

# INTERNATIONAL CIVIL AVIATION ORGANIZATION



**MEETINGS OF THE TASK FORCE, RANDOM ROUTING STUDY GROUP AND  
TECHNICAL WORKING GROUP ESTABLISHED BY THE  
ELEVENTH INFORMAL MEETING ON THE IMPROVEMENT OF THE AIR  
TRAFFIC SERVICES IN THE SOUTH ATLANTIC**

*(Rio de Janeiro, Brazil, 13 – 16 April 2004)*

## **R E P O R T**

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## **History of the meeting**

### **ii-1 Introduction**

ii-1.1 The meeting of the SAT/11 Task Force was held in Rio de Janeiro, Brazil, from 13 to 16 April 2004. The meeting was hosted by Brazil and was held at the Copacabana Excelsior Hotel.

ii-1.2 The meeting was officially opened by Mr Carlos Cirilo, Brazilian aeronautical authority, who welcomed the participants and wished them fruitful deliberations and a nice stay in Brazil. In his welcome address, Mr. Cirilio emphasized the importance of Informal South Atlantic Meetings, in particular in the context of the implementation of the CNS/ATM systems. The CNS Regional Officer, from the ICAO Western and Central African Office, Mr. Prosper Zo'o-Minto'o, also addressed the meeting and extended his warm welcome to the delegates. He thanked the Brazilian authorities for the arrangement of the meeting and expressed happiness on the effort being made by the SAT Group to implement CNS/ATM applications.

ii-1.3 Mr. Julio Pereira, ATM Officer of DECEA, Brazil, was unanimously elected as Chairman of the meeting.

ii-1.4 Mr. Prosper Zo'o-Minto'o, was the Secretary of the meeting. He was assisted by Mr. Jorge Fernandez Demarco, ATM Regional Officer from the ICAO, Lima Office.

### **ii-2 Attendance**

ii-2.1 The meeting was attended by XX participants from 7 contracting States (Angola, Argentina, Brazil, Portugal, Senegal, South Africa, Spain), 3 international organizations (ASECNA, IATA, SITA), 2 airline operators (TAP, VARIG) and Jeppesen.

ii-2.2 The List of participants is shown at **Appendix A** to this report.

### **ii-3 Working language**

ii-3.1 The meeting was conducted in English and documentation was made available in this language.

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## Agenda

The meeting adopted at its opening session the following agenda:

Agenda Item 1 : Review of the Terms of reference and work programmes of SAT/11 Task Force, Random RNAV Routing Study Group and Technical Working Group.

Agenda item 2: Discussion on SAT/11 Task Force (TF) Terms of Reference and its assigned tasks

1. Review of SATMA report on post-implementation safety assessments for RVSM and RNP operations in the EUR/SAM Corridor.
2. Feasibility of a relevant and appropriate cost recovery mechanism for SATMA
3. Establishment of RVSM, RNP/RNAV procedures for the AFI/CAR/SAM and EUR/SAM Interface area.
4. Monitoring of flight plan availability and proposals for corrective measures.
5. Appropriate measures for the elimination of ATM and CNS deficiencies.
6. Development of operational guidance material with a view to ensuring harmonization and standardization of ADS/CPDLC applications.
7. Applicability of emerging ATM concepts and systems within the SAT area.

Agenda Item 3 : Discussion on SAT/11 Random RNAV Routing (RRSG) Terms of Reference and its assigned tasks

1. Review of the necessary steps to achieve the timely implementation of random RNAV routing in the AR1/AH2 and AR2/AH8 routing areas, in accordance with the respective CNS/ATM plans.
2. Preparation of all relevant elements in view of the implementation of random RNAV routing, including required safety assessments, implementation timescales and related cost-benefit analyses for consideration by SAT/12.

Agenda Item 4 : Discussion on SAT/11 Technical Working Group (TWG) Terms of Reference and its assigned tasks

1. Studies related to the expansion of CAFSAT network to cater for aeronautical telecommunication requirements within the SAT Region. Such studies should include coordination issues, service channel interfaces, monitoring and control system

- architecture, system availability, expansion of nodes and services, user interfaces and bandwidth monitoring.
2. Investigations on the lack of flight plans, including individual cases, with emphasis on the aeronautical fixed telecommunication network (links, switching centres, routing directory and transit time statistics).
  3. Feasibility and cost-effectiveness of internetworking between existing VSAT networks (AFISNET, CAFSAT, REDDIG, SADC) and other emerging networks .
  4. Support and monitoring of activities related to the integration/interoperability of existing VSAT networks (AFISNET, CAFSAT, REDDIG, SADC) aimed at achieving a consolidated, seamless and cost-effective network.
  5. Implementation time-frames in the AFI and SAM CNS/ATM implementation plans, address cost-benefit aspects for the use of CNS/ATM applications.
  6. Harmonization of aeronautical fixed services (AFS) end-to-end protocols.
  7. Use of existing or emerging digital VSAT networks (AFISNET, CAFSAT, , REDDIG, SADC, etc.) in order to implement data link systems to support ATN applications within the SAT area.
  8. Harmonization of the technical aspects of ADS/CPDLC programmes developed by SAT States/FIRS, taking due account of operational requirements. Harmonization of ADS/CPDLC should address issues such as the use of common standards, transmission protocols, data formats, procedures, methods of work, etc...

Agenda Item 5 : Any other Business.

- Contingency planning
- Date and venue of SAT/12 Meeting

**Agenda Item 1 :        Review of the Terms of reference and work programmes of SAT/11 Task Force, Random RNAV Routing Study Group and Technical Working Group.**

1.1        Under this agenda item, the meeting reviewed the terms of reference and work programmes of SAT/11 established Task Force, Random RNAV Routing Study Group and Technical Working Group, as shown at **Appendices B1, B2 and B3** to this report.



**Agenda item 2: Discussion on SAT/11 Task Force (TF) Terms of Reference and its assigned tasks**

**Monitoring of missing flight plans and discussion of corrective measures.**

2.1 The meeting was presented with status reports on missing flight plans established by Brazil, Senegal and South Africa as requested by SAT previous meetings. It recalled SAT8 Conclusion 4/1, SAT/9 Conclusion 3/1, SAT/10 Conclusion 10/3 and SAT/11 Conclusion 11/1 relating to the phenomenon of missing flight plans and expressed great concern at its persistence and magnitude in the EUR/SAM Corridor (an RNP/10 and RVSM environment) as shown at **Appendix C** to this report providing detailed statistical data compiled by Brazil and Senegal in 2003 and 2004.

2.2 After discussions, the meeting reiterated the need for continued vigilance and on site management, and formulated the following decision and conclusions:

**Decision SAT/11 TF/01: Status reports on missing flight plans in SAT area**

- **That the reporting format adopted by SAT/11 for the ACCs monthly status reports on missing plans (Conclusion SAT/11 TF/1 refers) be amended by the Secretariat to include additional information (e.g. explanatory elements such as the reason for the shortcoming).**

**Conclusion SAT/11 TF/02: Need for further investigations on the lack of flight plans and designation of ACC focal points of contacts**

- **That SAT ACCs:**
  - a) **Continue to carry out investigations on the lack of flight plans, case by case; and**
  - b) **Designate their focal points of contact for the conduct and coordination of the investigations as required; the ACC designated focal points of contact (one per ACC) should be communicated to other ACCs and ICAO Regional Offices with their coordinates (names, telephone numbers, fax numbers, electronic mail addresses, etc.)**

**Conclusion SAT/11 TF/03: Investigation on users FPL procedures**

- **That, in addition to ACC investigations, IATA analyze and evaluate the reliability of the flight plan procedure used by a selected member airline involved with the missing flight plans in the SAT area, and inform SAT members of their findings.**

**Development of operational guidance material with a view to ensuring harmonization and standardization of ADS/CPDLC applications.**

***ADS/CPDLC trials/evaluation in an operational environment***

2.3 The meeting was informed by ATNS, South Africa that the introduction of ADS significantly changed the way air traffic control is performed in Oceanic and other remote areas that are beyond the coverage of land-based communication and surveillance systems, the accurate and timely indication of an aircraft's position and reliable communications being the key to the operation of a safe, responsive and effective ATC system in these areas. In effect, ADS capabilities enable the air traffic controller to monitor flight progress, ensure safe separation of aircraft. The meeting noted that ATNS has made an

ADS/CPDLC service available in its area of responsibility since 1999, allowing for enhanced communication and surveillance in remote areas, including the transitioning areas between Angolan, Namibian, South American and South African managed airspace, and that the ATNS ADS/CPDLC service is willing to accommodate in any ADS/CPDLC validation process within the South Atlantic Ocean and adjacent continental AFI areas for operations and for trials and demonstrations. The following conclusion was formulated:

**Conclusion SAT/11 TF/04: Use of ADS/CPDLC applications**

- **That users be informed of the availability of ADS/CPDLC in the South Atlantic Ocean and adjacent continental AFI areas for operations and for trials and demonstrations, and be encouraged to make use of ADS/CPDLC in areas where these systems are operational.**

