INTERNATIONAL CIVIL AVIATION ORGANIZATION

WESTERN AND CENTRAL AFRICAN OFFICE

REPORT OF THE SIXTEENTH MEETING ON THE IIMPROVEMENT OF AIR TRAFFIC SERVICES OVER THE SOUTH ATLANTIC (SAT/16)

(RECIFE, BRAZIL, 02 to 06 May 2011)

The designations employed and the presentation of the 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 authorities, or concerning the delimitation of its frontiers or boundaries.

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History of the meeting

1. **Place and duration of the meeting**

1.1 The Sixteenth Informal Coordination Meeting on the improvement of air traffic services over the South Atlantic (SAT/16) was held in Recife, Brazil from 02 to 06 May 2011. The meeting was hosted by the Departamento de Control del Espacio Aéreo (DECEA) of Brazil and was held at the Park Hotel.

2. **Opening ceremony**

2.1 The meeting was officially opened by Mr. **Joao Batista Oliveira Xavier**, Chief of CINDACTA III of DECEA, who welcomed the participants and wished them fruitful deliberations and a nice stay in Brazil. In his welcome address, Mr. **Batista Oliveira** emphasized the importance of the SAT Group meetings with regard to the improvement of ATS services and the safety of operations over the South Atlantic (SAT). He took the opportunity to reaffirm Brazil commitment to the work carried out by the SAT Group and highlighted the permanent support provided by the concerned States to SAT meetings.

3. **Organization, Secretariat and attendance**

3.1 Mr. Luiz Ricardo de Souza Nascimiento, Chief of Division of Air Navigation of DECEA, Brazil, was unanimously elected as Chairperson of the meeting.

3.2 Mr. **Sadou MARAFA**, ATM Regional Officer of the ICAO WACAF Office, was the Secretary of the meeting. He was assisted by **François-Xavier SALAMBANGA** CNS Regional Officer ICAO Dakar Office and Mr. **Onofrio SMARRELLI**, CNS Regional Officer ICAO Lima Office.

3.3 The meeting was attended by 45 participants from ten (10) ICAO contracting States namely, Angola, Argentina, Brazil, Cape Verde, Cote d'Ivoire, Portugal, South Africa, Senegal, Spain and Uruguay and 5 International/Interregional Organizations (ARINC/USA, ASECNA, IATA, INSA and SITA).

3.4 The list of the participants and their contact addresses is at **Appendix A** to this report.

4 **Working languages**

4.1 The meeting was conducted in English language and its relevant documentation was presented in this language.

5. **Agenda of the meeting**

5.1 The meeting adopted the following agenda:

Agenda Item 1: Air Traffic Management (ATM)

1. Follow up of SAT/1 Conclusions pertaining to the ATM field
2. Follow up of the AORRA airspace implementation.
3. SATMA report on Traffic Statistics, Safety procedures and operational procedures in the EUR/SAM corridor.
4. ATS Contingency planning
5. Any other ATM business

Agenda Item 2: Communications, Navigation and Surveillance (CNS)

1. Follow up of SAT/15 Conclusions pertaining to the CNS field
2. Review of AFS performance
3. Review of CNMC report
4. Any other CNS business

Agenda Item 3: Communications, Navigation and Surveillance/ Air Traffic Management (CNS/ATM) Systems

1. Harmonization of ADS/CPDLC programmes
- Review of the Report of the Second SAT FANS 1/A Interoperability Team (SAT/FIT/6)

2. Performance Based Navigation (PBN) in the South Atlantic

Agenda Item 4: Future Work Programme

Agenda Item 5: Any other business.

Agenda Item 6: Conclusions and Decisions of the meeting

The meeting adopted the following conclusions and decisions:

Agenda Item 1: Air traffic management (ATM)

1.1 Follow up of SAT/15 Conclusions pertaining to the ATM field

Conclusion SAT16/01: Unknown traffic in the South Atlantic (follow-up on conclusion SAT15/07)

That In view of the longstanding problems of unknown traffic and coordination issues in the South Atlantic,

a) Argentina, Brazil and Uruguay will continue joining their efforts to address all the challenges in terms of infrastructure and operational procedures in order to enhance the safety in the area concerned.
b) The three States will develop a Safety Case covering the area concerned, in order to determine the hazards, assess the safety risks and propose resolution/ mitigation actions, under the leadership of the ICAO SAM regional office.
c) Any other SAT member may participate in the Safety Case on request, by providing traffic data/information.
d) The States will ask SAM regional office to send the finding of the Safety Case to be discussed at high level within ICAO, and ICAO to ensure the corrective actions are implemented.

