allowed to choose either to equip (approved or certified) or to fly segregated airspace.

2.1.2.5 The seamless airspace, which is indispensable for total benefit, will not be achieved without close co-ordination among providers and between providers and users. It is then more and more necessary and important that providers and users agree before any decision on implementation is taken. In this regard the following should be kept in mind:

- Communications

The objective of the region is full deployment of an ATN environment with the possibility to accommodate FANS1/A and the highest degree of functionality possible.

- Navigation

The ultimate objective of the Region is a navigation system based on satellite as a sole means of navigation for all phases of flight. As far as augmentation is concerned, any deployment should be in line with the regional policy as defined and approved by APIRG.

- Surveillance

Even if the Region is recognized as a valid candidate for ADS, enough caution is necessary at all levels in order to avoid ground equipage with prototypes and/or systems without operational benefits.

2.1.2.6 All planned operations, including domestic, civil and military operations to the extent that they may influence the ATS system, should be taken into account when system capacity is defined to meet the requirements.

2.1.3 The objectives

2.1.3.1 The future system must evolve from the present system so as to meet user needs to the maximum extent possible while taking the potential benefits from the application of new system technologies. This evolution should be guided by the principle of maintaining an optimum separation assurance.

2.1.3.2 Of the overall goals of the future ATM system, the following are specially of relevance in the AFI context:

a) maintenance of, or increase in, the existing level of safety;

b) increased system capacity and full utilization of capacity resources as required to meet traffic demand;

c) dynamic accommodation of user-preferred three-dimensional and four-dimensional flight trajectories;

d) accommodation of full range of aircraft types and airborne capabilities;

e) improved provision of information to the users such as weather conditions, traffic situation, availability of facilities;

f) improved navigation and landing capabilities to support advanced approach and departure procedures;

g) increased user involvement in ATM decision making including air-ground computer dialogue for flight negotiation;

h) create, to the maximum extent possible, a single continuum of airspace, where boundaries are transparent to users; and

i) organize airspace in accordance with ATM provision and procedures.

2.1.3.3 Priority should be given to the implementation of systems or functions specifically aimed at the attainment of any of these stated objectives.

2.1.4 Planning Targets

2.1.4.1 Under Section III the Implementation Plan identifies target dates, by which individual tasks are required to be accomplished. These are in line with the following milestones:

1999	Uniform application of 10 minutes longitudinal separation in the upper airspace;
1999	Provision of area control service in upper airspaces;
1999	Pursue the implementation of fixed RNAV routes contained in the AFI ANP;
1999	Implementation of WGS-84;
1999	Data exchange between Flight Data Processing Systems (FDPS) in selected Air Traffic Control Centres;
1999	Progressive introduction of Controller pilot data link communications (CPDLC) with full capacity in 2005;
1999	Complete implementation of all AFTN and ATS/DS circuits;
1999	Extension of VHF coverage at all operationally significant altitudes;
1999	Progressive provision of SSR in selected airspaces;
2000	Progressive reduction of lateral separation minima in selected airspaces from 100 NM to 50 NM (in RNP 10 environment) and eventually to 30 ~~or 25~~ NM (in RNP 5 environment) as dictated by operational requirements;
2000	Progressive introduction of Automatic Dependent Surveillance (ADS) Service with full ground capability by 2005;
2000	Continuation of introduction of Random RNAV routes in oceanic airspaces;
2000	Progressive introduction of random RNAV routes above FL 350 in continental airspaces;
2000	Progressive introduction of GNSS-based procedures;
2000	Progressive introduction of RNP 5 in selected upper airspaces;
2001	Progressive introduction of Longitudinal RNAV/RNP separation minima of 10 minutes and / or 80NM RNAV derived distance in selected airspaces;
200~~1~~5	Progressive introduction of AIDC with completion by 200~~5~~8;
2002	Progressive Implementation of 1000 FT Vertical Separation Minima (RVSM) between FL290 and FL410 in selected airspaces[1].

Note 1: In accordance with para. 2.2.1.8 of this Document, implementation of RVSM should be pursued within APIRG. In areas of routing adjacent to ~~the EUR Region~~other regions, the planning target date should be harmonized with the selected date in ~~that Region~~ those regions (i.e. EUR/AFI 2002; AFI/MID Nov. 2003; AFI/CAR/SAM January 2005 and AFI/ASIA/PAC Nov. 2003).

2.1.5 Institutional Arrangements

2.1.5.1 Many of the technical and operational aspects of the implementation of the integrated CNS/ATM system are still under development. It is not possible, or probably even wise, at this stage to establish detailed institutional arrangements which, in many ways, will be strongly influenced by the options to be retained.

2.1.5.2 APIRG will closely monitor world-wide developments relating to Global Communications and Navigation Satellite systems and address the issue in due course.

2.1.5.3 Meanwhile, it would appear to be in the best interest of cost-effectiveness and efficiency of the overall system if an open, competitive environment was finally retained for the provision of individual elements of the new concept.

2.1.6 Trials and Demonstrations

2.1.6.1 It is anticipated that many contenders for the provision of individual elements of the integrated CNS/ATM system will emerge. It is also to be anticipated that such contenders will need partners at the level of provider and user States and Organizations, so that technical solutions can be tested in the operational environment.

2.1.6.2 As a matter of priority for the AFI Region, trials and demonstrations should be:

a) operationally oriented;

b) aimed at providing familiarization with the new technologies and concepts;

c) aimed at assisting States with the transition; and

d) aimed at demonstrating cost-effectiveness.

2.1.6.3 It is also anticipated that the results of trials are also likely to provide useful information to assist the regional planning bodies in their work. In this context trials are encouraged and supported.

2.1.6.4 Providers and User States and Organizations are encouraged to co-operate in the conduct of trials. In order to minimize redundancy, the objectives and scope for specific trials and the results of such trials should be co-ordinated and disseminated through APIRG or its designated subsidiary body.

2.2 SYSTEM CONFIGURATION

~~STAGE~~ 1995 - 2015

2.2.1 Airspace and Air Traffic Management

2.2.1.1 Airspace planning is to be carried out in close co-ordination between civil and military users, with a view to achieving an efficient joint utilization of available airspace to the greatest benefit of all users.

2.2.1.2 The ideal objective of airspace management should be to maximize the utilization of available airspace, by dynamic accommodation of all short-term requirements within a single system.

2.2.1.3 Where a single system is not established, a dynamic time-sharing of specific volumes of airspace should be considered; permanent segregation of airspace among various categories of users should be avoided. In this case airspace management should be oriented by the following principles:

a) airspaces reserved for individual classes of users shall be released as soon as the respective operational need ceases;

b) specific reserved airspace should be released for limited periods or at specific altitudes;

c) alternative routes should be established in order to facilitate traffic management when specific airspaces are intended for alternative civil and military use;

d) specific reserved airspaces may be relocated when required and possible.

2.2.1.4 Air traffic management in AFI should evolve progressively from the present route system to a system of area navigation (RNAV) routes.

2.2.1.5 Random RNAV areas should be established whenever feasible. Where implementation of random RNAV areas may not be feasible due to traffic densities or constraints of the present CNS/ATM system, priority should be given to the implementation of those elements of the new CNS/ATM concept aimed at eliminating such constraints.