***Adoption of FANS1/A Operations Manual in the South Atlantic/Establishment of FANS Interoperability Team***

2.4 The meeting considered its assigned task concerning the development of operational guidance material with a view to ensuring harmonization and standardization of ADS/CPDLC applications. It recalled that, though currently supported by non-ATN SARPs compliant data link services provided by ARINC and SITA data link services, FANS-1/A operations had been introduced in many regions. In this respect, the meeting was informed that the Informal Pacific ATC Co-ordinating Group (IPACG), the Informal South Pacific ATC Co-ordinating Group (ISPACG), the Informal Indian Ocean Co-ordinating Group (IIOCG), and the Bay of Bengal (BOB) had developed a common FANS-1/A Operations Manual in order to harmonize operational procedures and to ensure systems interoperability. It therefore agreed that this Operations Manual should be adopted by adding SAT FIRs to its area of applicability, as a means of ensuring the desired harmonization between these FIRs and with adjacent areas, and requested States comments thereon before its submission to SAT/12. The following decision was adopted:

**Decision SAT/11 TF/05: Adoption of FANS 1/A operational manual**

- **That SAT ACCs and users provide the Secretariat with their comments on the FANS 1/A manual presented to the SAT/11 Task Force meeting before it is submitted to SAT/12 meeting for adoption with a view to ensuring harmonization of ADS/CPDLC procedures/systems with other regions.**

2.5 The meeting similarly recommended the establishment of SAT FANS Interoperability Team (FIT) composed of SAT member States and Organizations, airline operators, aircraft manufacturers and data link providers, and tasked with addressing all aspects related to ADS/CPDL system interoperability. The following conclusion was formulated accordingly:

**Conclusion SAT/11 TF/06: Creation of a FANS 1/A Interoperability Team (FIT)**

- **That a SAT FANS 1/A Interoperability Team (FIT) be created to oversee the monitoring of FANS 1/A system to ensure that it continues to meet its performance, safety and interoperability requirements and that operations and procedures are working as specified. The FIT main objectives are to:**
  - a) follow the ADS/CPDLC trials conducted by SAT States, as required;**
  - b) review identified problem reports and determine appropriate resolution;**

- c) **develop interim operational procedures to mitigate the effects of problems until such time as they are resolved;**
- d) **monitor the progress of problem resolution;**
- e) **prepare summaries of problems encountered and their operational implications;**
- f) **assess system performance based on information in CRA periodic reports; and**
- g) **authorize and co-ordinate system testing.**

*Note: The Secretariat should contact all parties involved: ATS provider States and Organizations, users, industry (Airbus, Boeing, ARINC, SITA), etc.*

#### **Flight level allocation scheme (FLAS) in the EUR/SAM corridor**

2.6 The meeting was informed that in order to harmonize the RVSM operations with the adjacent ICAO Regions (NAM, NAT and PAC), CAR/SAM States involved in RVSM implementation by January 20, 2005 should apply ICAO Annex 2 – *Rules of the Air*, Appendix 3 flight level allocation scheme. Furthermore, it recalled that the RVSM post-implementation flight level allocation scheme adopted by Brazil, Cape Verde, Senegal and Spain in the EUR/SAM Corridor, was not compliant with Annex 2 provisions in order to accommodate Canaries and Recife ACCs requirements.

2.7 The meeting anticipated the difficulties that might be encountered in Recife FIR due to FLAS incompatibility, and accordingly agreed that EUR/SAM Corridor States should conform to the provisions in Annex 2, Appendix 3. It consequently analyzed the possible impact of this change in the southern part of Canaries FIR, and the need to establish a transition area and to carry out the necessary coordination with Portugal before making a final decision. The following conclusion was formulated:

#### **Conclusion SAT/11 TF/07: RVSM flight level allocation scheme applicable in the EUR/SAM Corridor**

- **That Brazil, Cape Verde, Senegal and Spain analyze and take the appropriate actions as necessary for the establishment of a new flight level allocation scheme in the EUR/SAM corridor, in accordance with Appendix 3 of ICAO Annex 2 before the end of May 2004, in order to publish a common AIP on November 25, 2004, to come into force on January 20, 2005.**

*Note: The Secretariat should carry out consultations with States concerned for the adoption of the above conclusion before SAT/12 meeting.*

#### **Data collection for RVSM/RNP10 post - implementation report**

2.8 The meeting recalled SAT Conclusions 10/1 – *Data collection procedures and presentation of statistical data* – and 10/2 – *RNP/10 and RVSM post-implementation programme* – requesting the South Atlantic Monitoring Agency (SATMA) to:

- develop a post-implementation assessment programme in order to ensure the stability, safety and efficiency of the new environment after the implementation of RNP/10 and RVSM, and
- provide SAT and SAT Task force meetings with safety assessment reports, based on traffic data compiled by all ACCs in accordance with established procedures.

2.9 The meeting therefore reminded ACCs and users of their duties in this respect in order for safety assessments to reliably reflect traffic characteristics in the EUR/SAM Corridor, thus giving the exact level of safety. It also reconsidered the need for a new reporting format as discussed at SAT/11, the current

deviation notification format having been adopted by the AFI Regional Monitoring Agency (ATNS, South Africa), and decided that it should be maintained to ensure compatibility. The current deviation notification format is accessible on SATMA Website ([www.satmasat.com](http://www.satmasat.com)).

### **RVSM and RNP exemptions**

2.10 The meeting discussed at length a proposal to allow RVSM and RNP/10 exemptions in the EUR/SAM Corridor, such exemptions being in force in several areas where RVSM and RNP/10 operations have been implemented (e.g. WATRS and ASIA/PAC). Likewise, exemptions will be allowed in CAR/SAM, in accordance with the RVSM AIC published by all CAR/SAM States on April 17, 2003.

2.11 It recalled that, when considering the issue of RVSM and RNP/10 exemptions in the EUR/SAM Corridor for the benefit of non-approved aircraft flights (such as: ferry flights, maintenance flights, and humanitarian flights) SAT previous meetings opted not to formalize these exemptions and agreed that they should be addressed on a case-by-case basis (Conclusion SAT 11/...refers). The meeting further analyzed this issue, based on existing examples and plans in other regions and with due consideration to traffic density in the EUR/SAM corridor. Furthermore, it recognized that RVSM provisions in Doc 7030 state that “*exceptionally, aircraft that have not received RVSM state approval may be cleared to operate in airspace where RVSM may be applied in accordance with policy and procedures established by the State provided that 600 m (2000 ft) vertical separation is applied.*”

2.12 The meeting therefore recommended that States responsible for the provision of air traffic services in the EUR/SAM Corridor might consider authorizing temporary RVSM/RNP/10 exemptions for non-approved under the following circumstances:

- a) the aircraft is being initially delivered to the State of Registry or Operator.*
- b) the aircraft was formally RVSM/RNP-10 approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM/RNP-10 requirements and/or obtain approval.*
- c) the aircraft is being utilized for mercy or humanitarian purposes.*

2.14 It was also agreed that the EUR/SAM Corridor Airspace being at the interface between AFI, CAR/SAM and EUR Regions and considering the peculiarities of the European airspace, that is one of the busiest airspace in the world, the exemptions should be limited to Atlantico/Recife FIRs, Canarias FIR (Southern part only<sup>1</sup>), Dakar FIR and Sal FIR. These FIRs should accordingly publish necessary aeronautical information (AIP/SUPP) by using the model attached to this report at **Appendix D**. The following conclusion was adopted:

### **Conclusion SAT/11 TF/08: RVSM and RNP/10 exemptions**

- **That, pursuant to SAT Conclusion 11/8, Brazil, Cape Verde, Senegal and Spain publish on November 25, 2004 (AIRAC date) a common AIP Supplement establishing Special Coordination Procedures for Cruise Operation of Non-RVSM/RNP10 Compliant Aircraft in RVSM/RNP10 Airspace of EUR/SAM Corridor as shown at Appendix D to the report, to come into force on January 20, 2005.**

*Note: The Secretariat should contact Cape Verde as soon as possible for timely approval.*

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<sup>1</sup> In order to prevent non – approved aircraft from entering the European RVSM airspace.

**RVSM implementation in the interface between AFI and SAM regions**

2.15 The meeting was informed that preparations were underway for the timely implementation of RVSM in CAR/SAM Region, i.e. by January 20, 2005, whilst a “go/no go decision” was expected in the AFI Region during the second half of 2004. The meeting therefore analyzed RVSM implementation options at the interface between AFI and SAM Regions, particularly in Atlantico, Johannesburg and Luanda oceanic FIRs, assuming that RVSM implementation might be delayed in Johannesburg and Luanda FIRs. The following options were considered by order of priority:

**a) RVSM implementation in Johannesburg and Luanda oceanic FIRs**

2.16 Ideally, RVSM should be implemented in AR1/AH2 and AR2/AH8 (including Johannesburg and Luanda oceanic FIRs) coincidentally with the CAR/SAM Region, in accordance with SAT Conclusion 11/17, in order to offer preferred flight profiles to aircraft operating between Johannesburg and São Paulo/Guarulhos (about 40 flights per month) and between Luanda and Rio de Janeiro/Galeão (about 10 flights per month)<sup>2</sup>. In this case, corresponding transition areas will have to be established in the continental parts of Johannesburg and Luanda FIRs.

