



INTERNATIONAL CIVIL AVIATION ORGANIZATION
TWELFTH MEETING ON THE IMPROVEMENT OF THE AIR TRAFFIC SERVICES IN THE SOUTH ATLANTIC

(Sal, Cape Verde, 15 – 17 December 2004)

Agenda Item 5: CNS/ATM Systems Implementation.

(Presented by the Secretariat)

Summary

This working paper presents the ATM Evolution Tables - En route operations- of the CAR/SAM Regional Plan for the Implementation of CNS/ATM Systems, Document II, Action Plan, as amended by GREPECAS.

1 Introduction

1.1 The ATM Evolution Tables -en route operations- for the Homogeneous Areas 1 and 8 (AH1 and AH8) were developed by the CAR/SAM Regional planning and Implementation Group (GREPECAS) for inclusion in the CAR/SAM Regional Plan for the Implementation of CNS/ATM Systems, Document II, Action Plan and then approved by the RAN CAR/SAM/3 Meeting (Buenos Aires, Argentina, 1999) for inclusion in the Air Navigation Plan, Document FASID.

2 Discussion

2.1 In light of the studies carried out by the RLA/98/003 Project, taking into consideration the on-going RVSM, RNP and RNAV routes implementation programmes, as well as the activities carried out by the South Atlantic Group (SAT), the GREPECAS/12 Meeting analyzed the corresponding ATM Evolution Tables for the 18 Air Traffic Flows identified in the CAR/SAM Regions, including the Atlantic Ocean.

2.2 When revising and updating the ATM Evolution Tables, new requirements have been considered such as common implementation dates for most Air Traffic Flows and the ATM functions that would not be implemented were deleted. Therefore, in addition to having a more realistic planning, the implementation process of the relevant ATM elements shown in the attached Tables can be initiated.

2.3 The Meeting considered that the ATM evolution Tables should be reviewed every two years, and amended as necessary. In this connection, GREPECAS/12 requested the Secretariat to amend the ATM Evolution Tables in the CAR/SAM Regional Plan for the Implementation of CNS/ATM Systems, Document II, Action Plan.

3 Action by the meeting

3.1 The meeting is invited to take into account the information provided at Appendix A to this paper when considering the harmonization of the CAR/SAM and AFI ANPs.

APPENDIX A
ATM EVOLUTION IN THE CAR/SAM REGIONS – EN-ROUTE OPERATIONS – AH1
(Table 4)