2.2.1.6 The RNP values to be used in the AFI Region should be selected from the following ones:

a) RNP 5, with consequential route spacing of ~~25NM or~~ 30NM as appropriate, on continental RNAV routes or RNAV areas, and in those non-RNAV ATS routes where ground-based navigation aids permit frequent determination of position and the requirement for full VHF coverage is satisfied;

b) RNP 10, with consequential route spacing of 50 NM, on oceanic RNAV routes where there is limited navaids coverage and in continental airspaces.

Note: Transition areas, namely between continental and oceanic airspaces, between pure RNAV and VOR/DME environments will be assessed case by case.

2.2.1.7 Optimum longitudinal separation minima must be applied on an internationally co-ordinated manner. The aim will be to apply not more than 10 minutes longitudinal separation progressively in the Region. However, in selected airspaces where navigation aids are not available to permit frequent

determination of aircraft's position, use of Mach Number Technique (MNT) shall be applied. Lower minima may be required in specific areas of the Region, and in this case will be based upon the availability of positive surveillance to ATC. The introduction of longitudinal separation minima based on RNAV Route criteria of 10 minutes/80NM should be pursued through APIRG.

2.2.1.8 In order to increase airspace capacity, implementation of Reduced Vertical Separation ~~minima~~ minimum (RVSM 1000ft) for subsonic aircraft between FL290 and FL410 inclusive, should be pursued through APIRG.

2.2.1.9 There will be a progressive introduction of automated flight data processing systems (FDPS) by Air Traffic Control Units. The main objectives of ATC automation should be, by priority:

a) assistance to ATC co-ordination, especially between adjacent FIRs and between control sectors within busy ATS units;

b) code-call sign correlation in radar units;

c) assistance in monitoring adherence to flight plan;

d) computer assisted conflict prediction;

e) computer assisted conflict resolution.

2.2.1.10 Automated preparation of flight progress strips is a desirable by-product of automated flight plan processing, but not an objective in itself in most of the ATS units in the Region.

2.2.1.11 ATC automation should also aim at simplifying the interface between the air traffic controller and the communication and information systems, namely AFTN, AIS, MET.

2.2.1.12 In view of the recognized potential of the Minimum Safe Altitude Warning System (MSAW) to enhance flight safety, States are encouraged to implement this system as soon as possible. APIRG will monitor the progress of implementation.

2.2.1.13 In order to enhance ATM benefits in an RNP/RNAV environment, States are advised to refer to the material in **Appendix ~~H~~G** relating to ATM operational requirements in an RNP/RNAV environment.

2.2.2 Surveillance

2.2.2.1 In accordance with Annex 6, Part I, paragraph 6.1.19, carridge and operation of pressure-altitude reporting transponders is mandatory throughout the AFI Region.

~~2.2.2.1~~2.2.2.2 Terminal areas (TMAs)

~~2.2.2.1.1~~2.2.2.2.1 Secondary Surveillance Radar (SSR) should be used to provide surveillance within busy TMAs meeting criteria to be defined by APIRG; SSR Mode S ~~data link~~ will gradually be introduced in selected busy TMAs to be confirmed by APIRG. ~~Introduction of VDL Mode 4 will be considered in due course.~~

~~2.2.2.1.2~~2.2.2.2.2 ~~Primary radars may continue to be used in those TMAs where there is a mix of transponder equipped and non-transponder equipped aircraft and the number of non-transponder equipped aircraft is sufficiently large to justify the requirement~~.

~~2.2.2.1.3~~2.2.2.2.3 ADS may be introduced, initially on a trial basis and eventually in broadcast mode (ADS-B) ~~which is still under development~~ . The AFI Region recognizes the advantages to be derived from ADS-B in terms of reduced costs and operational benefits.

~~2.2.2.2~~2.2.2.3 En-route

~~2.2.2.2.1~~2.2.2.3.1 En-route surveillance will mostly continue to be based on present procedural methods, but with improved pilot-controller communications in terms of reliability and transit times. This improvement will come about mostly as a result of enhanced mobile communications and of fixed communications between adjacent ACCs.

~~2.2.2.2.2~~2.2.2.3.2 Where a requirement for en-route surveillance has been identified, this shall rely essentially on SSR, and on ADS, including ADS-B, particularly for low density, remote and oceanic airspaces outside SSR coverage.

~~2.2.2.2.3~~2.2.2.3.3 ~~Automatic Position Reporting will be initiated on a cooperative basis in selected airspaces.~~

~~2.2.2.2.4~~2.2.2.3.4 ADS, including ADS-B, will be introduced, initially on a trial basis.

~~2.2.2.2.5~~2.2.2.3.5 There is no requirement for primary radars for en route surveillance in the Region. Those already in place should be progressively phased-out.

2.2.3 Navigation

2.2.3.1 Approach and landing

2.2.3.1.1 The AFI strategy for transition from ILS to new precision approach and landing systems is based on the worldwide strategy developed by the Special Communications/Operations Divisional Meeting (1995) (SP COM/OPS/95) for the introduction and application of non-visual aids to approach and landing which enables each region to develop an implementation plan for future systems. The AFI strategy, which will be kept under constant review states as follows:

a) continue ILS operations to the highest level of service as long as operationally acceptable and economically beneficial.

Note: To co-ordinate with the users any withdrawal of ILS and provide at least a five-year notice for the withdrawal of any ILS ground-based equipment.

b) promote the use of multimode receiver (MMR) or equivalent airborne capability to maintain aircraft interoperability;

c) validate the use of and implement ~~of~~ GNSS, with such augmentations as required, to support approach and departure operations, including Category I operations~~, and implement GNSS for such operations as appropriate~~; and

d) complete feasibility studies for Category II and III operations, based on GNSS technology, with such augmentations as required. If feasible, implement GNSS for Category II and III operations where operationally acceptable and economically beneficial.

2.2.3.1.2 The initial AFI GNSS implementation strategy was adopted by the APIRG/12 Meeting (Tunis, 21 - 25 June 1999). It details an evolutionary path from existing constellations through a minimal satellite-based augmentation system (SBAS) providing over the whole AFI Region a non-precision approach capability with vertical guidance at 20 m accuracy (APV-I). The updated AFI GNSS strategy is shown at Appendix I to this document.

~~2.2.3.1.2~~2.2.3.1.3 ~~Although i~~It is anticipated that Global Navigation Satellite System (GNSS) will provide the capability for precision approaches, these shall ~~not~~ be taken into consideration in the formulation of the requirements of the regional air navigation plan ~~for the time being~~ .

~~2.2.3.1.3~~2.2.3.1.4 GNSS may be used as an approach and landing guidance system initially as an overlay to conventional systems or as a stand-alone sysem.