**b) Implementation of ICAO Annex 2 Appendix 3 a) (Table of Cruising Levels), maintaining the separation minimum of 2000 ft.**

2.17 Taking into consideration the very low density of traffic in the southern part of the EUR/SAM Corridor, the adoption of *ICAO Annex 2, Appendix 3 a) - Table of Cruising Levels* - in Johannesburg and Luanda oceanic FIRs maintaining the vertical separation minimum of 2000 ft, should be a suitable solution. In this case, all flight levels (i.e. FL 300, 320,...etc) would be utilized. The vertical separation minimum of 2000 ft will avoid unnecessary exclusion of non-approved RVSM aircraft. As mentioned in para. 2.16 above, corresponding transition areas will have to be established in the continental parts of Johannesburg and Luanda FIRs.

**c) Delay of the RVSM implementation in Atlantico FIR until the RVSM implementation in the Johannesburg and Luanda FIRs.**

2.18 In case options a) and b) hereabove cannot be implemented, then RVSM implementation should be postponed in Atlantico FIR until one of these options becomes applicable, in order to avoid the establishment of a transition area over the South Atlantic (an HF environment without surveillance facilities).

2.19 The following conclusion was formulated accordingly:

**Conclusion SAT/11 TF/09: RVSM implementation in the AFI/CAR-SAM interface**

- **That States take the appropriate measures to achieve full implementation of RVSM in the SAT area (AR1/AH2 and AR2/AH8) coincidentally with the CAR/SAM Region, in January 2005, in accordance with SAT Conclusion 11/17; otherwise, the postponement of RVSM implementation in Atlantico FIR and the southern part of Ezeiza and Montevideo FIRs might have to be considered due to VHF and/or radar requirements for transition areas.**

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<sup>2</sup> According to CARSAMMA database.

**SAT RMA Handbook**

2.20 The meeting recalled SAT Conclusion 11/...and reiterated the need for SATMA to adopt the RMA Handbook developed by SASP whose publication as an ICAO manual is expected by the end of 2006, to ensure harmonization of monitoring procedures worldwide. It particularly requested SATMA to ascertain whether all the parameters defined in Doc 9574, Chapter 6 - *System Performance Monitoring* - were duly taken into account when performing safety assessments and, such being the case, to continuously monitor these parameters. SATMA should also monitor the approval status of all operators and aircraft using the EUR/SAM Corridor. The following decision and conclusion were therefore formulated:

**Decision SAT/11 TF/10: Analysis of RVSM safety assessment parameters and aircraft/operator approval status**

- **That SATMA take the appropriate actions in order to:**
  - a) **analyze :**
    1. **the parameters that were taken into account in the RVSM safety assessments, in accordance with ICAO Doc. 9574, Chapter 6 – System Performance Monitoring; and**
    2. **the approval status of operators and aircraft using EUR/SAM Corridor Airspace; and**
  - b) **present the results to SAT/12 meeting.**

**Conclusion SAT/11 TF/11: Integrity/Accuracy of SATMA information on RVSM approval status of aircraft and operators**

- **That SATMA harmonize its database on RVSM approval status of aircraft and operators in order to avoid discrepancies and to prevent flights from undue penalties and safety risks.**
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**Agenda Item 3 : Discussion on SAT/11 Random RNAV Routing (RRSG) Terms of Reference and its assigned tasks**

**Implementation options for the introduction of Random RNAV routing in the South Atlantic**

3.1 The Meeting recalled SAT/11 Conclusions 11/9 on its creation and 11/10 on the introduction of random RNAV routing in the EUR/SAM Corridor (AR1/HA2) and AFI/NAT/SAM Interface (AR2/HA8) at AIRAC date of November 2005.

3.2 In addressing its assigned work, the Meeting considered four (4) implementation options proposed by South Africa, each of these options being a stand-alone proposal with the possibility of considering the various options as phases. It noted that these proposals had been circulated to all members in October 2003 for comments and that only Argentina and Uruguay had provided their comments before the meeting.

3.3 Proposals included a graphic depiction of each option, together with the suggested wording for a proposed AIP Supplement, a short explanation of each of the options and a list of any related advantages or disadvantages. These four (4) options are summarized as follows:

| Options | Description   |
|---------|---|
| 1       | Option 1 includes: <ul style="list-style-type: none"> <li>• All of the Johannesburg Oceanic FIR west of and abutting the IORRA north of 60°S;</li> <li>• Most of the oceanic areas of the Luanda FIR Oceanic area;</li> <li>• Most of the oceanic areas of the Comodoro Rividavia FIR north of 60°S;</li> <li>• Most of the oceanic areas of the Ezeiza FIR;</li> <li>• All of the Montevideo Oriental and Oceanic sectors;</li> <li>• A large section of the Atlantico FIR.</li> </ul> |
| 2       | Option 2 incorporates all of Option 1 but also includes all of the Atlantico, Dakar and Accra FIRs south of the equator.  |
| 3       | Option 3 incorporates all of the two previous options but includes a larger section of the Dakar FIR north of the equator but commencing southeast of track UA 302, leaving that track procedurally clear of the AORRA.   |
| 4       | Option 4 incorporates all of Option 3 but includes further sections of the Atlantico and Dakar FIRs, allowing the AORRA to abut the EURSAM Corridor.  |

3.4 The meeting discussed at length the necessity to implement ADS/CPDLC before the introduction of random routing, and felt that though ADS and CPDLC were not mandatory as such in a random routing environment, these applications must be considered as prerequisites in some areas due to traffic complexity and safety considerations.

3.5 After analyzing the advantages and disadvantages of each proposals and the convenience/inconvenience of implementing random RNAV routing at once in the whole South Atlantic area or gradually, taking due account of some difficulties in the EURSAM corridor, the meeting favoured a two-phased implementation (Conclusion SAT/11 TF/13 refers).

3.6 The meeting therefore agreed on the need to develop a detailed plan of action involving all parties concerned and including all aspects of the AORRA implementation, such as safety assessment, procedures, co-ordination, operator requirements, ATS workload, human factors, etc., with a clear description tasks, requirements and responsibilities.

3.7 The following conclusions were formulated:

**Conclusion SAT/11 TF/12: Need for ADS/CPDL environment in the EUR/SAM Corridor**

- That random RNAV operations be implemented in the EUR/SAM Corridor in an ADS/CPDLC environment only.

**Conclusion SAT/11 TF/13: Implementation of Random Routing in the South Atlantic area**

- That :
  - a) the action plan developed at Appendix E be adopted for the implementation of random RNAV routing in the South Atlantic;
  - b) a two-phased approach be adopted for the implementation of random RNAV routing in the South Atlantic as follows:
    - 1) Phase A: implementation in November 2005 (AIRAC date) in the southern part of SAT area as described at Appendix F; and
    - 2) Phase B: implementation in November 2006 (AIRAC date) in the whole South Atlantic, including the EUR/SAM corridor and the corresponding portion of Johannesburg FIR.

**Decision SAT/11 TF/14: Cost – benefit analysis for the implementation of random RNAV operations (Phase A)**

- That Brazil be assigned the cost-benefit analysis related to Phase A of the implementation of random RNAV operations referred to in Conclusion 13 hereabove, in close coordination with IATA, and present the findings of the study to SAT/12 meeting.

**Random Routing West of UN741 and on RNAV route Santiago de Chile /Madrid**

3.8 The meeting considered the introduction of random RNAV routing West of UN741 and on RNAV route Santiago de Chile/Madrid.

***Introduction of random routing West of UN741***

3.9 It appeared that though the principle of implementing random routing West of UN741 has been agreed upon at SAT previous meetings, some air navigation providers were reluctant to proceed with the implementation, with adverse effects on the economy and safety of flights in that part of the EUR/SAM corridor.

***Introduction of random routing on RNAV route Santiago de Chile /Madrid***

3.10 The meeting noted the implementation on February 19, 2004 of an RNAV route (UM799) from San Juan (JUA) VOR/DME in Mendoza FIR to Sao Louis (SLI) VOR/DME in Belen FIR, in order to join Santiago de Chile with Madrid and other airports in Europe. Concerns were expressed by some delegates



about the introduction of random routing in that complex area where only flight information and alert services are provided (class G airspace) and where some ATS incidents have been reported.

3.11 The meeting adopted the following conclusion:

**Conclusion SAT/11 TF/15: Random RNAV limitations West of UN741**

- **That random RNAV operations West of UN 741 be approved under the following conditions:**
  - a) **utilization limited to airlines operating from Santiago de Chile to Madrid and vice versa**
  - b) **Flights operate at a distance of at least 50 NM from UN741;**
  - c) **IATA will advise on users demand for random routing in order to consider the possibility to allow them to operate in the area concerned;**
  - d) **States closely monitor air navigation operations to ensure that an acceptable level of safety is maintained in this area; and**
  - e) **SATMA will confirm whether those flights were taken into account when performing RVSM and RNP/10 pre-implementation and post-implementation safety assessments.**

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**Agenda Item 4 : Discussion on SAT/11 Technical Working Group (TWG) terms of reference and its assigned tasks**

**Expansion of CAFSAT network (Task No. 1)**

4.1 The meeting was informed that the Johannesburg CAFSAT node was commissioned on 15 and 22 September 2003 for Dakar and Las Palmas respectively and that, these links being very reliable, the expensive leased line Johannesburg/ Dakar was consequently discontinued on November 2003.