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1.2 Follow up of the AORRA airspace implementation

Conclusion SAT 16/02: Routes in AORRA in contingency situation

That
a) All fixed routes, suspended within the AORRA airspace, remain available on chart and in aircraft databases through their constitutive waypoints as published.

b) In case of contingency situation, those to be reactivated be published by NOTAM with their relevant waypoints, by ANSPs.

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Conclusion SAT 16/03: Extension of the AORRA boundary from lat 0° to 4°N

That a Working Group comprising Dakar ACC, Abidjan ACC, Accra ACC Roberts ACC, ASECNA and IATA is established with the mandate to discuss the extension of the AORRA boundary from the equator to the latitude 04°N line, and the new gates and transitions routes to be created, as proposed by IATA.

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Conclusion SAT16/04: Supplemental AORRA information

That:

1. ***Each SAT Member State designates a contact person responsible for the management and upkeep of the information on AORRA.***
2. ***South Africa will coordinate with other SAT members the development of a comprehensive operational document and present the draft to the next SAT meeting, in order to harmonize their respective operational information in terms of AORRA operations.***

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1.3 SATMA report on Traffic Statistics, Safety procedures and operational procedures in the EUR/SAM corridor.

Conclusion SAT16/05: Data for risk assessment

That apart from LHD/LD monthly report, States provide SATMA with data regarding 2010/2011 traffic following, if possible, the DATA models of document "DATA NEEDED FOR EUR/SAM MONITORING AND ASESSMENTS" published in SATMA website (www.satmasat.com).

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Conclusion SAT16/06: Common additional procedures to prevent LHDs

That the modification to ICAO Doc.7030 proposed under Conclusion SAT/15/05 is amended as follows:

Supplementary safety procedures for aircrafts in cases of air/ground communications problems (radio or CPDLC) and relay with other aircrafts is not available.
Procedures for aircrafts flying along the EUR-SAM Corridor, aircrafts will perform SLOP in cases where:

a) Impossible, difficult or incomprehensive radio or CPDLC communications with the relevant ACC after trying to establish the communications at least during 10 minutes.
b) Doubts and impossible confirmation of a clearance issued by ATC.
c) When performing an ATC clearance with additional restriction (time to reach the cleared flight level, Mach number, etc.) and the position of the aircraft is 10 minutes or less to the next boundary.

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Conclusion SAT16/07: LHD monitoring team

That as per conclusion SAT14TF1/08 and Decision SAT15/01, States must continue sending to SATMA the monthly reports about deviations detected.

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Decision SAT 16 /01: LHD reporting

That the SATMA Altitude Deviation Form as amended and shown at Appendix C is adopted.

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1.4 ATS Contingency planning

Conclusion SAT16/08: Contingency plan for the SAT Area

That

1. ***Each SAT Member State designate a contact person responsible for the development of a common Contingency Plan for the SAT area***

2. ***South Africa circulate the draft Contingency Plan presented under WP05 to all SAT members for review and inputs, and present a final draft by end of June 2011***

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1. 5 Any other ATM business

Conclusion SAT16/09: South-Atlantic Interoperability Initiative to Reduce Emissions (SAIRE)

That, SAT members

a) support the SAIRE and any other initiative (Iflex, OPTIMI, INSPIRE, etc...) to improve energy efficiency and lower aircraft noise through the development and implementation of environmentally friendly procedures for all phases of flight
b) make any effort to participate in any initiative within the framework of the SAIRE project.

Agenda Item 2: Communications, Navigation and Surveillance (CNS)

2.1 Follow up of SAT/15 Conclusions pertaining to the CNS field

Follow-up Conclusion SAT/15/09: Implementation of ATS/DS circuit for Luanda/Atlantico

Conclusion SAT/16/10: Implementation of the ATS/DS Circuit between Luanda and Atlantico

That:

a) In the framework of the Joint Technical Team for CAFSAT evaluation and re-engineering Spain, Team Leaderé, provide Brazil and Angola with the guidelines for planning of CAFSAT modernization plan by end of June 2011;
b) Considering the a) results Angola and Brazil implement and operate the Luanda Atlantico ATS/DS circuit by the end of April 2012.