~~2.2.3.1.4~~2.2.3.1.5 ~~The initial AFI GNSS implementation strategy was adopted by the APIRG/12 Meeting (Tunis, 21 - 25 June 1999). It details an evolutionary path from existing constellations through a minimal satellite-based augmentation system (SBAS) providing over the whole AFI Region a non-precision approach capability with vertical guidance at 20 m accuracy (APV-I). The updated AFI GNSS strategy is shown at Appendix I to this document.~~

2.2.3.2 Terminal areas (TMAs)

2.2.3.2.1. As a general principle, navigation facilities in TMAs must allow for navigation during departure, holding and approach with the required degree of accuracy. For the time-frame encompassed by this first Stage, the standard navigation aid in TMAs is envisaged to remain the VOR/DME.

2.2.3.2.2. Whenever feasible, VORs must be so located as to serve both terminal and en-route requirements.

2.2.3.2.3. ~~NDBs may continue to be used on a case by case basis when there is an agreed requirement to be confirmed by APIRG.~~Installation of new NDBs is discouraged.

2.2.3.2.4. Global Navigation Satellite systems may initially be used as supplemental navigation means in the TMAs.

2.2.3.3. En-route

2.2.3.3.1 Area Navigation (RNAV) will progressively be extended throughout the AFI Region, based on the criteria contained in the ICAO Manual on Required Navigation Performance (RNP) (Doc 9613 - AN/937) and within the terms and conditions defined by the AFI Planning and Implementation Regional Group (APIRG).

2.2.3.3.2 VOR/DME will continue to be the agreed en-route navigation aid in the AFI Region along conventional ATS routes, as long as GNSS has not been approved as a sole means system for en route in accordance with Phase II of the AFI GNSS strategy. In case a requirement exists for a new route or for a higher level of navigation performance along an existing route, primary consideration should be given to meet the requirement by the implementation of an RNAV route.

2.2.3.3.3 NDBs will not normally be provided for en-route navigation unless there is an operational requirement which cannot be satisfied by any other means, this will be confirmed through APIRG.

2.2.3.3.4 Global Navigation Satellite Systems will be used as supplemental en-route navigation means and as primary en-route means in designated airspaces.

2.2.3.3.5 It is foreseen that GNSS will eventually become the sole means of radio navigation and that the present radionavigation systems will be progressively withdrawn. The timing of such withdrawal will depend on many factors, among which the level of implementation and the quality of the new systems will be prominent. Withdrawal will only be undertaken in line with a plan to be developed by APIRG.

2.2.4 Communications

2.2.4.1 Mobile voice communications

2.2.4.1.1 Aeronautical mobile voice communications should provide for static-free, direct pilot-controller communications throughout the Region, at least at operationally significant altitudes.

2.2.4.1.2 Voice, will remain the main form of pilot-controller communications throughout the region within the time-frame encompassed by this ~~first Stage~~Plan. Meanwhile, the early introduction of data links is supported and encouraged with the initial main objective of reducing R/T workload.

2.2.4.1.3 In view of the remoteness of large areas of the AFI region, aeronautical mobile satellite service (AMSS) voice ~~links~~ offers one of the best methods of achieving the above objectives. However, the number of users equipped for this type of communications may not be significant for several years, and therefore efforts should continue on the implementation of remote and extended range VHF.

2.2.4.1.4 HF voice stations could be phased out as VHF and ~~satellite~~ AMSS voice communications become available in a given FIR or in a given portion of the airspace; for the time being, however, increased traffic on HF will have to be accommodated and it will be necessary to ensure the integrity, reliability and availability of the ~~system~~ ground HF facilities.

~~2.2.4.1.5Although high frequency (HF) data link was not addressed in the original CNS/ATM concept, ICAO has adopted SARPs for HF data link (HFDL). HF data link is ATN compliant. APIRG will closely monitor these developments.~~

2.2.4.2 Fixed Communications

2.2.4.2.1 The aeronautical fixed ~~telecommunications system~~ service must provide for the exchange of messages between end-users with a very high degree of reliability within the specified transit times; in case this cannot be achieved within the current configuration of the AFTN Plan or the ATS/DS ~~switched~~ network plan, these must be re-planned as necessary and without delay in order to meet those objectives.

2.2.4.2.2 As a step towards the ATN the mutual support between aeronautical networks should be reinforced by the automatic interchange of messages, at least at the level of AFTN main centres, and ideally at the level of all tributary centres.

2.2.4.3 Data communications

2.2.4.3.1 The goal of the AFI Region is the implementation of the ATN for ground-to-ground and air-to-ground data communications. It is anticipated that the mobile element of the integrated ATN may be developed at a slower pace than the end-user requirements for fixed communications; it is essential to ensure that the implementation of the necessary improvements to the ground network does not suffer delays as it is a pre-requisite for the development of the air-ground network as well.

2.2.4.3.2 In those circumstances in AFI, where only satellite links will be capable of supporting the implementation of the ground elements of the ATN with the required degree of reliability, considerations concerning costs of circuits, should not therefore delay the implementation of specific links by satellite whenever such requirement has been identified.

2.2.4.3.3 Notwithstanding the above, and considering the regional objective of inter-operability between sub-networks, the decision on which carrier to use to connect specific centres must be taken based on cost-benefit and operational efficiency only. The final aim is for a global ATN ensuring that the routing over the various sub-networks is predominantly based on choice.

Data link communication services

2.2.4.3.4 In oceanic and low/medium air traffic density areas where ground-based communication infrastructure cannot be deployed, AMSS and HF data links will be progressively introduced. Where a ground-based infrastructure can be deployed, VHF data link to be specified by regional agreement, will be introduced to support air-ground ATN-compatible applications.

Data link surveillance services

2.2.4.3.5 Surveillance data link services will be progressively introduced, using either the SSR Mode S extended squitter, or the universal access transceiver (UAT) or the VDL Mode 4, based on regional agreement.

~~2.2.4.3.4~~2.2.4.3.6 There will be a progressive introduction of Gate data-links at the busiest airports in the Region. This consists of a physical link between aircraft on the apron and ATC. The main purpose of this type of data-link, in so far as ATC is concerned, is to allow for ATC clearance delivery by data instead of voice, thus reducing communications work-load and the risk of misinterpretation.

~~2.2.4.3.5~~2.2.4.3.7 Data link flight information services (DFIS) ~~applications, like the two other ATM data link applications~~ (ADS, CPDLC~~)~~ have been standardized~~. and validated by the Automatic Dependent Surveillance Panel (ADSP). These~~ DFIS services will make it possible to improve both aeronautical and meteorological air-ground communications as well as the availability of meteorological information (METAR, WINDSHEAR, RVR, TAF, SIGMET, AIREP, SIGWX, etc.). In particular, DFIS will make it possible for aircraft ~~operating on Europe-Africa and Gulf of Guinea routes~~ to obtain meteorological and aeronautical information by a reliable and relatively un-congested data link.

Note: This Document may eventually include the AGA, AIS/MAP, MET and SAR elements of the CNS/ATM system.

SECTION III - AFI CNS/ATM IMPLEMENTATION PLAN

3.1 INTRODUCTION

3.1.1 The present section gives a detailed presentation of the implementation activities of the AFI CNS/ATM Implementation Plan and information on the programme of activities to be carried out by concerned States and users to implement specific system components of the Plan.