1. Traffic flow	Sao Paulo/Rio de Janeiro – Europe (AH1)	5. Current operational situation			
2. Airspace	Continental/Oceanic	<ul style="list-style-type: none"> ▣ 10 min / 80 NM MNT longitudinal separation ▣ Standard vertical separation / RVSM in EUR/SAM corridor ▣ Continental conventional lateral separation according to SARPs ▣ 50 NM lateral oceanic separation ▣ ATS RNAV – RNP 10 routes ▣ Radar surveillance partially available ▣ Satisfactory ATS speech communication coordination ▣ Satisfactory AMS communications ▣ New and old generation aircraft fleet 			
3. Traffic density (5)	Low				
4. FIRs involved	Atlántico, Brasilia, Recife (Dakar – AFI)				
6. ATM evolution	7. Minimum on-board requirements	8. Minimum ground requirement services	9. Imp. date	10. Remarks	
11. ATS tracks/routes					
▣ Fixed RNAV routes	<ul style="list-style-type: none"> ▣ RNAV capacity ▣ RNP 4 or 5 approval ▣ DCPC voice (3) 	<ul style="list-style-type: none"> ▣ RNP 4 or 5 publication ▣ DCPC voice (1) (3) ▣ Ground-ground speech com. (3) 	2008 (4)	<ul style="list-style-type: none"> ▣ RNP certification and publication will depend on airspace and/or ATS routes concerned ▣ When necessary, civil/military coordination for the location/redesign of prohibited and restricted zones will be required ▣ Applicable in continental airspace ▣ Non applicable in EUR/SAM corridor 	
▣ Random RNAV routes	<ul style="list-style-type: none"> ▣ RNAV capacity ▣ RNP 10 certification ▣ DCPC voice (3) 	<ul style="list-style-type: none"> ▣ RNP 10 publication ▣ DCPC voice (1) (3) ▣ Ground-ground speech com. (3) 	2006	<ul style="list-style-type: none"> ▣ RNP certification and publication will depend on airspace and/or ATS routes concerned: <ul style="list-style-type: none"> - EUR/SAM corridor 2006 - Continental airspace TBD ▣ When necessary, civil/military agreement for flexible use of airspace will be required 	
▣ Autonomous flight	To be developed	To be developed	To be developed	▣ Concept being defined by ICAO	
12. Longitudinal separations between aircraft in ATS tracks/routes					
▣ 50 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▣ FMS (2) ▣ RNP 10 certification ▣ DCPC voice (3) 	<ul style="list-style-type: none"> ▣ RNP 10 publication ▣ DCPC voice (1) ▣ Ground-ground speech com. (3) ▣ MNT application ▣ 30' maximum position information 	2006	<ul style="list-style-type: none"> ▣ Applicable in EUR/SAM corridor ▣ Non-applicable in continental airspace 	
▣ 30 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▣ FMS (2) ▣ RNP 4 approval ▣ DCPC voice ▣ ADS / CPDLC 	<ul style="list-style-type: none"> ▣ RNP 4 publication ▣ DCPC voice ▣ Ground-ground speech com. / AIDC (3) ▣ MNT application ▣ ADS / CPDLC 	2010	<ul style="list-style-type: none"> ▣ Applicable in EUR/SAM corridor ▣ Non-applicable in continental airspace 	
13. Spacing between ATS tracks/routes					
▣ 30 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▣ RNP 4 approval ▣ DCPC voice ▣ ADS / CPDLC 	<ul style="list-style-type: none"> ▣ RNP 4 publication ▣ DCPC voice ▣ Ground-ground speech com./AIDC (3) ▣ ADS / CPDLC 	2010	<ul style="list-style-type: none"> ▣ Applicable in EUR/SAM corridor ▣ Non-applicable in continental airspace 	
▣ 18 NM minimum (bidirectional) (non radar environment)	<ul style="list-style-type: none"> ▣ RNP 4 or 5 certification approval ▣ VHF DCPC voice 	<ul style="list-style-type: none"> ▣ RNP 4 or 5 publication ▣ VHF DCPC voice ▣ Ground-ground speech com./AIDC (3) ▣ Appropriate NAV infrastructure 	2010	<ul style="list-style-type: none"> ▣ Applicable in continental airspace ▣ Non applicable in EUR/SAM corridor ▣ See Note (6) 	
▣ 16.5 minimum (unidirectional) (non radar environment)	<ul style="list-style-type: none"> ▣ RNP 4 approval ▣ VHF DCPC voice 	<ul style="list-style-type: none"> ▣ RNP 4 publication ▣ VHF DCPC voice ▣ Ground-ground speech com./AIDC (3) ▣ Appropriate NAV infrastructure 	2010	<ul style="list-style-type: none"> ▣ Applicable in continental airspace ▣ Non applicable in EUR/SAM corridor ▣ See Note (6) 	
▣ Between 10 and 15 NM (radar environment)	<ul style="list-style-type: none"> ▣ RNP 4 or 5 approval ▣ VHF DCPC voice ▣ SSR transponder 	<ul style="list-style-type: none"> ▣ RNP 4 or 5 publication ▣ VHF DCPC voice ▣ Ground-ground speech com./AIDC (3) ▣ Appropriate NAV infrastructure ▣ Radar surveillance 	To be developed	<ul style="list-style-type: none"> ▣ Applicable in continental airspace ▣ Non applicable in EUR/SAM corridor ▣ See Note (6) 	
▣ Between 8 and 12 NM (radar environment)	<ul style="list-style-type: none"> ▣ RNP 4 certification ▣ VHF DCPC voice ▣ SSR transponder 	<ul style="list-style-type: none"> ▣ RNP 4 publication ▣ VHF DCPC voice ▣ Ground-ground speech com./AIDC (3) ▣ Appropriate NAV infrastructure ▣ Radar surveillance 	To be developed	<ul style="list-style-type: none"> ▣ Applicable in continental airspace ▣ Non applicable in EUR/SAM corridor ▣ See Note (6) 	
14. Reduced vertical separation minima					
▣ RVSM 1 000 ft between FL290 and 410	<ul style="list-style-type: none"> ▣ RVSM certification ▣ DCPC voice (3) 	<ul style="list-style-type: none"> ▣ Supervision of system performance* ▣ DCPC voice (3) ▣ Ground-ground speech com. 	2005	<ul style="list-style-type: none"> ▣ Applicable in continental airspace ▣ Full operational capability in 2006 ▣ *Refer to Doc 9574, <i>Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive</i> ▣ Planning elaborated by South Atlantic (SAT) group of States 	
15. Airspace organization and management (AOM)					
▣ Enhanced flexible use of airspace	<ul style="list-style-type: none"> ▣ Nav. capacity according to airspace ▣ DCPC voice (3) ▣ Data link 	<ul style="list-style-type: none"> ▣ DCPC voice ▣ Ground-ground speech com./AIDC (3) ▣ Com. with military units ▣ Civil/military coordination ▣ Automation 	2012	<ul style="list-style-type: none"> ▣ Agreements are required to optimize the use of prohibited and restricted zones to achieve ATS routes as direct as possible ▣ Database will contain information such as airspace reserves, aeronautical information, aerodromes, traffic, MET, SAR, etc. 	