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Follow up Conclusion SAT/15/11: ***Trials for extension of ATS-N5 Voice switching protocol***

Conclusion SAT/16/11: **Trials for extension of ATS-N5 Voice switching protocol**

That in accordance with the recommendation contained within the ICAO Manual on ATS Ground-Ground Voice Switching and Signalling (Doc 9804, Chapter 2 Section 2.3), SAT States pursue their effort to conducting the ATS-N5 Voice switching protocol through the following steps:

a) Spain provide an update procedure for the implementation of ATS-N5 voice switching protocol in EUR/SAM area by 30th June 2011;
b) Other SAT States report current VCCS capability to support ATS-N5 by 29 July 2011;
c) Spain develops and conducts trials with the SAT States that comply with b) in coordination with the Joint Technical Team for CAFSAT modernization and re-engineering.

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Follow up Decision SAT/15/02: ADS Data Sharing

Decision SAT/16/02: **Operational Requirements for ADS Data Sharing**

That in order to establish technical, financial and legal aspects, SAT ATM/WG is urged to implement Decision SAT/15/02*: ADS Data Sharing, *by conducting the study on the operational requirements to be provided to the SAT CNS/WG for consideration during the next SAT/17 Meeting.

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Follow-up Conclusion SAT/15/12: Implementation and Interconnection of AMHS systems

Conclusion SAT/16/12: **Development of Memorandum of Understanding for AMHS interconnection**

That in order to ensure a coordinated AMHS interconnection, SAT States are encouraged to develop, if necessary, bilateral Memorandum of Understanding taking into consideration all the technical operational and administrative requirements.

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Conclusion SAT/16/13: **Implementation of AMHS within the SAT region**

That in order to take the benefit of ICAO provision in AMHS implementation process, SAT States who have not implemented AMHS, endeavor to participate in the forthcoming regional seminars and workshops organized by ICAO to support the implementation of AMHS regional Plans requirements.

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2.2 Review of AFS Performance

Conclusion SAT/16/14: Regular Evaluation of AFS performance

That SAT States forward the monthly availability of AFS (AFTN & ATS/DS) to the respective ICAO Regional Offices for compilation and analysis starting from first of June 2011 or commence the delivery of such information as soon as possible thereafter, while advising the relevant ICAO office of the intended date on which delivery of the information will commence.

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Follow up Conclusion SAT/15/13: ***Investigation of missing Flight Plans***

Conclusion SAT/16/15: **Development of a consolidated procedure for the analysis of missing Flight Plans**

That in accordance with the Terms of Reference of SAT/CNS/WG, a draft consolidated procedure should be developed by ASECNA, by the end of year 2O11, in order to properly mitigate the missing flight plans.

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Conclusion SAT/16/16: **ATS voice circuits implementation via REDDIG and CAFSAT VSAT networks**

That Argentina, Brazil, French Guyana, Santa Maria, Senegal, South Africa, Trinidad &Tobago and Uruguay inform to the respective ICAO regional offices by the fifteen June 2011 their intention to implement ATS voice trials using a double hoop satellite link through the REDDIG and CAFSAT networks following the draft Action Plan presented as Appendix D to this report, in order to complete the pending direct circuit implementation between CAR /SAM and AFI region specified in their respective Air Navigation Plan (DOC 8733 & 7474).

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Conclusion SAT/16/17: **ATS voice circuits implementation via AFISNET and CAFSAT VSAT networks**

That considering the operational coordination requirement, Brazil and Côte D'Ivoire, inform to their respective ICAO regional offices by the fifteen June 2011 through an agreed planning, their intention to implement ATS voice trials using a double hoop satellite link through the AFISNET and CAFASAT networks in order to satisfy the ATS coordination requirement between Abidjan and Atlantico ACCs.