3.2 PLANNING METHODOLOGY

3.2.1 En route airspace

3.2.1.1 Taking into account the global nature of the CNS/ATM Systems, the AFI Region has been divided into ~~ten~~ six homogeneous areas of routing corresponding to the major traffic flow patterns of the Region. The ~~ten~~ six areas of routing (AR) are:

AR-1: the Europe - South Atlantic (EUR/SAT) oceanic routes;

AR-2: the Atlantic Ocean interface between the AFI, NAT and SAM Regions (AFI/NAT/SAM interface);

AR-3: the Europe to Eastern Africa routes including the area of the Indian Ocean (EUR/AFI-East);

AR-4: the Europe to Southern Africa routes (EUR/AFI-South), including the Continental Southern Africa routes;

AR-5: the ~~coastal routes over the Gulf of Guinea~~ Continental Western Africa routes, including coastal areas;

~~AR-6: the Iberian peninsula to Canaries routes;~~

~~AR-7: the North AFI coastal area (EUR/AFI interface);~~

~~AR-8: the Continental Southern Africa routes~~;

~~AR-9: the Trans-Sahelian routes~~; and

AR-~~10~~6: the Trans-Indian Ocean area interfacing with the ASIA/PAC Region.

3.2.1.2 Chart CNS/ATM-1 in **Appendix A** shows the areas of routing.

3.2.1.3 For each area of routing a set of air traffic management (ATM) objectives has been defined. Then the required communications, navigation, surveillance (CNS) systems are derived taking into account the nature (oceanic, continental) of the area, the existing CNS systems and the improvements which could be introduced during the time frame of the plan ~~(1995 - 2005)~~.

3.2.2 Terminal airspace and Aerodromes

3.2.2.1 The AFI CNS/ATM Plan defines three types of terminal airspaces based on the traffic density and the complexity of the traffic pattern. The three types of TMAs are:

a) TMA Type 1: characterized by multiple airports within the single TMA, a complex traffic pattern and a high density traffic;

b) TMA Type 2: characterized by multiple airports within the TMA, a complex traffic pattern and a medium density traffic; and

c) TMA Type 3: low density traffic TMAs.

3.2.2.2 Likewise, three types of aerodromes are defined based on traffic density (high, medium and low).

3.2.2.3 The TMAs and aerodromes of the AFI Region will be type-designated by the AFI Planning and Implementation Regional Group (APIRG) based on the proposals by provider and user States and organizations concerned.

3.3 AFI CNS/ATM IMPLEMENTATION PLAN ~~(1995 - 2005)~~

3.3.1 The first phase of the AFI CNS/ATM Implementation Plan is intended to cover the 1995 - ~~2005~~ 2010 time period.

3.3.2 En route

3.3.2.1 The major en route ATM objectives are:

- extension of random routing in oceanic areas;
- reduction of separation minima in oceanic and high traffic density continental areas;
- progressive extension of fixed and random RNAV routes; and
- definition of Required Navigation Performance (RNP) values for specific itineraries.

3.3.2.2 To support the above ATM objectives, it is proposed in the plan to:

- improve and extend VHF coverage in continental area;
- introduce data links progressively;
- improve the AFTN network and implement ATS/DS circuits;
- improve SSR surveillance in certain continental areas;
- introduce automatic position reporting as a first step toward automatic dependent surveillance (ADS); and
- introduce ATC automation gradually.

3.3.2.3 The en-route AFI CNS/ATM Plan is shown at **Appendix B**.

3.3.3 TMAs and Aerodromes

3.3.3.1 In terminal airspace and aerodromes, VHF coverage will be extended to at least 150 NM, while VHF data link is to progressively be introduced in high and medium traffic density areas.

3.3.3.2 For navigation in terminal areas, GNSS is to be introduced during the planning period.

3.3.3.3 The AFI Region has adopted a strategy to evolve to a GNSS-based navigation system from en-route to CAT I. In the mean time, ~~F~~for approach and landing at aerodromes, ILS will remain the standard aid. GNSS based approach procedures will be progressively introduced as follows:

a) overlay to ILS procedures;

b) non-instrument runways; and

c) non-precision runways.

3.3.3.4 For surveillance, voice position reports will remain the dominant procedure. However in high and medium traffic density terminal and approach area, SSR will be required while ADS will be progressively introduced.

3.3.3.5 The AFI CNS/ATM Plan for TMAs and aerodromes is at **Appendix C**. The list of TMAs and Aerodromes is at **Appendix D**.

3.3.4 GNSS Applications

3.3.4.1 For en route navigation, GNSS will be used, initially as a supplemental-means of navigation. States are recommended to make use of the guidance material contained in ICAO Circular 267 - AN/159 - *Guidelines for the introduction and operational use of the Global Navigation Satellite System (GNSS)* when drafting their GNSS Plan. Particular attention should be given to the following:

a) procedures development;

b) aeronautical coordinates referenced to the WGS-84 coordinate system;

c) data base creation and maintenance;

d) certification and operational approvals;

e) ground and flight inspection;

f) trials and demonstrations;

g) GNSS planning and organization;

h) GNSS training;

i) information of users by NOTAM and Aeronautical Information Circular;

j) legal issues; and

k) implementation assistance through ICAO.

3.3.4.2 A sample Aeronautical Information Circular (AIC) for the approval of GPS as a supplemental means of navigation for en route and terminal operations and overlay non-precision approaches (NPA) was adopted by the AFI/7 RAN Meeting and is shown as Appendix E. In due course, a similar AIC for approval of GNSS-based precision approach and landing applications shall be developed and included in this document.

3.4 IMPLEMENTATION PROGRAMME ~~*(1995 - 2005)*~~

3.4.1 This part of Section III defines in more detail, the actions to be undertaken by States and users in each area of routings or in the terminal and approach areas for the actual co-ordinated implementation of the Plan.

3.4.2 Timelines Reference Sheets (TRS)

3.4.2.1 The Timelines Reference Sheets (TRS) which reflect the actual plans of States, the status of implementation ~~is at **Appendix F**~~ are published in Volume II of Doc 003, *Status of Implementation of the AFI CNS/ATM Plan*.

3.4.3 Implementation worksheets

3.4.4.1 The implementation worksheets have been developed for each operational and technical element. The area concerned, the FIRs involved, the specific activity that must be carried out, the system that must be in place, by whom, and in which time-frames are identified. The implementation worksheets are aimed at providing to all concerned clear guidance to ensure uniformity of approach, compatibility of implemented systems and procedures and training. They will be used by Implementation Co-ordination Groups (ICGs) which are recommended to be set-up for each area of routing.

3.4.4.2 The implementation worksheets are at **Appendix ~~G~~F**.

3.4.4 Implementation Co-ordination Groups (ICGs)

3.4.4.1 The achievement of the intended benefits along each routing or within each area of affinity is entirely dependent on the coordinated implementation of the required elements by all concerned, provider and users alike. This section introduces the three pillars on which the attainment of that objective will rely: the Implementation Worksheets (IWS), the Implementation Co-ordination Groups (ICG's), and the Time-lines Reference Sheets (TRS).

3.4.4.2 The Implementation Worksheets (IWS) detail, for each traffic flow and for each area of affinity, and for every CNS element, the systems that must be put in place, by whom, and within which time-frames. Thus, the IWS will provide to all concerned a clear indication of what is required from each one of them, and will provide the basis to ensure coordinated and harmonized systems deployment.