4.2 The meeting was also informed that Argentina planned to implement a CAFSAT node in Ezeiza in 2005, in order to provide for the AFI/SAM entry/exit circuit between Ezeiza and Johannesburg.

**Improvement of CAFSAT performance and coordination**

***Investigations on the lack of ATS messages (Task No.2)***

4.3 The meeting discussed at length ways and means to better contribute to the investigations on the lack of ATS messages, including flight plans. It agreed on the need to harmonize monitoring procedures, protocols and reporting methodologies between SAT centres, including AFTN statistics on circuits availability and transit times; to harmonize AFI, EUR and SAM routing directories and to effectively implement routing directory requirements at switching centres, under ICAO coordination.

***Technical coordination***

4.4 The meeting noted that difficulties were being experienced by CAFSAT members in coordinating changes in the network due to the fact that there is no single point of responsibility. An example is the difficulties encountered by ATNS, South Africa when implementing a revised power transmission plan from Intelsat during the inclusion of the Johannesburg CAFSAT node into the network. It is also difficult to coordinate the upgrades at the other sites and if a new site joins the CAFSAT network. The meeting recalled that at SAT/7 (Casablanca, Morocco, October 1998), when it was decided to implement the CAFSAT network, Spain (Las Palmas FIR) received the mandate to coordinate the implementation thereof and, in view of the coordination problems being experienced, it recommended that Spain (AENA) continues to play its role as CAFSAT coordinator. Spain offered to continue discharging such function, subject to an agreement.

4.5 The meeting also was of the view that SAT centres designate their contact persons to be tasked with technical coordination with the other centres and the network coordinator (as necessary).

4.6 The following Conclusion was formulated accordingly:

**Conclusion SAT/11 TF/16: Improvement of CAFSAT performance and coordination**

- **That, in order to improve CAFSAT performance and coordination between centres:**
  - a) **SAT members harmonize their monitoring procedures, protocols and reporting methodologies, including periodic AFTN statistics on circuits availability and transit times;**
  - b) **ICAO Regional Offices harmonize AFI, EUR and SAM routing directories as required and coordinate their effective implementation at switching centres no later than May 15, 2004; and**
  - c) **SAT members designate their contact persons responsible for technical coordination between CAFSAT centres, including coordination with the network coordinator as required.**

**Integration of VSAT networks (Tasks 3, 4 and 7)**

4.7 The meeting discussed technical aspects and advantages of the integration of VSAT networks using INTELSAT satellite IS 10-02 @ 359° East to be launched on 15 June 2004, in accordance with APIRG Conclusion 14/12 and SAT Conclusion 11/12, and was presented with the preparatory work carried out in AFI Region and the outcome of the regional planning meeting held in Johannesburg from 31 March to 1 April 2004, to which some of SAT members attended. It regretted the absence of INTELSAT and some SAT members.

4.8 After discussions, the meeting was of the view that SAT members needed more time to further analyze CAFSAT migration to IS 10-04. It therefore agreed that CAFSAT should migrate at a later stage. In this connection, the meeting noted that a network coordinator would carry out the necessary coordination with all CAFSAT members.

4.9 The meeting also discussed a proposal concerning the interconnection between REDDIG and CAFSAT and concluded that such interconnection was not opportune.

4.10 The following conclusion was formulated:

**Conclusion SAT/11 TF/17: Phased approach to the consolidation of aeronautical VSAT networks**

- **That, taking due account of networks institutional aspects, development plans and technical considerations:**
  - a) **AFISNET network only should migrate to INTELSAT IS 10-02@359° East in the first phase; and**
  - b) **CAFSAT, MEDSAT, MID, NAFISAT and SADC/2 VSAT networks should be established on the IS 10-02 satellite as soon as practicable at a later stage.**

**Harmonization of ADS/CPDLC programmes (Task No.8)**

4.7 The meeting was apprised of the implementation status of ADS/CPDL in SAT area and noted that only South Africa and Spain had so far implemented these applications, whereas other SAT members had plans for 2005. It was agreed that SAT members should provide comments on the technical aspects of the FANS 1/A operational manual referred to in Decision SAT/11 TF/05 - *Adoption of FANS 1/A operational manual* -.

**CNS/ATM system evolution tables**

4.8 The meeting recalled that SAT stakeholders have decided for the implementation in one goal of Random RNAV Routing with the supporting CNS elements (ADS and CPDLC), the extension of the RVSM application area and further reduction of both longitudinal and lateral separations. It therefore reviewed and amended the CNS/ATM systems evolution tables for SAT FIRs based on the following ATM objectives and CNS requirements:

- a) RVSM: The reduced vertical separation minima have been applied in the SAT EUR/SAM corridor since January 2002. The plan foresees a full RVSM environment. It is proposed to support the conclusion of SAT/11 to implement RVSM throughout the whole SAT (AR1 and AR2) from FL290 to Fl 410 as of January 2005 concomitantly with CAR/SAM region.
- b) Random RNAV routing: As per the current table, random RNAV routing was supposed to be progressively implemented in SAT from West to East starting in 2002. It is proposed to support a two-phase implementation in accordance with *paragraph 3.5 and Conclusion SAT/11 TF/13* of this report, taking due account of some difficulties in the EURSAM corridor. Effective implementation will depend on ACCs and airlines readiness.
- c) Distance based Longitudinal Separation: the SAT CNS/ATM plan foresees a phase and progressive implementation of distance-based longitudinal separation. It is proposed to start the implementation of an 80 NM distance based longitudinal separation in 2005.
- d) ADS and CPDLC having been made mandatory for the establishment of the planned Random RNAV Routing in the EUR/SAM Corridor, sound plans are in place for their implementation in Dakar and Sal ACCs. The relevant authorities in Cape Verde (Sal FIR) and Senegal (Dakar FIR) should be urged to expedite their implementation bearing in mind the agreed target date for full RNAV random routing in the South Atlantic.

4.9 The following conclusion was therefore formulated:

**Conclusion SAT/11 TF/18: Amendment of CNS/ATM systems evolution tables**

- **That the CNS/ATM systems evolution tables for AR1/HA1 and AR2/HA8 be amended using Appendix G to this report as a basis.**

*Note: The Secretariat will take necessary action to ensure harmonization of AFI and CAR/SAM CNS/ATM plans for these areas of routing.*

**Agenda Item 5 : Any other business.****Contingency planning**

5.1 The meeting acknowledged the need for ATS contingency plans to be implemented in South Atlantic FIRs, in order to comply to ICAO provisions (Annex 11, Doc 9426). These ATS contingency plans should be prepared and coordinated at SAT/12, prior to their submission to the ICAO Council as temporary amendment to ANPs. The following conclusion was formulated:

**Conclusion SAT/11 TF/19: Need for coordinated ATS contingency plans**

- **That:**
  - a) **SAT members carry out the necessary coordination to develop and implement harmonized ATS contingency plans in accordance with ICAO provisions in Annex 11 and Doc 9426; and**
  - b) **once finalized, the coordinated ATS contingency plans be submitted to the approval by the ICAO Council as temporary amendment to ANPs.**

**Date and venue of SAT/12 Meeting**

5.2 The meeting recalled that, at SAT/11 meeting, Cape Verde offered to host SAT/12 meeting. In the absence of Cape Verde, the meeting requested the Secretariat to carry out the necessary coordination the hosting of SAT/12 by this State preferably in the first week of December 2004, and timely inform SAT members of the agreed date and venue.

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**SAT/11 TASK FORCE, RANDOM RNAV ROUTING STUDY GROUP AND TECHNICAL  
WORKING GROUP MEETINGS  
(SAT/11 TF/RRSG/TWG)**

**(Rio de Janeiro, Brazil, 13-16 April 2004)**

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**TERMS OF REFERENCE OF THE TASK FORCE ESTABLISHED BY THE SAT/11 MEETING**

- Considering the evolutionary implementation of CNS/ATM systems in areas of routing AR1/AH2 AR-2/AH8, the Task Force should explore ways and means to achieve further enhancements in ATM capacity and aeronautical telecommunications, and to implement CNS/ATM elements taking into consideration the timescales agreed for these areas of routing. It will be guided by the requirements identified in the AFI and CAR/SAM CNS/ATM Implementation plans.
- *Note: The Task Force will adopt a pragmatic approach and may set up auxiliary bodies to carry out specific tasks, as necessary.*

**WORK PROGRAMME**

| <b>TASK No.</b> | <b>SUBJECT</b>  | <b>TARGET DATE</b> |
|-----------------|---|--------------------|
| 1.              | Evaluate the results of the pre-implementation/post-implementation safety assessments to be carried out by SATMA for RVSM and RNP operations in the EUR/SAM Corridor. | <u>CONTINUOUS</u>  |
| 2.              | Study the feasibility of a relevant and appropriate cost recovery mechanism for SATMA   | SAT/12             |
| 3.              | Study RVSM, RNP/RNAV procedures to be established for the AFI/CAR/SAM and EUR/SAM Interface area.   | SAT/12             |
| 4.              | Monitor flight plan availability and propose appropriate corrective measures.   | Continuous         |
| 5.              | Explore ways and means of taking appropriate measures for the elimination of ATM and CNS deficiencies.  | Continuous         |
| 6.              | Develop operational guidance material with a view to ensuring harmonization and standardization of ADS/CPDLC applications.  | SAT/12             |
| 7.              | Study the applicability of emerging ATM concepts and systems within the SAT area.   | Continuous         |