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2.3 Review of CNMC report

Follow up Decision SAT/15/03: **Adoption of the Terms of Reference of CAFSAT Network Management Committee**

Decision SAT/16/03: **Adoption of the Report of the first meeting of CNMC**

That the Report of the first meeting of CAFSTAT Network Management Committee (CNMC) is adopted as attached in APPENDIX E to this report.

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Conclusion SAT/16/18: **Active participation in CNMC meetings by CNMC members**

That CNMC Members should endeavour to actively:

a) Participate in CNMC regular meetings and technical specialized Task Forces/Study Groups and therefore,

b) ***Provide the suitable support to their nominated delegates in accordance with the commitment they have taken under the Terms of Reference and Work Programme of CNMC.***

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Follow up Conclusion SAT/15/14: Harmonization of AFS maintenance procedures and AFS statistics data collection

Conclusion SAT/16/19: Development of CAFSAT Earth Stations Performance Data Collection Form (PDCF)

That in accordance with ICAO guidelines on Performance of Very Small Aperture Terminals (VSAT), ASECNA and GHANA, already tasked by SNMC Conclusion 18/ 02 for the matter, develop and submit to next CNMC meeting, a draft Earth Stations Performance Data Collection Form (PDCF) aiming to facilitating the future automation of the collection and the monitoring of CAFSAT stations performance data, taking into consideration the most sensitive components of the network.

Note: List of sensitive components: Modems, UP/down Converters, SSPA , Antenna Feed….

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Decision SAT/16/04: Utilization of provisional templates for the collection of the Performance data statistic of CAFSAT nodes

That meanwhile the complete development of the PDCF (Conclusion SAT/16/19 refers) for the automation of the monitoring of the Network Performance, CAFSAT members adopt the templates attached in Appendix F and report quarterly to the current CNMC manager with copy to relevant ICAO Regional Offices.

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Follow up Conclusion SAT/15/15: Modernization of CAFSAT Network

Conclusion SAT/16/20: Development of a Roadmap for CAFSAT joint technical evaluation and re-engineering

That in accordance with ICAO guidance materials (*Annexe X, Vol 1, Attachment F: Guidance material concerning reliability and availability of radiocommunications and navigation aids; ICAO Guidelines on Performance of Very Small Aperture Terminal (VSAT) Networks*) CNMC member states develop a Roadmap for a Joint Technical Evaluation and re-engineering in the view of ensuring an efficient and optimized modernization of CAFSAT Network taking into consideration:

a) Required service performance level of the network to support the operation and development of sensitive current and forthcoming CNS/ATM components;
b) CAFSAT interoperability with its neighboring networks;
c) Maintenance fundamental parameters governing service availability, continuity and integrity such as: reliability, turn over statistics, maintenance personnel expertise;
d) Cost-effectiveness;

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Decision SAT/16/05: Establishment of a Joint Technical Team for CAFSAT Network evaluation and re-engineering

That a Joint Technical Team for CAFSAT network evaluation and re-engineering (JTT) is established with Terms of Reference and Work Programme presented in Appendix G to this report.

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2.4 Any other CNS business

Follow up Conclusion SAT/15/16: Implementation of AIDC /OLDI in SAT

Conclusion SAT/16/21: Development of a harmonized Interface Communication Documentation

That in accordance with their Regional Plan AFI SAT States develop Interface Communication Documents (ICD) taking in consideration the existing ICD in the SAM Region in order to facilitate an harmonized AIDC implementation and operation in the SAT region.

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Agenda Item 3: Communications, navigation and surveillance / Air traffic management (CNS/ATM) Systems

3.1 Harmonization of ADS/CPDLC programmes

• Review of the Report of the Sixth SAT FANS 1/A Interoperability Team (SAT/FIT/6)

Decision SAT 16/06: SAT/FIT/6 Report

That the SAT/16 Meeting approved the SAT/FIT/6 Report and its conclusions.

Agenda Item 4: Terms of reference and Future Work Programme

Decision SAT 16 /07: Amendment to the work programmes of the ATM/WG and the CNS/WG

That the work programmes of ATM/WG and CNS/WG are amended as shown at Appendix H to this report.