3.4.4.3 Implementation Coordination Groups (ICGs) should be established for each routing and for each area of affinity. Members will be all those providers and users alike, required to implement systems either on the ground or airborne on the area of routing concerned, i.e., States and or Organizations responsible for the provision of services in the FIRs concerned, and the Users Organizations.

3.4.4.4 On their implementation role, the ICGs are independent of the Regional Planning machinery. They will nevertheless be guided by the IWS, on which they are free to improve and detail as necessary. However, any substantive modification either of objectives or time frames must be submitted to APIRG through the CNS/ATM Sub-Group in order to ensure overall conformity at the Regional level. The ICGs will, in their work, give due regard to the maintenance of, or increase in, the existing level of safety.

~~3.4.4.5~~ The ICAO Secretariat will co-ordinate the establishment and activities of ICGs. ~~The ICGs will appoint a coordinator for each element (i.e. for each IWS). The coordinator will be responsible to initiate and~~

~~co- ordinate actions required to carry out implementation and among all concerned. The coordinator will also be responsible to report to the CNS/ATM Sub-group on progress, on eventual constraints being experienced, or on any other matters of concern. These will be mostly reflected in the TRS as detailed below.~~

3.4.4.5 The Timelines Reference Sheets ~~at Appendix F~~in Volume II of Doc 003 are intended to ensure timeliness of implementation and to identify deviations so that corrective action can be initiated on a timely manner. They show, again for each element and for each area of affinity, the planned date of implementation and the FIRs and States concerned. Against each FIR, they will show the date on which the responsible authority has declared it can meet the requirement. This will allow for immediate identification of any significant deviation where corrective action may be required.

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LIST OF APPENDICES

APPENDIX A

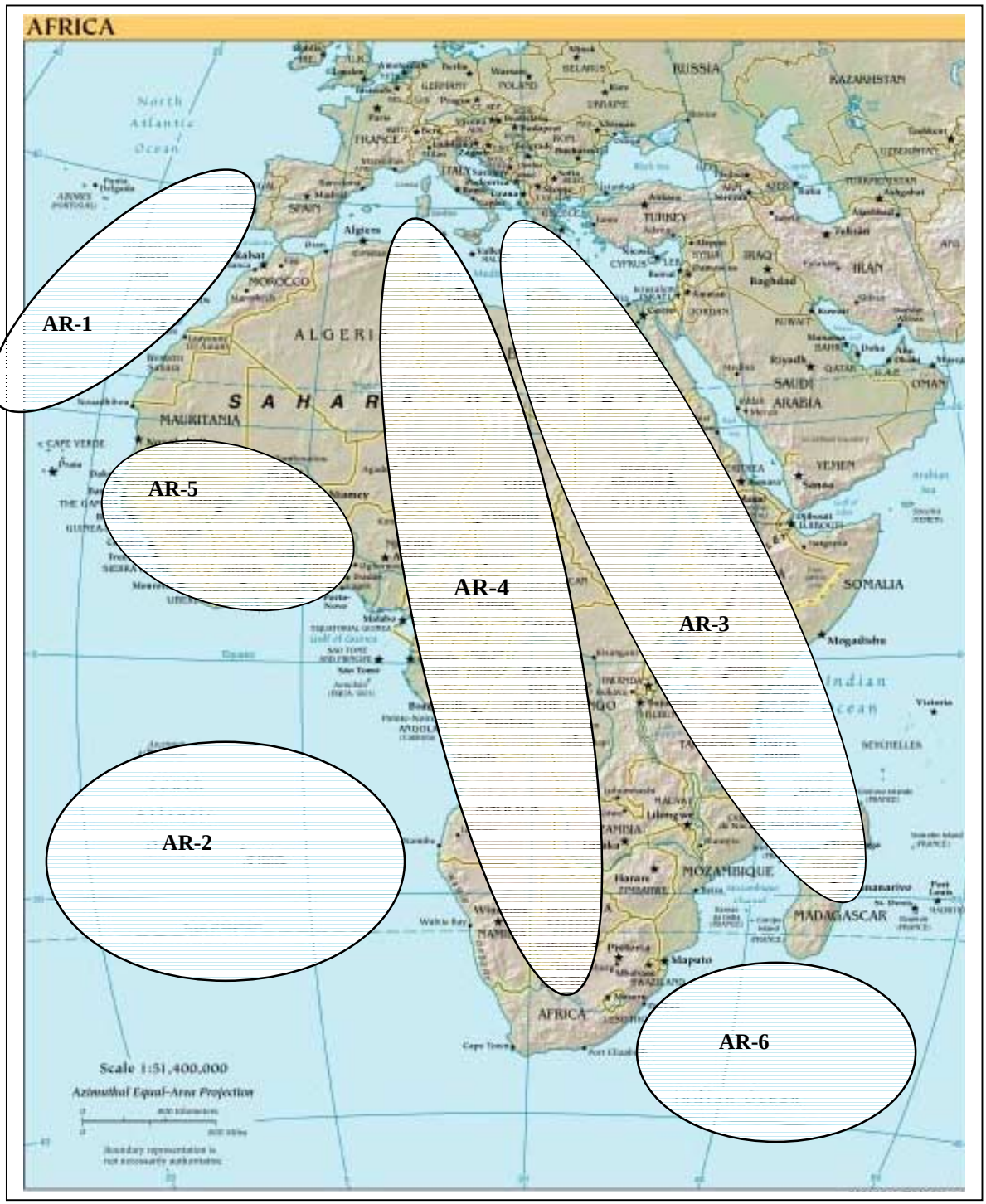
Areas of routing

Area of routing (AR)	Traffic flows	FIRs involved	Type of area covered	Remarks
AR-1	Europe - South Atlantic (EUR/SAT)	Canarias Casablanca Dakar Oceanic Lisboa[1] ~~Recife~~[1]Atlantico[1] Sal	Oceanic en-route low density in southern part and oceanic high density in northern part	Major traffic flow EUR/AFI/SAM
AR-2	Atlantic Ocean (AFI-NAT/SAM interface)	Accra Dakar Oceanic Johannesburg-Oceanic Luanda ~~Sal~~	Oceanic en-route low density	Homogeneous area AFI/NAT/SAM
AR-3	Europe - Eastern Africa (including oceanic areas)	Addis Ababa Antananarivo Asmara Cairo Dar es Salaam Entebbe Khartoum Mauritius Mogadishu Nairobi Seychelles Tripoli	Continental en-route / oceanic low density	Major traffic flow AFI/EUR
AR-4	Europe - Southern Africa, including Continental Southern Africa routes	Algiers Beira Brazzaville Cape Town Gaborone Harare Johannesburg Kano Kinshasa Lilongwe Luanda Lusaka N'Djamena Niamey Tripoli Tunis Windhoek	Continental en-route low density	Major traffic flow AFI/EUR
AR-5	~~Gulf of Guinea~~Continental Western Africa including coastal areas ~~(Coastal routes)~~	Accra ~~Brazzaville~~ Dakar Kano Niamey Roberts	Continental/oceanic low density	Homogeneous area AFI
~~AR-6~~	~~Iberian Peninsula - Canaries~~	~~Canarias~~ ~~Casablanca~~ ~~Lisbon~~[1]	~~Oceanic high density~~	~~Major traffic flow AFI/EUR~~