- *Note: The Task Force should take appropriate action on pressing issues and submit its proposal to the SAT/12 meeting.*

**COMPOSITION**

- *The Task Force of multi-disciplinary nature shall comprise of experts from States responsible of FIRs in routing areas AR1/AH2 and AR2/AH8, and experts from adjacent FIRs and international organizations.*
- *Rapporteur: Spain.*
- *Task Team leader: Brazil (Task No.6).*
- *Working arrangements: The SAT/11 TF should complete its work and submit its proposal to the SAT Group. The SAT/11 TF should work through electronic correspondence prior to meetings.*

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**TERMS OF REFERENCE OF THE RNAV RANDOM ROUTING STUDY (RRSG) ESTABLISHED BY THE SAT/11 MEETING**

- To undertake the necessary steps in order to achieve the timely implementation of RNAV random routing in the AR1/AH2 and AR2/AH8 routing areas, in accordance with the respective CNS/ATM plans.
- The RRSg should prepare all relevant elements in this respect, including any required safety assessments, implementation timescales and related cost-benefit analyses for consideration by SAT/12.

**COMPOSITION**

- The Random Routing Study Group (RR/SG) being of multi-disciplinary nature shall comprise of experts from Brazil, Cape Verde, Portugal, Senegal, South Africa, Spain, ASECNA and IATA.
- *Rapporteur: South Africa.*
- *Working arrangements: The SAT/RRSG should complete its work and submit its proposal to the SAT Group. The RRSg should work through electronic correspondence prior to meetings.*

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**TERMS OF REFERENCE OF THE TECHNICAL WORKING GROUP (TWG) ESTABLISHED BY THE SAT/11 MEETING**

- Considering the GREPECAS and APIRG *Air Navigation* Plans, the SAT/TWG should explore ways and means of achieving further enhancements in ATM efficiency within in areas of routing AR1/AH2 AR-2/AH8, by resorting to emerging technologies and, in particular, by taking advantage of rationalization, integration and harmonization of systems where appropriate.
- Implementation of new systems should be sufficiently flexible to accommodate existing and future services in an evolutionary and cost-effective manner.
- The associated institutional arrangements shall not inhibit competition among service providers complying with relevant ICAO Standards, Recommended Practices and Procedures.

**WORK PROGRAMME**

| <b>TASK No.</b> | <b>SUBJECT</b>  | <b>TARGET DATE</b> |
|-----------------|---|--------------------|
| 1.              | Carry out studies related to the expansion of CAFSAT network to cater for aeronautical telecommunication requirements within the SAT Region. Such studies should include coordination issues, service channel interfaces, monitoring and control system architecture, system availability, expansion of nodes and services, user interfaces and bandwidth monitoring. | Continuous         |
| 2.              | Undertake investigations on the lack of flight plans, including individual cases, with emphasis on the aeronautical fixed telecommunication network (links, switching centres, routing directory and transit time statistics).  | SAT/12             |
| 3.              | Study the feasibility and cost-effectiveness of internetworking between existing VSAT networks (AFISNET, CAFSAT, REDDIG, SADC) and other emerging networks.   | SAT/12             |
| 4.              | Support and monitor all activities related to the integration/interoperability of existing VSAT networks (AFISNET, CAFSAT, REDDIG, SADC) aimed at achieving a consolidated, seamless and cost-effective network.  | SAT/12             |
| 5.              | Considering implementation time frames in the AFI and SAM CNS/ATM implementation plans, address cost-benefit aspects for the use of CNS/ATM applications.   | SAT/12             |
| 6.              | Study the harmonization of aeronautical fixed services (AFS) end-to-end protocols.  | SAT/12             |
| 7.              | Evaluate the feasibility of using existing or emerging digital VSAT networks (AFISNET, CAFSAT, REDDIG, SADC, etc.) in order to implement data link systems to support ATN applications within the SAT area.   | SAT/12             |
| 8.              | Study the harmonization of the technical aspects of ADS/CPDLC programmes developed by SAT States/FIRs, taking due account of operational requirements. Harmonization of ADS/CPDLC should address issues such as the use of common standards, transmission protocols, data formats, procedures, methods of work, etc...  | SAT/12             |

**COMPOSITION**

- The Technical Working Group (TWG) being of multi-disciplinary nature shall comprise of experts from States responsible of FIRs in the area concerned, experts from adjacent FIRs and international organizations and the aeronautical industry.
- **Rapporteur:** *Senegal.*
- **Task Team leaders:** *ASECNA (Tasks. Nos.3 and 4), Brazil (Task No.8)*
- **Working arrangements:** *The TWG should complete its work and submit its proposals to SAT. The TWG should work through electronic correspondence prior to meetings.*

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**MISSING FLIGHT PLANS STATUS REPORT IN ATLANTICO FIR  
(PERIOD : MARCH 2003 TO FEBRUARY 2004)**

**Summary of Missing Flight Plan per City of Departure**

| CITY OF DEPARTURE | MONTHLY FLIGHTS<br>EUR TO SAM | AVERAGE MONTHLY<br>MISSING FLIGHT PLANS<br>(MARCH 2003/FEBRUARY<br>2004) | PERCENTAGE OF<br>MISSING FLIGHT<br>PLANS |
|-------------------|-------------------------------|--|--|
| EDDF              | 71                            | 3,67   | 5,2%                                     |
| EGLL              | 50                            | 4,16   | 8,3%                                     |
| EHAM              | 19                            | 0,16   | 0,8%                                     |
| LEMD              | 214                           | 16,91  | 7,9%                                     |
| LFPG              | 132                           | 1,91   | 1,4%                                     |
| LIMC              | 65                            | 0,67   | 1,0%                                     |
| LIRF              | 24                            | 0,5  | 2,1%                                     |
| LPPT              | 148                           | 3,16   | 2,1%                                     |
| LSZH              | 20                            | 0,16   | 0,8%                                     |

**MISSING FLIGHT PLANS STATUS REPORT IN ATLANTICO FIR**  
**(PERIOD: MARCH 2003 TO FEBRUARY 2004)**  
**Summary of Missing Flight Plan per Operator**

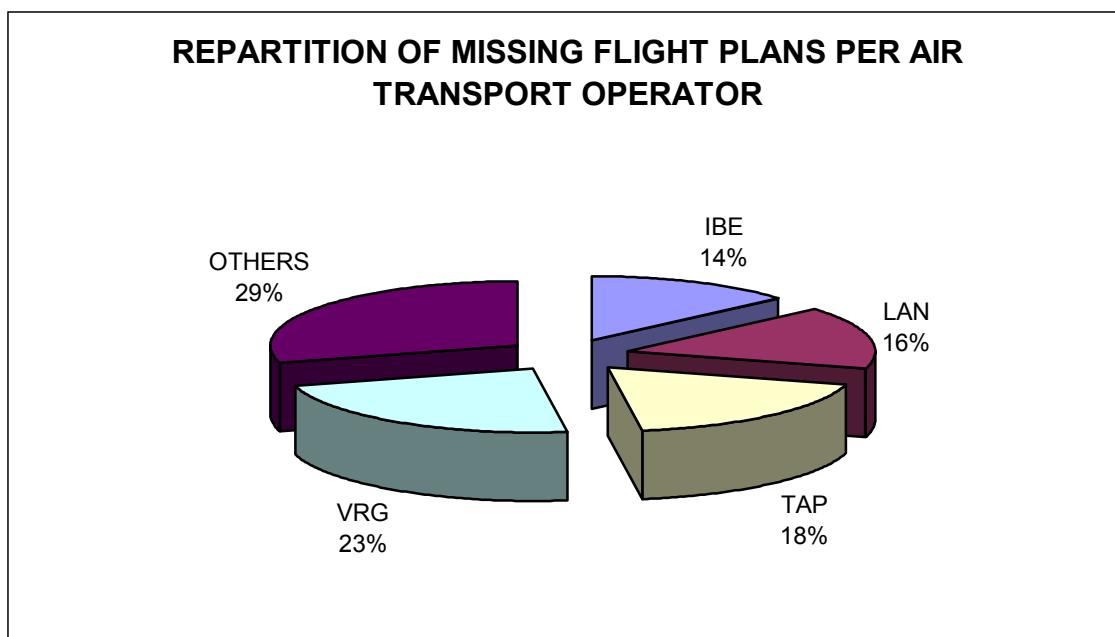
| CITY | OPERATOR | MISSING FLIGHT PLANS | % TOTAL |
|------|----------|----------------------|---------|
| EDDF | VRG      | 9                    | 20%     |
|      | DLH      | 35                   | 80%     |
|      | TOTAL    | 44                   |         |
| EGLL | VRG      | 5                    | 10%     |
|      | BAW      | 45                   | 90%     |
|      | TOTAL    | 50                   |         |
| EHAM | KLM      | 3                    | 100%    |
|      | TOTAL    | 3                    |         |
| LEMD | VRG      | 7                    | 3,53%   |
|      | IBE      | 12                   | 6,06%   |
|      | PUA      | 63                   | 31,81%  |
|      | LAN      | 76                   | 38,38%  |
|      | ARG      | 14                   | 7,07%   |
|      | SWD      | 26                   | 13,13%  |
|      | TOTAL    | 198                  |         |
| LFPG | VRG      | 5                    | 18,51%  |
|      | TAM      | 3                    | 11,11%  |
|      | AFR      | 19                   | 70,37%  |
|      | TOTAL    | 27                   |         |
| LIMC | VRG      | 4                    | 33,33%  |
|      | AZA      | 7                    | 58,33%  |
|      | LDI      | 1                    | 8,33%   |
|      | TOTAL    | 12                   |         |
| LIRF | ARG      | 2                    | 33,33%  |
|      | AZA      | 4                    | 66,66%  |
|      | TOTAL    | 6                    |         |
| LPPT | VRG      | 11                   | 28,94%  |
|      | TAP      | 17                   | 44,77%  |
|      | MMZ      | 4                    | 10,52%  |
|      | CSTMQ    | 2                    | 5,26%   |
|      | LXR      | 1                    | 2,63%   |
|      | YSS      | 3                    | 7,89%   |
|      | TOTAL    | 38                   |         |
| LSZH | SWR      | 1                    | 100%    |
|      | TOTAL    | 1                    |         |