Agenda Item 5: Any other business

None

Summary of Discussions

Agenda Item 1: Air Traffic Management (ATM)

1.1 Follow up of SAT/15 Conclusions pertaining to the ATM field

1.1.1 The Secretariat presented the status of implementation of conclusions emanating from the fifteenth meeting of the improvement of air traffic control in the South Atlantic (SAT/15), which was held in Lisbon, Portugal, from 19 to 21 May 2010. The meeting reviewed and noted the actions taken by SAT Members and the Secretariat on the conclusions. The status of implementation of these Conclusions is shown at **Appendix B** to this report.

1.1.2 The meeting particularly extended on the follow-up of Conclusion SAT 15/07 "Unknown traffic in the South Atlantic". It was reported that Argentina, Brazil and Uruguay held a coordination meeting in Lima Peru the 13 August 2010 with the participation of ICAO, with the aim to improving operational procedures to ensure safety in the area concerned. The three States committed to implement all remedial actions identified during the coordination meeting.

1.1.3 The meeting however noted the persistency of unsafe conditions occurring in the area concerned. Numerous safety concerns are still raised with respect to the operations in that area, among which unknown or uncoordinated traffic flying through many airspaces. The meeting was of the view that more efforts should be taken by all stakeholders to tackle these occurrences.

1.1.4 The meeting therefore formulated the following conclusion:

Conclusion SAT16/01: Unknown traffic in the South Atlantic (follow-up on conclusion SAT15/07)

That in view of the longstanding problems of unknown traffic and coordination issues in the South Atlantic,

a) Argentina, Brazil and Uruguay will continue joining their efforts to address all the challenges in terms of infrastructure and operational procedures in order to enhance the safety in the area concerned.

b) The three States will develop a Safety Case covering the area concerned, in order to determine the hazards, assess the safety risks and propose resolution/mitigation actions, under the leadership of the ICAO SAM regional office.

c) Any other SAT member may participate in the Safety Case on request, by providing traffic data/information.

d) The States will ask SAM regional office to send the finding of the Safety Case to be discussed at high level within ICAO, and ICAO to ensure the corrective actions are implemented.

1.2 Follow up of the AORRA airspace implementation.

1.2.1 The meeting was apprised of the implementation of AORRA Phases 3 and 4 on the AIRAC date of 26 August 2010, thus completing the establishment of the entire AORRA airspace as initially designed. Likewise, as required by former SAT meetings, all States and ANSPs concerned have suspended all fixed routes within the AORRA and created transition routes to/from AORRA.

1.2.2 However, the attention of the meeting was drawn to the difficulties that the reactivation of the suspended fixed routes in case of contingency situations may raise, as these routes are no more neither on charts nor in operators' flight planning data bases.

1.2.3 The meeting recalled that these routes should be only "suspended" not "cancelled"; meaning that their related waypoints should remain on the charts and in aircraft databases as well. This was clearly stated in the guidance given by SAT meetings on the issue.

1.2.4 The meeting reformulated the following conclusion in this regard:

Conclusion SAT 16/02: Routes in AORRA in contingency situation

That:

a. All fixed routes, suspended within the AORRA airspace, remain available on chart and in aircraft databases through their constitutive waypoints as published

b. In case of contingency situation, those to be reactivated be published by notam with their relevant waypoints, by ANSPs.

1.2.5 The meeting was seized with a proposal from IATA for an extension of the AORRA airspace from the equator to the north, precisely from 0 deg latitude to 4 deg latitude. This extension is estimated to provide increased environmental benefits. The following examples of savings in CO2 emissions using the proposed northern boundary were shown:

Route	CO2 Savings per Flight (kg)
Johannesburg - Atlanta	142
Dubai - Sao Paulo	94.5
Dakar - Cape Town	400

1.2.6 In addition to that, this option would extend the AORRA boundary to an optimum distance from the North East continental border in order to benefit from the ground radar and VHF coverage where currently available.

1.2.7 In the whole the larger random routing airspace will enable flights to fly optimized trajectories, recognizing the opportunity of flying user preferred routes, reducing fuel consumption and improving surveillance, thereby increasing airspace safety and efficiency.

1.2.8 The moving of the boundary will of course require the creation of new entry/exit waypoints on the new border and transitions to/from domestic airspace.