Area of routing (AR)	Traffic flows	FIRs involved	Type of area covered	Remarks
~~AR 7~~	~~North AFI/Coastal and EUR/AFI Interface routes~~	~~Algiers~~ ~~Cairo~~ ~~Casablanca~~ ~~Tripoli~~ ~~Tunis~~	~~Continental / Oceanic low density~~	~~Homogeneous area AFI/EUR~~
~~AR 8~~	~~Continental Southern Africa~~	~~Beira~~ ~~Gaborone~~ ~~Harare~~ ~~Cape Town~~ ~~Dar es Salaam~~ ~~Johannesburg~~ ~~Lilongwe~~ ~~Luanda~~ ~~Lusaka~~ ~~Windhoek~~	~~Continental low density~~	~~Homogeneous area AFI~~
~~AR 9~~	~~Trans Sahelian~~	~~Asmara~~ ~~Dakar~~ ~~Kano~~ ~~Khartoum~~ ~~N'Djamena~~ ~~Niamey~~	~~Continental low density~~	~~Homogeneous area AFI~~
AR-~~10~~6	Trans-Indian Ocean	Antananarivo Bombay[1] Johannesburg-Oceanic Male[1] Mauritius Melbourne~~Perth~~[1] Seychelles	Oceanic low density	Homogeneous area AFI/ASIA

Note: 1: Outside AFI. Indicated for completeness.

APPENDIX A


AFRICA
AR-1
AR-2
AR-3
AR-4
AR-5
AR-6
Scale 1:51,400,000
Azimuthal Equal-Area Projection

APPENDIX B, DOC 003

CNS/ATM Plan by Area of routing

Table 1- En-route

Area of Routing	FIRs	Systems Evolution ~~1995-2005~~1995-2010				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Europe - South Atlantic (Oceanic routes) **AR-1**	Canarias Casablanca Dakar Oceanic Lisboa[1] Atlantico~~Recife~~[1] Sal	Fixed RNAV routes (1995); Progressive evolution towards a random RNAV environment from West to East (~~2000 –~~Nov. 2005); Reduction of longitudinal separation to 10 minutes using Mach Number Technique (1998); ~~extension to route UA302 (1999);~~ Longitudinal separation 30 NM (2001). Lateral separation 25 NM (2001) both with radar surveillance; Distance based separation 80 NM (1998 - 2002) 50NM (2002 - onwards); Reduction of lateral separation to 50 NM (1999- 2004). Further reduction of lateral separation to ~~25 NM/~~30NM (2004 - onwards); RVSM (~~2000 - 2005~~2002): progressive evolution towards RVSM FL290/410	DCPC (data) by participating aircraft (Bpa) (~~2000~~2004); Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (~~1999~~2004- onwards)	RNP 5: Casablanca and Canarias FIRs (1998); RNP 10: Other FIRs (~~1999 - 2004~~2001); RNP 5: (~~2004 -~~2005 - onwards) Other FIRs GNSS as primary-means	~~Automatic Position Reporting (APR) Bpa trials (2000);~~ Automatic Dependent Surveillance (ADS) on RNP airspace Bpa (from ~~2000~~2004)

Note: 1: Outside AFI. Indicated for coordination.

Table 1- En-route

Area of Routing	FIRs	Systems Evolution ~~1995-2005~~1995-2010				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Atlantic Ocean (AFI-NAT/SAM interface) **AR-2**	Accra Dakar Oceanic Johannesburg Oceanic Luanda ~~Sal~~	Random routing (2005); Reduction of longitudinal separation to 10 minutes (2000) RVSM (Jan. 2005)	DCPC (data) by participating aircraft (Bpa) (1998); HF (voice) ~~Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)~~	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between main AFTN Centres (1998-onwards); AFTN and ATS/DS (1999)	RNP 10 (2000) GNSS as primary-means	~~Automatic Position Reporting (APR) Bpa trials (2000);~~ ADS (2000)

Table 1- En-route

Area of Routing	FIRs	Systems Evolution ~~1995-2005~~1995-2010				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Europe - Eastern Africa (including oceanic areas) **AR-3**	Addis Ababa Antananarivo Asmara Cairo Dar es Salaam Entebbe Khartoum Mauritius Mogadishu Nairobi Seychelles Tripoli	Fixed RNAV routes coexisting with conventional routes (1999); Longitudinal separation 10 minutes (2000); Lateral separation: progressive introduction of ~~25 NM or~~ 30 NM in line with RNP 5 in the upper airspace (2001); Vertical Separation: introduction of RVSM initially between FL 350 and FL 390 (~~2001~~2003-onwards) and extension to FL 290 - FL 410 by 2005; Full ATC service on all ATS routes above FL 245 and 150NM from international airports (1999); RNAV: Gradual implementation of Random RNAV initially above FL 350 from 2001.	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) DCPC (data) Bpa (2000).	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (1999-onwards); ~~Full interface between aeronautical networks (2001);~~ AFTN and ATS/DS (1999); Introduction of ATS inter-facility data communications (AIDC) starting in 200~~2005~~2 to be completed by ~~2005~~2008	RNP 10: (2000); RNP 5: from 2001 onwards GNSS as primary-means	Procedural; ADS 2001 onwards with full ground capability in 2005; SSR in selected airspaces (1999); Automation: progressive introduction of computer assisted conflict detection and resolution from 2000

Table 1- En-route

Area of Routing	FIRs	Systems Evolution ~~1995-2005~~1995-2010				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Europe - Southern Africa including Continental Southern Africa routes **AR-4**	Algiers Beira Brazzaville Cape Town Gaborone Harare Johannesburg Kano Kinshasa Lilongwe Luanda Lusaka N'Djamena Niamey Tunis Tripoli Windhoek	Fixed RNAV routes coexisting with conventional routes from 1995 ~~to 2000~~; Longitudinal separation 10 minutes from (2000) Lateral separation minima; Gradual introduction of ~~25 NM or~~ 30 NM in line with RNP 5 in the upper airspace (~~2000~~2001); RVSM: Introduction initially between FL 350 and 390 (~~2002~~2003-onwards), evolving towards FL 290/410 ~~from~~ by 2005; Full ATC service on all ATS routes above FL 245 and 150NM from international airports (1999). Random RNAV initially above FL350 from 2001	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) DCPC (data) Bpa (From 2001)	Implementation of all ATS/DS circuits. AFTN and ATS/DS links upgraded; ~~full interface between aeronautical networks (from,2001);~~ Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (1999 - onwards); Gradual introduction of AIDC from 2005 to be completed by (~~2005~~2008)	RNP 5: ~~Initially above FL350 (~~from ~~2000~~2001~~)~~ onwards ~~WGS 84~~ GNSS as primary-means	Procedural (on account of traffic diversity); ADS (200~~0~~1 onwards with full ground capability in 2005~~)~~; SSR at Brazzaville, Kinshasa, Luanda and N'Djamena from (2000); ~~RADAR and ADS integration from (2000)~~