**MISSING FLIGHT PLANS STATUS REPORT IN DAKAR OCEANIC FIR  
(PERIOD: NOVEMBER 2003 TO FEBRUARY 2004)**

**NOVEMBER 2003**

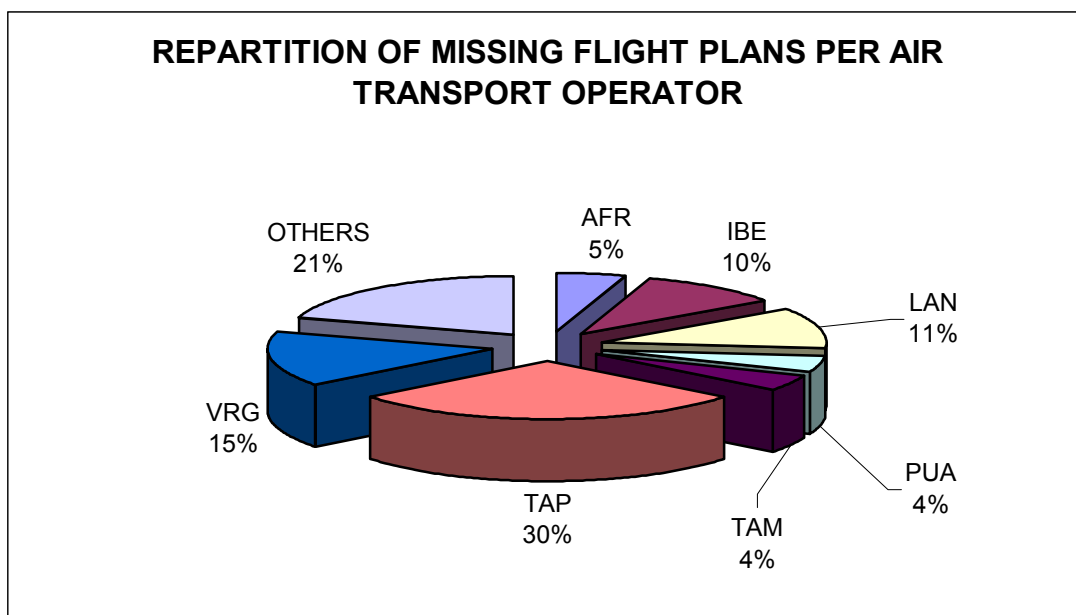
- Missing flight plans number: 44 ;
- North bound traffic (corresponding to entry points KENOX,AMDOL, POMAT ONOBI and BOTNO): 15 or **34%** ;
- South bound traffic (corresponding to entry points NANIK, DEKON, TASIL, RAKUD, ERETU): 29 or **66%** ;



- “**Others**” means airlines whose number of missing flight plans number are less than or equal to three (3).
- 71% of missing flight plans concern VARIG (VRG), AIR PORTUGUAL (TAP), LAN and IBERIA (IBE).
- The number of missing flight plans related to South bound traffic (29) is higher than the one of North bound (15).

**DECEMBER 2003**

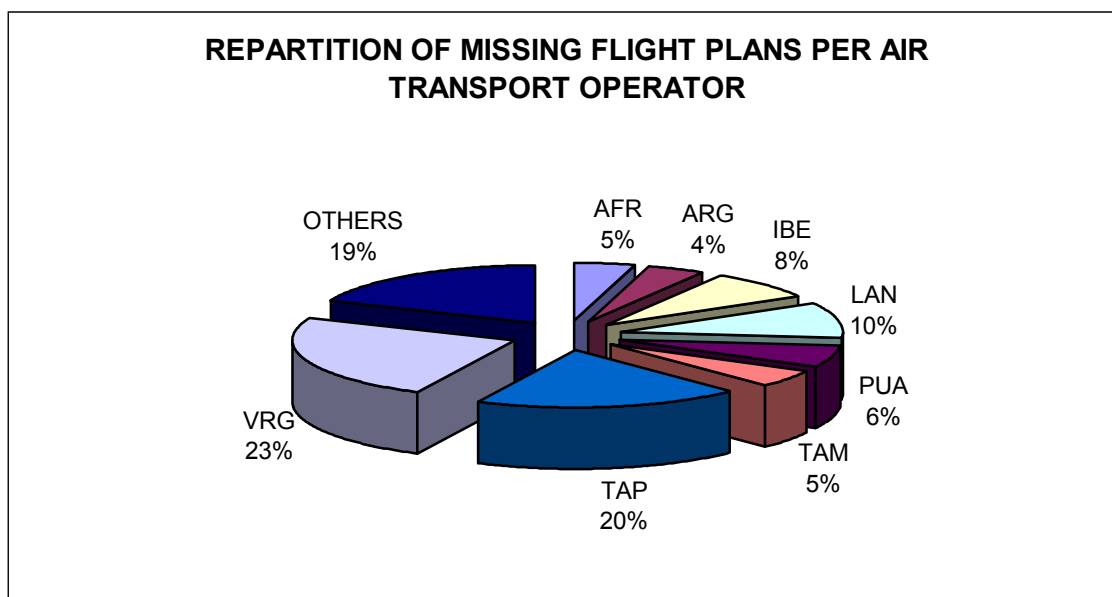
- Missing flight plans : 158;
- North bound Traffic (corresponding to entry points KENOX,AMDOL, POMAT ONOBI and BOTNO): 66 or **42%** ;
- South bound traffic (corresponding to entry points NANIK, DEKON, TASIL, RAKUD, ERETU): 92 or **58%** ;



- 66% of missing flight plans concern AIR PORTUGUAL (TAP), VARIG (VRG), LAN and IBERIA (IBE).
- The number of missing flight plans related to South bound traffic (92) is higher than the one of North bound (66).

**JANUARY 2004**

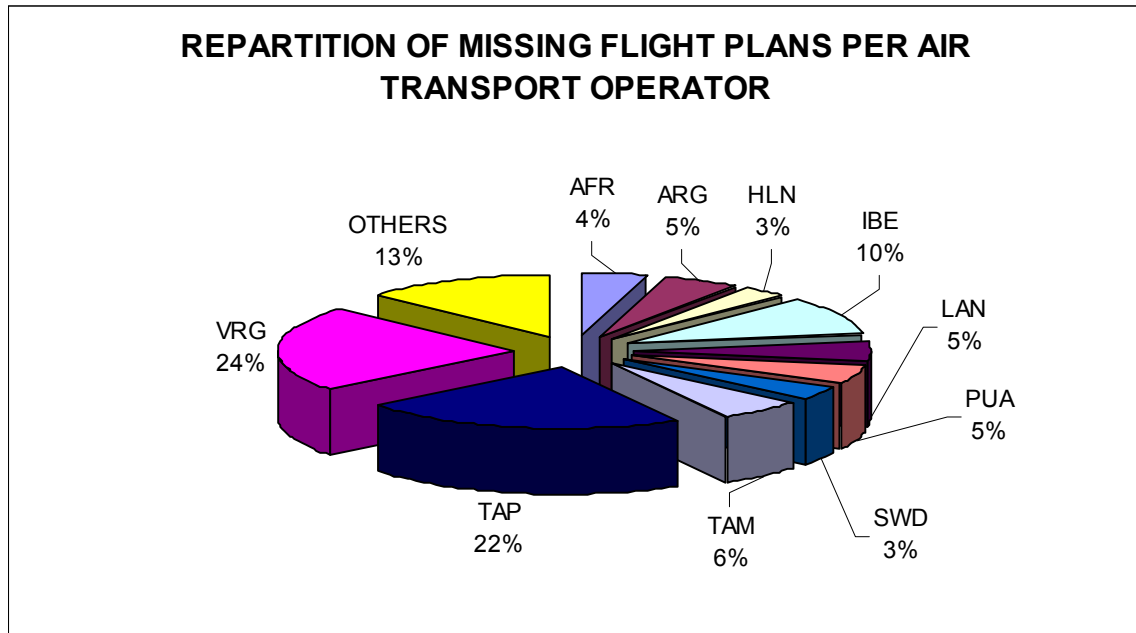
- Missing flight plans: 202;
- North bound traffic (corresponding to entry/exit points KENOX,AMDOL, POMAT ONOBI and BOTNO): 89 or 44% ;
- South bound traffic (corresponding to entry points NANIK, DEKON, TASIL, RAKUD, ERETU): 113 or 56% ;



- 53% of missing flight plans concern VARIG (VRG), AIR PORTUGUAL (TAP) and LAN.
- The number of missing flight plans related to South bound traffic (113) is higher than the one of North bound (89).