16. Air traffic flow management (ATFM)				
FMU (7)	Data link	Automation Voice and data com. (ICC) (8)	2008	Database will contain information such as airspace reserves, aeronautical information, aerodromes, traffic, MET, SAR, etc.
ATFM	Data link	Automation Voice and data com. (ICC) (8)	2010	Centralized ATFM requires a regional agreement Database will contain information such as airspace reserves, aeronautical information, aerodromes, traffic, MET, SAR, etc.

1. Speech communications through a third party (aeronautical telecommunications station) at the criterion of competent ATS authority on the basis of an evaluation of the impact of this communications method in the provision of ATS and the consequent effect of the safety of air operations within the airspace in question.
2. It is assumed that FMS availability includes RNAV capacity.
3. For air traffic services, radiotelephony will be used in air-ground and ground-ground communications and could be improved with data link .
4. Date refers to implementation of new RNAV routes with RNP requirements.
5. Traffic is considered to be of high density when 100 aircraft or more operate at a given time within a circling having a radius of 250 NM.
6. En-route lateral separation systems require periodical and conformity regional operational safety assessment
7. FMU: Flow Management Unit
8. ICC (Inter-Centre Communications): Data communications between ATS units to support ATS, such as notification, coordination, transfer of control, flight planning, airspace management and air traffic flow management.

APPENDIX A
ATM EVOLUTION IN THE CAR/SAM REGIONS — EN-ROUTE OPERATIONS — AH8
(Table 17)