Table 1- En-route

Area of Routing	FIRs	Systems Evolution ~~1995-2005~~1995-2010				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
~~Gulf of Guinea (Coastal routes)~~ Continental Western Africa routes including coastal areas AR-5	Accra ~~Brazzaville~~ Dakar Kano Niamey Roberts	Fixed RNAV routes coexisting with conventional routes from 1999; Longitudinal separation 10 minutes (2000); Full ATC service on all ATS routes above FL 245 and 150NM from international airports (1999). Lateral separation ~~25NM or~~ 30 NM in an RNP 5 environment (2001 - onwards); RVSM initially between (FL 350-FL 390) (~~2002~~ 2003 -onwards); Random routing initially above FL350 (2001 - onwards)	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) Progressive introduction of DCPC (data) from ~~1999~~ 2000 onwards	AFTN and ATS/DS links upgraded (1999); Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main Centres (1999-onwards); ~~Full interface between aeronautical networks 2001 - onwards~~ Gradual introduction of AIDC from 2005 to be completed by (2008)	~~VOR/DME (TMAs);~~ RNP 5 environment (2001) GNSS as primary-means	SSR along itinerary Abidjan/Accra/Lagos (2000); ADS/CPDLC from 2001 with full ground capability by 2005

Table 1- En-route

Area of Routing	FIRs	Systems Evolution 1995-2005				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Iberian Peninsula-Canaries AR 6	Canarias Casablanca Lisbon[1]	Fixed RNAV routes (1995); Longitudinal separation 30 NM (2001). Lateral separation 25 NM (2001) both with radar surveillance; RVSM (2002 - onwards)	DCPC 2005 - onwards	Gradual introduction of ATN compatible bit-oriented procedures (BOP) between main AFTN centres (2002)	RNP 5 (1998) GNSS as primary means	APR Bpa (1998); Mode S (2000); ADS Bpa - 1999 onwards

Note: 1: Outside AFI. Indicated for coordination.

Table 1- En-route

Area of Routing	FIRs	Systems Evolution 1995-2005				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
North AFI/Coastal and EUR/AFI Interface routes AR 7	Algiers Cairo Casablanca Tripoli Tunis	Reduction of longitudinal separation to 10 minutes along specific itineraries (2000) ; Fixed RNAV coexisting with conventional routes (1999); RVSM (2002 - onwards)	DCPC 2005 onwards; Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)	Gradual introduction of ATN between selected ACCs (1999); ATS/DS (1999)	VOR/DME (TMAs); RNP 5 2000 onwards in selected upper airspaces GNSS as primary means	SSR (high density airspaces) (2000); Mode S (where justified) (2000).

Table 1- En-route

Area of Routing	FIRs	Systems Evolution 1995-2005				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Continental Southern Africa AR 8	Beira Gaborone Harare Cape Town Dar es Salaam Johannesburg Lilongwe Luanda Lusaka Windhoek	Fixed RNAV routes coexisting with conventional routes (2000); Longitudinal separation 10 minutes (2000); Full ATC on all ATS routes above FL 245 and 150NM from international airports.(2000); Lateral separation (TBD); Random routing initially above FL 350 (TBD); RVSM initially between FL350 and FL390 (TBD)	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) DCPC (data) from 2000	AFTN implemented (1999); Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (1999); ATS/DS (1999); AIDC (2001-2005)	VOR/DME (TMAs); RNP 10 (2000); RNP 5: (from 2000), and evolution to RNP 4 in selected airspaces GNSS as primary means	SSR (high density airspaces) (1996); ADS/CPDLC Bpa (2000); SSR (Luanda, 2000)

Table 1- En-route

Area of Routing	FIRs	Systems Evolution 1995-2005				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Trans-Sahelian AR 9	Asmara Dakar Kano Khartoum N'Djamena Niamey	Fixed RNAV routes co-existing with conventional routes (1999) evolving to random routing; Full ATC service on all ATS routes above FL 245 and 150NM from international airports. Longitudinal separation of 10 minutes (2000); Lateral separation 25 NM or 30 NM in an RNP 5 environment (2001 - onwards); RVSM initially between FL350 - 390 (2001 - 2005) Random routing initially above FL350	Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000) DCPC (data) (2000 - 2005).	AFTN and ATS/DS links upgraded (1999); Full Interface between aeronautical networks 2001 - onwards; Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (1999 - onwards)	RNP 10: (2000); RNP 5: 2000 onwards evolving towards RNP5 GNSS as primary means	APR Bpa (1998); ADS/DCPC (2001 - onwards) with full ground capability by 2005; SSR coverage at N'Djamena sector

Table 1- En-route

Area of Routing	FIRs	Systems Evolution ~~1995-2005~~1995-2010				
		Airspace and Traffic Management	Communications		Navigation	Surveillance
			Mobile Service	Fixed Service		
1	2	3	4	5	6	7
Trans-Indian Ocean **AR ~~10~~6**	Antananarivo Bombay[1] Johannesburg Oceanic Male[1] Mauritius Melbourne~~Perth~~[1] Seychelles	Reduction of longitudinal separation to 10 minutes (2000); Random routing in selected portions of the airspace (1999); RNP itineraries (2000); Full ATC service on all ATS routes above FL 245 and 150NM from international airports; Reduction of lateral separation to 50 NM coinciding with RNP 10 from 2000 onwards; RVSM along selected itineraries initially between FL 310-FL370 (2001-onwards) evolving towards FL 290-FL 410 from 2005 onwards.	DCPC (data) from 1999); Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)	AFTN and ATS/DS links upgraded (1999); ~~Interface between aeronautical networks (1999);~~ AIDC (~~2002~~2005) with full capability in 200~~85~~	RNP 10: (2000) GNSS as primary-means	~~APR Bpa (1999);~~ ADS Bpa (2000)

Note: 1: Outside AFI. Indicated for coordination.

APPENDIX D, Doc 003

Tentative Categorization of TMAs and Aerodromes
Classification provisoire des TMA et Aérodromes

State/Etat	TMA	Type	Aerodromes	Type
Algeria/Algérie	Alger		Alger	
	Constantine		Constantine Bejaia* Jijel*	
	Annaba		Annaba Tebessa	
	Oran		Oran Tlemcen Tiaret Mascara*	
	Other TMAs		Other Aerodromes	
Angola	Luanda		Luanda Huambo	
Benin/Bénin	Cotonou		Cotonou	
Botswana	Francistown Gaborone Maun Kasane		Gaborone Others	
Burkina Faso	Bobo Dioulasso Ouagadougou		Bobo Dioulasso Ouagadougou	
Burundi	Bujumbura		Bujumbura	
Cameroon/Cameroun	Douala Garoua Yaounde		Douala Yaounde/Nsimalen	
Cape Verde/Cap-Vert	Sal		Amilcar Cabral Francisco Mendes	
Central A.Rep./R.C.A.	Bangui		Bangui	
Chad/Tchad	Ndjamena		Ndjamena	
Comoros/Comores	Moroni			
Congo	Brazzaville Pointe Noire		Brazzaville Point Noire	
Côte d'Ivoire	Abidjan Bouake		Abidjan/F.H. Boigny Bouake	
Dem. Rep. Of Congo Rep. Dém. Du Congo	Kinshasa Other TMA's		Kinshasa Other aerodromes	
Djibouti	Djibouti		Djibouti	