1.2.9 In light of the above, the meeting agreed to the principle of the extension of the AORRA boundary from lat 0° to 4° and formulated the following conclusion:

Conclusion SAT 16/03: Extension of the AORRA boundary from lat 0° to 4°N

That a Working Group comprising Dakar ACC, Abidjan ACC, Accra ACC Roberts ACC, ASECNA and IATA is established with the mandate to discuss the extension of the AORRA boundary from the equator to the lat 04°N line, and the new gates and transitions routes to be created, as proposed by IATA.

1.2.10 With regard to the information to be published on the implementation the AORRA, the meeting was of the view that this is a circumstance which calls for a regional initiative supporting the information contained in doc 7030 (ICAO Regional Supplementary Procedures) with a more collective document which provides detailed information which can be referenced at one point.

1.2.11 Indeed, the vast size of the random routing area designated as AORRA and the number of FIRs which support the area, leads to a fragmentation of information relating to requirements which each FIR may require a operator to adhere to while operating within that particular airspace.

1.2.12 It was therefore proposed that a document which may be in the form of a combined AIP Supplement, including all information relevant to operations within the various FIR's area of responsibility which cover the AORRA airspace, be published at least annually, possibly co- incident with either the SAT or SAT/TF meeting, at which time information relevant to operations within the AORRA is updated and circulated under the auspices of the IACO offices to which the various FIRs are accredited to.

1.2.13 The meeting considered a draft AIP Supplement proposed by South Africa as an example in this context. It was however agreed that the issue as well as the draft AIP proposed should be examined more deeply under all aspects and details before final decision.

1.2.14 The meeting therefore formulated the following conclusion:

Conclusion SAT16/04: Supplemental AORRA information

That:

1. ***Each SAT Member State designate a contact person responsible for the management and upkeep of the information on AORRA***

2. ***South Africa will coordinate with other SAT members the development of a comprehensive operational document and present the draft to the next SAT meeting, in order to harmonize their respective operational information in terms of AORRA operations.***

1.3 SATMA report on Traffic Statistics, Safety procedures and operational procedures in the EUR/SAM corridor

Note: ***all SATMA full reports are available on SATMA website (www.satmasat.com)***

1.3.1 SATMA presented to the meeting global and detailed information about the air traffic statistics of the EUR-SAM Corridor during year 2010 as well as the evolution of these figures since 2004. In summary:

a) Global figures:
- important drop of the traffic during 2009 (-16%);
- a moderate increase of +2% in 2010;
- globally the Corridor is at similar level than during 2006 with the same average traffic per day;
- in 2011, from January to March, 5% of increase; average number of air movements per day
- until 87 movements; consolidation of the positive tendency initiated on May 2010.

b) Traffic per route (2010)
- unidirectional UN741 (18%): decrease
- unidirectional UN866 (24%): stable
- bidirectional UN873 (40%): increase
- bidirectional UN857 (15%): increase

1.3.2 The meeting was presented also with a summary and conclusions of the 2009 RVSM/RNP10 safety assessment in EURSAM corridor applying the collision risk model to available data.

1.3.3 The assumptions and data available for the assessment were as follows:

- Traffic growth hypothesis: 6% per annum.
- Palestra (Aena's database) database for the Canaries UIR (01/01/2009-31/12/2009).
- Traffic sample from SAL and Atlantic-Recife (01/01/2009-31/12/2009).
- Traffic sample from Dakar (01/01/2009-31/03/2009, 01/05/2009-30/06/2009 and 01/09/2009-31/10/2009).
- Only those crossing routes with more than 50 aircraft per annum have been analysed.
- Traffic on RANDOM two routes represents less than 2% of the total traffic. ROSTA-NADIR is southbound traffic and mainly even levels are used and NADIR-ABALO is northbound traffic and only odd levels are used.
- SAL, Dakar and Atlantic-Recife traffic samples do not include all the flights and/or all the information for the required waypoints.
- Trajectories and information at required waypoints (i.e., time and FL) were assumed, considering the most logical routes and speedsrisk evaluated in 6 different locations along the Corridor.