**FEBRUARY 2004**

- Missing flight plans : 233;
- North bound traffic (corresponding to entry/exit points KENOX,AMDOL, POMAT ONOBI and BOTNO): 69 or **30%** ;
- South bound traffic (corresponding to entry points NANIK, DEKON, TASIL, RAKUD, ERETU): 164 or **70%** ;



- 62% of missing flight plans concern VARIG (VRG), AIR PORTUGUAL (TAP) and IBERIA (IBE).
  - The number of missing flight plans related to South bound traffic (164) is higher than the one of North bound (69).
-

**AIP SUPP****Special Coordination Procedures for Cruise Operation of Non RVSM/RNP10 Compliant Aircraft in the EUR/SAM RVSM/RNP10 Airspace**

**1 -** Non-RVSM/RNP-10 compliant aircraft may not flight plan between FL 290 and FL 410 inclusive within RVSM/RNP-10 airspace. After special coordination as detailed below, the following non-RVSM/RNP-10 aircraft may flight plan to fly in the EUR/SAM Corridor RVSM/RNP-10 airspace (*see Note*)

- a) Is being initially delivered to the State of Registry or Operator.
- b) Was formally RVSM/RNP-10 approved but has experienced an equipment failure and is being flown to a maintenance facility for repair in order to meet RVSM/RNP-10 requirements and/or obtain approval.
- c) Is being utilized for mercy or humanitarian purposes.

*Note: The Special Coordination Procedures for Cruise Operation of Non RVSM/RNP10 Compliant Aircraft in the EUR/SAM Corridor Airspace will not be applicable in the northern part of Canaries FIR, defined by the following coordinates: xx°xx'xx''; : xx°xx'xx''; xx°xx'xx'';*

**2 -** The non RVSM and/or RNP10 aircraft mentioned in a) and b) above will not be authorized to fly in the EUR/SAM corridor RVSM/RNP10 airspace between 21:00 UTC and 09:00 UTC.

**3 -** Atlantico ACC will coordinate non-RVSM/RNP-10 status with Dakar, Sal and Canaries ACCs for the flights from South America to Europe. Canaries ACC will coordinate non-RVSM/RNP-10 status with Dakar, Sal and Atlantico ACCs for the flights from Europe to South America.

**4 -** Aircraft operators requesting approval as detailed in paragraph 1 above shall:

- a) Obtain approval from Atlantico or Canaries ACC normally not more than 24 hours and not less than 4 hours prior to intended departure time.
- b) Include "STS/APVD NONRVSM" and/or "STS/APVD NONRNP-10" in Field 18 of the ICAO Flight Plan.

*Note: Approval means authorized to operate in the RVSM/RNP-10 Airspace. Aircraft operating levels will be subject to Air Traffic Control.*

**5 -** Contact details for approval request are as follows:

- Atlantico ACC: Telephone:
- Canaries ACC: Telephone:
- Dakar ACC: Telephone:
- Sal ACC: Telephone:

**6 -** This approval process is intended exclusively for the purposes indicated above and not as a means to circumvent the normal RVSM/RNP10 approval process.

**7 -** RVSM approved aircraft will be given priority for level allocation over non-RVSM approved aircraft.

**8 -** The vertical separation minimum between non-RVSM aircraft operating in the RVSM stratum and all other aircraft is 2,000 ft.

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**ACTION PLAN FOR THE IMPLEMENTATION OF RANDOM ROUTING AREA IN THE SOUTH ATLANTIC  
(PHASE A)**

| <b>Activities</b>  | <b>Responsible Area</b> | <b>Starting date</b> | <b>Finalization date</b> | <b>Status of application</b> | <b>Remarks</b>   |
|--|-------------------------|----------------------|--------------------------|------------------------------|--|
| 1. Notification to the CARSAMMA/ARMA of ADS/CPDLC equipped aircraft                    | States<br>IATA          | April 2004           | Permanent activity       |                              |  |
| 2. Identification of operational needs.  | SAT<br>States           | N/A                  | December 2004            |                              |  |
| 3. Cost-benefit analysis considering :<br>- ATS services providers;<br>and<br>- Users. | States/<br>Users        | April 2004           | December 2004            |                              |  |
| 4. Study of the impact in the airspace ATC simultaneous                                | States                  | April 2004           | December 2004            |                              | The study must consider the use of airspace simulation tools   |
| 5. AIC for the dissemination of Information  | States                  | N/A                  | February 2005            |                              | Most of the information related to the implementation by all means available will ensure the success of the implementation in the target date.             |
| 6. Develop Regional/National Documentation   | SAT<br>States           | April 2004           | March 2005               |                              |  |
| 7. Coordination with ATS providers and users   | States                  | December 2004        | Permanent activity       |                              | Most of the dissemination of the programme will ensure the success of the implementation in the target date.   |
| 8. Programme for airspace safety assessment.   | CARSAMMA/ARMA           | December 2004        | Permanent activity       |                              | Considering the goal of $5 \times 10^{-9}$ (TLS) in fatal accidents by flight hour, safety assessment is a fundamental element to implement the programme. |
| 9. Data collection programme for the 99  | States and<br>Users     | December 2004        | Permanent activity       |                              |  |

| <b>Activities</b>   | <b>Responsible Area</b> | <b>Starting date</b> | <b>Finalization date</b> | <b>Status of application</b> | <b>Remarks</b>   |
|---|-------------------------|----------------------|--------------------------|------------------------------|--|
| evaluation of airspace safety   |                         |                      |                          |                              |  |
| 10. Publication of an AIP Supplement with the applicable procedures and requirements. | States                  | N/A                  | September 2005           |                              | States should include in their corresponding AIPs the minimum requirements and the applicable supplementary procedures.                            |
| 11. Final Safety assessment   | CARSAMMA/<br>ARMA       | June 2005            | September 2005           |                              |  |
| 12. Decision to continue or postpone the implementation                               | States                  | N/A                  | September 2005           |                              | The implementation programme will continue provided that all parties involved have complied with tasks that has been specified in the action plan. |
| 13. Conduct local training for air traffic controllers/crew members                   | States                  | June 2005            | November 2005            |                              |  |
| 14. Date of the Random Routing implementation   | States                  | N/A                  | November 2005            |                              |  |