State/Etat	TMA	Type	Aerodromes	Type
Egypt/Égypte	Alexandria Aswan Cairo Hurgadah Luxor		Abu Simbel Alexandria Aswan El Arish* Cairo Hurghada Luxor Mers Matruh Sharm El Sheikh St. Catherine Taba	
Equat. Guinea/Guinée Equat.	Malabo		Malabo Bata*	
Eritrea/Érythrée	Asmara		Asmara Assab	
Ethiopia/Éthiopie	Addis Ababa		Addis Ababa Dire Dawa	
France (Réunion)	St. Denis		St. Denis	
Gabon	Libreville Port Gentil		Libreville Port Gentil	
Gambia/Gambie	Banjul		Banjul	
Ghana	Accra Kumasi		Accra/KIA Kumasi/Kumasi	
Guinea/Liberia/Sierra Leone	Roberts		Conakry Freetown Monrovia	
Guinea Bissau/Guninée Bissau	Bissau		Bissau	
Kenya	Nairobi		Nairobi Eldoret Mombasa	
Lesotho	Maseru		Maseru	
Libyan Arab Jamahiria	Benghazi Tripoli		Benghazi Tripoli Sebha	
Madagascar	Ivato		Ivato Mahajanga Toamasina	
Malawi	Lilongwe		Lilongwe	
Mali	Bamako		Bamako	
Mauritania/Mauritanie	Nouakchott Nouadhibou		Nouakchott Nouadhibou	
Mauritius	Mauritius		S.S. Ramgoolam	
Morocco/Maroc	Casablanca Agadir Fes Marrakech Ouarzazate Oujda Rabat-Sale Tangiers		Casablanca Agadir Fes Marrakech Ouarzazate Oujda Rabat-Sale Tangiers	

State/Etat	TMA	Type	Aerodromes	Type
Mozambique	Beira Maputo		Beira Maputo	
Namibia	Windhoek		Windhoek	
Niger	Niamey		Niamey	
Nigeria/Nigéria	Abuja Calabar Ilorin Kaduna Kano Lagos Maiduguri Port Harcourt Sokoto		Abuja Calabar Ilorin Kaduna Kano Lagos/Murtala Mhmd. Maiduguri Port Harcourt Sokoto	
Rwanda	Kigali		Kigali	
Sao Tome	Sao Tome		Sao Tome	
Senegal/Sénégal	Dakar		Dakar/L.S. Senghor	
Seychelles	Seychelles		Seychelles Int.	
Somalia/Somalie	Mogadishu		Mogadishu	
South Africa/Afrique du Sud	Bloemfontein Cape Town Durban East London George Johannesburg Lanseria Port Elizabeth		Bloemfontein Cape Town Durban East London George Johannesburg Lanseria Port Elizabeth	
Spain (Canary Islands) Espagne (îles Canaries)	Canarias		Gran Canaria Tenerife Sur Tenerife Norte Lanzarote Fuerteventura La Palma El Hierro	
Sudan	Khartoum		Khartoum	
Swaziland	Manzini		Manzini	
Togo	Lome Niamtougou		Lome Niamtougou	
Tunisia/Tunisie	Tunis Djerba Monastir Sfax Tabarka Tozeur		Tunis Djerba Monastir Sfax Tabarka Tozeur	
Uganda/Ouganda	Entebbe		Entebbe	
United Rep. of Tanzania/Tanzanie	Dar es Salaam		Dar es Salaam	
Zambia/Zambie	Lusaka Ndola		Lusaka Livingstone Ndola	
Zimbabwe	Harare		Harare	

Note: * means aerodrome not part of the AFI Plan / * signifie aérodrome ne faisant pas partie du Plan AFI.

APPENDIX F

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE AFI CNS/ATM IMPLEMENTATION CO-ORDINATION SUB-GROUP

1. Terms of reference

a) Ensure the continuing and coherent development of the AFI Regional Implementation Plan for CNS/ATM systems in the light of new developments, in harmony with the Global Plan Air Navigation Plan for CNS/ATM Systems (Global Plan) and the plans of adjacent regions;

b) Prepare cost/benefit analyses for CNS/ATM Implementation options;

c) Study institutional arrangements for the implementation of CNS/ATM systems in the AFI Region.

2. Work Programme

Item	Task description	Priority	Target date
1	Continue the evolutionary development of the AFI CNS/ATM Systems Implementation Plan (AFI/7 Concl. 13/1)	A	Continuing
2	Identify requirements for digital flight information service (D-FIS) and develop appropriate implementation worksheets for the concerned areas of routing (AFI/7 Concl. 13/1)	B	APIRG/15
3	Develop comprehensive business cases for competing CNS/ATM Implementation options for the Routing Areas.	A	Continuing
4	Co-ordinate plans developed by States, international organizations, airlines, and industry for the implementation of the regional CNS/ATM systems implementation plan	A	Continuing
5	Update on a regular basis, Chapter 2 and the tables of Part II of the Global Plan	B	Continuing
6	Review work being done by MIDANPIRG on the Egyptian initiative for a multi mission satellite based system dedicated to CNS/ATM services and advise thereon.	B	APIRG/15
7	Monitor the research and development, trials and demonstrations within the AFI Region and information from other regions	B	Continuing
8	Give further consideration to the concept of Multinational ICAO AFI Air Navigation Facility/Service addressed in the AFI/7 Report under Agenda Item 14; (AFI/7, Concl. 10/6c)	A	Continuing

Item	Task description	Priority	Target date
9	Identify and address as appropriate, all actions necessary, including funding, legal and institutional aspects, for the timely implementation of the AFI GNSS strategy. (AFI/7, Concl. 10/6)	A	APIRG/15
10	Establish and maintain current a data base on CNS/ATM planning and implementation in the AFI Region	B	APIRG/15
11	Review the report on categorization of TMAs and airports for further development of the surveillance plan and GNSS plan.	A	APIRG/15
12	Continue the development of the AFI Aeronautical Surveillance Plan	A	APIRG/15
13	Review, in due course, the requirements for the implementation of GBAS at identified locations, in accordance with the AFI GNSS strategy	C	

Priority:

A High priority tasks on which work should be speeded up;

B Medium priority tasks, on which work should be undertaken as soon as possible, but without detriment to priority A tasks;

C Lesser priority tasks, on which work should be undertaken as time and resources permit, but without detriment to priority A and B tasks.

Composition: Angola, Algeria, Botswana, Cameroon, Cape Verde, Côte d=Ivoire, Congo, D.R. of Congo, Egypt, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Kenya, Lesotho, Mali, Mauritania, Morocco, Nigeria, Niger, Senegal, Seychelles, South Africa, Spain, Tunisia, Tanzania, Zambia, Arab Civil Aviation Commission (ACAC), ASECNA, IATA, IFALPA, IFATCA.