1. Traffic flow	South America – South Africa (AFI) (AH8)	5. Current operational situation		
2. Airspace	Oceanic	<ul style="list-style-type: none"> ▫ 30 min longitudinal separation ▫ Standard vertical separation ▫ 120 NM oceanic lateral separation ▫ ATS ↓ RNAV routes ▫ Radar surveillance unavailable ▫ Unsatisfactory ATS speech communication coordination ▫ Partially satisfactory AMS communications ▫ New and old generation aircraft fleet 		
3. Traffic density (5)	Low			
4. FIRs involved	Atlántico, Ezeiza Oceánica, Montevideo, Johannesburg (AFI)			
6. ATM evolution	7. Minimum on-board requirements	8. Minimum ground requirement services	9. Imp. date	10. Remarks
11. Tracks / ATS routes				
▫ Random RNAV routes	<ul style="list-style-type: none"> ▫ RNAV capacity ▫ RNP 4X approval ▫ DCPC voice (3) 	<ul style="list-style-type: none"> ▫ RNP X publication ▫ DCPC voice (1) (3) ▫ Ground-ground speech com. (3) 	2006	<ul style="list-style-type: none"> ▫ RNP certification and publication will depend on airspace and/or ATS routes concerned ▫ When necessary, civil/military agreement for flexible use of airspace will be required
▫ Autonomous flight	To be developed	To be developed	To be developed	▫ Concept being defined by ICAO
12. Longitudinal separations between aircraft in ATS tracks/routes				
▫ 80 NM minimum RNAV (non radar environment)	<ul style="list-style-type: none"> ▫ RNAV capacity ▫ DCPC voice (3) 	<ul style="list-style-type: none"> ▫ DCPC voice (1) (3) ▫ Ground-ground speech com. (3) ▫ MNT application ▫ 60' maximum position information 	To be developed	
▫ 50 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▫ FMS (2) ▫ RNP 10 approval ▫ DCPC voice (3) 	<ul style="list-style-type: none"> ▫ RNP 10 publication ▫ DCPC voice (1) ▫ Ground-ground speech com. (3) ▫ MNT application ▫ 30' maximum position information 	To be developed	
▫ 30 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▫ FMS (2) ▫ RNP 4 approval ▫ DCPC voice ▫ ADS / CPDLC 	<ul style="list-style-type: none"> ▫ RNP 4 publication ▫ DCPC voice ▫ Ground-ground speech com. / AIDC (3) ▫ MNT application ▫ ADS presentation 	To be developed	
13. Spacing between ATS tracks/routes				
▫ 50 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▫ RNP 10 approval ▫ DCPC voice (3) 	<ul style="list-style-type: none"> ▫ RNP 10 publication ▫ DCPC voice (1) (3) ▫ Ground-ground speech com. (3) 	To be developed	
▫ 30 NM minimum (non radar environment)	<ul style="list-style-type: none"> ▫ RNP 4 approval ▫ DCPC voice ▫ ADS / CPDLC 	<ul style="list-style-type: none"> ▫ RNP 4 publication ▫ DCPC voice ▫ Ground-ground speech com./AIDC (3) ▫ ADS / CPDLC 	To be developed	
14. Reduced vertical separation minima				
▫ RVSM 1 000 ft between FL290 and 410	<ul style="list-style-type: none"> ▫ RVSM certification ▫ DCPC voice (3) 	<ul style="list-style-type: none"> ▫ Supervision of system performance* ▫ DCPC voice (3) ▫ Ground-ground speech COM. 	2005	<ul style="list-style-type: none"> ▫ Regional agreement required ▫ Full operational capability on 2006 ▫ *Refer to Doc 9574, <i>Manual on Implementation of a 300 m (1 000 ft) Vertical Separation Minimum Between FL 290 and FL 410 Inclusive</i>
15. Airspace organization and management (AOM)				
▫ Enhanced flexible use of airspace	<ul style="list-style-type: none"> ▫ Nav. capacity according to airspace ▫ DCPC voice (3) ▫ Data link 	<ul style="list-style-type: none"> ▫ DCPC voice ▫ Ground-ground speech com./AIDC (3) ▫ Com. with military units ▫ Civil/military coordination ▫ Automation 	2012	<ul style="list-style-type: none"> ▫ Agreements are required to optimize the use of prohibited and restricted zones to achieve ATS routes as direct as possible ▫ Database will contain information such as airspace reserves, aeronautical information, aerodromes, traffic, MET, SAR, etc.
16. Air traffic flow management (ATFM)				
▫ FMU (7)	▫ Data link	<ul style="list-style-type: none"> ▫ Automation ▫ Voice and data com. (ICC) (8) 	2008	Database will contain information such as airspace reserves, aeronautical information, aerodromes, traffic, MET, SAR, etc.
▫ ATFM	▫ Data link	<ul style="list-style-type: none"> ▫ Automation ▫ Voice and data com. (ICC) (8) 	2010	<ul style="list-style-type: none"> ▫ Centralized ATFM requires a regional agreement ▫ Database will contain information such as airspace reserves, aeronautical information, aerodromes, traffic, MET, SAR, etc.

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