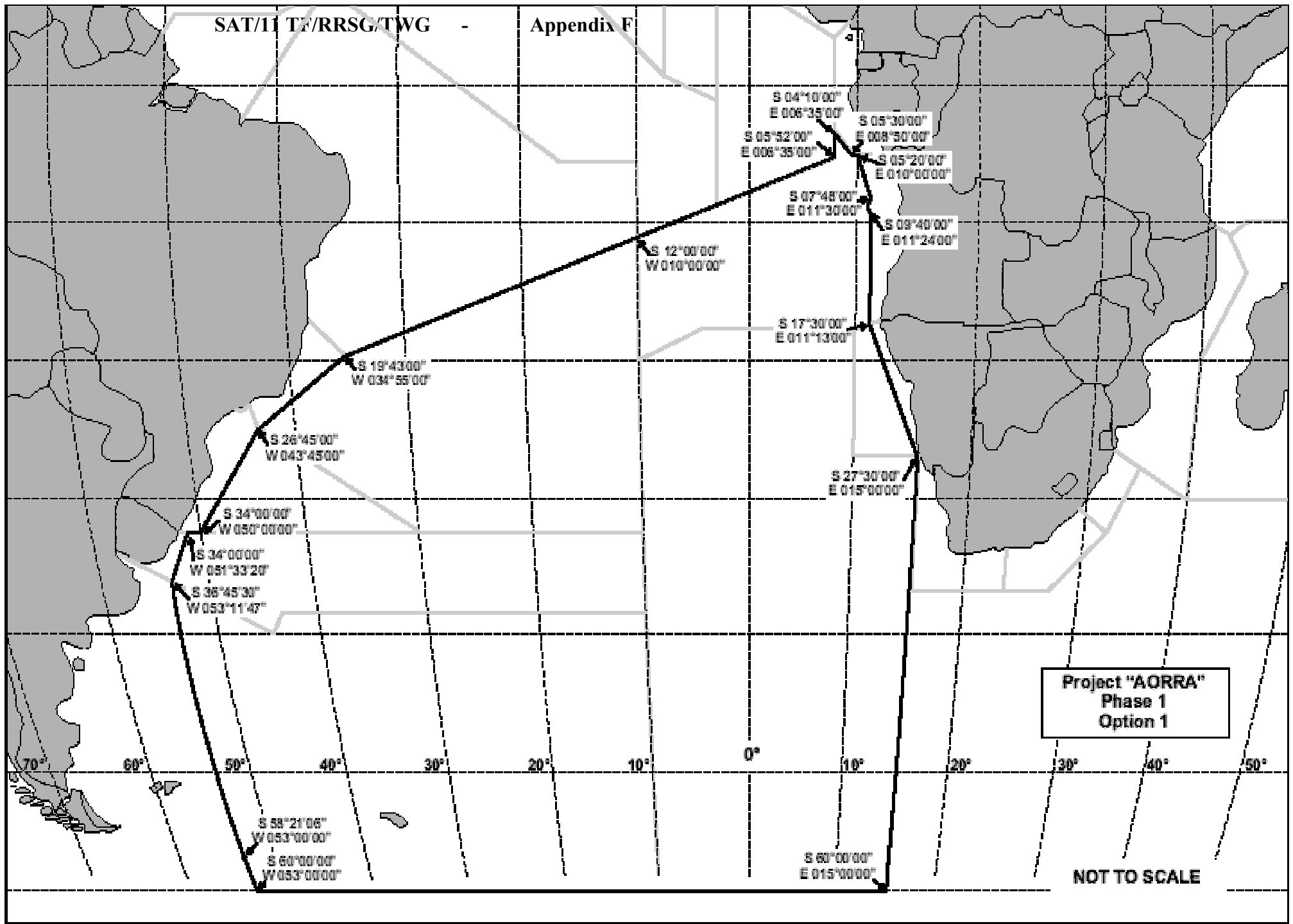
**ACTION PLAN FOR THE IMPLEMENTATION OF RANDOM ROUTING AREA IN THE SOUTH ATLANTIC  
(PHASE B)**

| <b>Activities</b>   | <b>Responsible Area</b> | <b>Starting date</b> | <b>Finalization date</b> | <b>Status of application</b> | <b>Remarks</b>   |
|---|-------------------------|----------------------|--------------------------|------------------------------|--|
| 1. Notification to the SATMA of ADS/CPDLC Equipped Aircraft                       | States<br>IATA          | April 2004           | Permanent Activity       |                              |  |
| 2. Identification of operational needs  | SAT<br>States           | N/A                  | December 2004            |                              |  |
| 3. Cost-benefit analysis considering:<br>- ATS services providers; and<br>- Users | States/<br>Users        | Jan 2005             | June 2005                |                              |  |
| 4. Study of the impact in the airspace/ATC Simulation                             | States                  | June 2005            | December 2005            |                              | The study must consider the use of airspace simulation tools   |
| 5. Establishment of the process for Operators ADS/CPDLC Approval                  | SAT States              | June 2005            | March 2006               |                              | <ul style="list-style-type: none"> <li>- The establishment of this process will ensure success in the timely implementation.</li> <li>- Reference documents: <ul style="list-style-type: none"> <li>• TBD</li> </ul> </li> </ul> |
| 6. AIC for the dissemination of Information                                       | States                  | N/A                  | September 2005           |                              | Most of the information related to the implementation by all means available will ensure the success of the implementation in the target date.   |
| 7. Develop Regional/National Documentation  | SAT States              | June 2005            | March 2006               |                              |  |
| 8. Coordination with ATS providers and users                                      | States<br>Users         | June 2005            | Permanent Activity       |                              | Most of the dissemination of the programme will ensure the success of the implementation   |

| Activities   | Responsible Area | Starting date | Finalization date  | Status of application | Remarks  |
|--|------------------|---------------|--------------------|-----------------------|--|
|  |                  |               |                    |                       | in the target date.  |
| 9. Establishment and maintenance of a record of ADS/CPDLC equipped aircraft                      | SATMA            | June 2005     | Permanent activity |                       | The timely knowledge of ADS/CPDLC aircraft will allow SATMA to inform the States involved of the progress status of the ADS/CPDLC capability of the fleet. |
| 10. Establishment of a minimal amount of ADS/CPDLC equipped aircraft to allow the implementation | States           | N/A           | June 2005          |                       |  |
| 11. Programme for airspace safety assessment   | SATMA            | June 2005     | Permanent activity |                       | Considering the goal of $5 \times 10^{-9}$ (TLS) in fatal accidents by flight hour, safety assessment is a fundamental element to implement the programme. |
| 12. Preliminary Safety assessment  | SATMA            | June 2005     | December 2005      |                       |  |
| 13. Data collection programme for the evaluation of airspace safety and operational availability | States and Users | June 2005     | Permanent activity |                       |  |
| 14. Publication of an AIP Supplement with the applicable procedures and requirements.            | States           | N/A           | September 2006     |                       | States should include in their corresponding AIPs the minimum requirements and the applicable supplementary procedures.                                    |
| 15. Operational Availability of Ground ADS/CPDLC Systems   | States           | April 2005    | June 2006          |                       |  |
| 16. Final Safety assessment  | SATMA            | June 2005     | September 2006     |                       |  |
| 17. Evaluation of the ADS/CPDLC equipped aircraft availability                                   | SATMA            | N/A           | September 2006     |                       |  |



| <b>Activities</b>   | <b>Responsible Area</b> | <b>Starting date</b> | <b>Finalization date</b> | <b>Status of application</b> | <b>Remarks</b>   |
|---|-------------------------|----------------------|--------------------------|------------------------------|--|
| 18. Decision to continue or postpone the implementation     | States                  | N/A                  | September 2006           |                              | The implementation programme will continue provided that all parties involved have complied with tasks that has been specified in the action plan. |
| 19. Conduct local training for air traffic controllers/crew | States                  | June 2006            | November 2006            |                              |  |
| 20. Date of the Random Routing implementation               | States                  | N/A                  | November 2006            |                              |  |



Project "AORRA"  
Phase 1  
Option 1

NOT TO SCALE

| Area of Routing  | FIRs  | Systems Evolution 1995-2010  |  |  |  |  |
|--|---|--|--|--|--|--|
|  |   | Airspace and Traffic Management  | Communications   |  | Navigation   | Surveillance   |
|  |   |  | Mobile Service   | Fixed Service  |  |  |
| 1  | 2   | 3  | 4  | 5  | 6  | 7  |
| <p><b>Europe - South Atlantic (Oceanic routes)</b></p> <p><b>AR-1/HA-1</b></p> | <p>Atlantico<br/>Canarias<br/>Casablanca<br/>Dakar Oceanic<br/>Lisboa<br/>Sal</p> | <p>Fixed RNAV routes (1995)</p> <p>Full a random RNAV environment (Dec.2006)</p> <p>Reduction of longitudinal separation to 10 minutes using Mach Number Technique (1998);</p> <p>Distance based separation 80 NM (2006) 50NM (2007 - onwards);</p> <p>Reduction of lateral separation to 50 NM (2005). Further reduction of lateral separation to 30NM (2007 - onwards);</p> <p>RVSM (2002)</p> | <p>DCPC (data) by participating aircraft (Bpa) (2005);</p> <p>Full VHF coverage on all ATS routes above FL300, and 150 NM from international airports (2000)</p> <p>CPDLC (2005)</p> | <p>Gradual introduction of ATN compatible bit-oriented procedures (BOP) between AFTN main centres (2005-onwards)</p> <p>AIDC<br/>AMHS (2005-onwards)</p> | <p>RNP 5: Casablanca and Canarias FIRs (1998);</p> <p>RNP 10: Other FIRs (1999-2004);</p> <p>RNP 5: (2005 - onwards) Other FIRs</p> <p>GNSS as primary-means</p> | <p>Automatic Position Reporting (APR) Bpa trials (2000);</p> <p>Automatic Dependent Surveillance (ADS) on RNP airspace Bpa (from 2005)</p> |

| Area of Routing   | FIRs  | Systems Evolution 1995-2010   |   |  |  |              |
|---|---|---|---|--|--|--------------|
|   |   | Airspace and Traffic Management   | Communications  |  | Navigation                                 | Surveillance |
|   |   |   | Mobile Service  | Fixed Service  |  |              |
| 1   | 2   | 3   | 4   | 5  | 6  | 7            |
| <b>Atlantic Ocean (AFI-NAT/SAM interface)</b><br><br><b>AR-2/HA-8</b> | Accra<br>Dakar Oceanic<br>Johannesburg Oceanic<br>Luanda<br>Sal | Random routing (2005)<br><br>Reduction of longitudinal separation to 10 minutes (2000)<br><br>RVSM (Jan.2005) | DCPC (data) by participating aircraft (Bpa) (2005);<br><br>HF (voice) | Gradual introduction of ATN compatible bit-oriented procedures (BOP) between main AFTN Centres (2005);<br><br>AFTN and ATS/DS (1999) | RNP 10 (2005)<br><br>GNSS as primary-means | ADS (2000)   |