1.3.4 Resulting Figures for CRM:

Lateral collision risk: TLS = $5 \cdot 10^{-9}$

Technical vertical risk: TLS =2. $5 \cdot 10^{-9}$

Locations	Technical Vertical Collision Risk 2009	Technical Vertical Collision Risk 2019
Canaries	$0.0094 \cdot 10^{-9}$	$0.0169 \cdot 10^{-9}$
SAL 1	$0.0037 \cdot 10^{-9}$	$0.0066 \cdot 10^{-9}$
SAL 2	$0.0059 \cdot 10^{-9}$	$0.0105 \cdot 10^{-9}$
Dakar 1	$0.0065 \cdot 10^{-9}$	$0.0116 \cdot 10^{-9}$
Dakar 2	$0.0062 \cdot 10^{-9}$	$0.0111 \cdot 10^{-9}$
Recife	$0.0063 \cdot 10^{-9}$	$0.0112 \cdot 10^{-9}$

Technical vertical risk: TLS =2. $5 \cdot 10^{-9}$

Locations	Technical Vertical Collision Risk 2009	Technical Vertical Collision Risk 2019
Canaries	$0.0094 \cdot 10^{-9}$	$0.0169 \cdot 10^{-9}$
SAL 1	$0.0037 \cdot 10^{-9}$	$0.0066 \cdot 10^{-9}$
SAL 2	$0.0059 \cdot 10^{-9}$	$0.0105 \cdot 10^{-9}$
Dakar 1	$0.0065 \cdot 10^{-9}$	$0.0116 \cdot 10^{-9}$
Dakar 2	$0.0062 \cdot 10^{-9}$	$0.0111 \cdot 10^{-9}$
Recife	$0.0063 \cdot 10^{-9}$	$0.0112 \cdot 10^{-9}$

Total vertical risk: TLS = $5 \cdot 10^{-9}$

Locations	Total Vertical Collision Risk 2009	Total Vertical Collision Risk 2019
Canaries	$1.7728 \cdot 10^{-7}$	$3.1748 \cdot 10^{-7}$
SAL 1	$5.0382 \cdot 10^{-7}$	$9.0226 \cdot 10^{-7}$
SAL 2	$4.3219 \cdot 10^{-7}$	$7.7398 \cdot 10^{-7}$
Dakar 1	$1.0423 \cdot 10^{-6}$	$1.8666 \cdot 10^{-6}$
Dakar 2	$1.0676 \cdot 10^{-6}$	$1.9120 \cdot 10^{-6}$
Recife	$4.2489 \cdot 10^{-7}$	$7.6091 \cdot 10^{-7}$

The Total vertical collision risk is composed of the technical vertical risk and the operational risk. Operational risk includes errors and in-flight contingencies with height deviations due to emergency procedures and turbulences.

1.3.5 In conclusion:

- Lateral and technical vertical risks are below the TLS.
- Total vertical risk is higher than the TLS; this is due to LHDs resulting from coordination errors, in particular those related to:
  - No notification of the transfer
  - Transfer at unexpected flight level

1.3.6 In light of the above, and given that the causes of the problems are well known, the meeting encouraged States involved to implement mandatory initiatives aimed to revert the situation concluded by 2009 Safety Assessment analysis following ICAO DOC 9937 , Chapter 1. 2.e "**initiate necessary remedial actions if RVSM requirements are not met**". *(Also Doc 9574).*

1.3.7 In the same vein, the meeting requested SATMA to present a summary of EUR/SAM Corridor Safety Assessment and LHD summary in next the RMA meeting (Montreal June 2011) and present a report of affecting conclusions from the RMA meeting to the SAT Group.

1.3.8 Lastly the meeting agreed to the following conclusion aiming at improving the quality of the risk assessment:

Conclusion SAT16/05: Data for risk assessment

> **That apart from LHD/LD monthly report, States provide SATMA with data regarding 2010/2011 traffic following, if possible, the DATA models of document "DATA NEEDED FOR EUR/SAM MONITORING AND ASESSMENTS" published in SATMA website (www.satmasat.com).**

1.3.9 SATMA as coordinator of the LHD Monitoring Team presented the meeting with the evolution of LHDs in the EUR-SAM Corridor from April 2.010 until February 2.011. For the 124 LHDs reported to SATMA, the most common reason (117 reports), is still the same than on previous SATMA reports, "operational coordination error between adjacent ACC´s".

1.3.10 However the meeting noted the important increase of the number of LHD reported, meaning that the culture of reporting is improving in all ACCs.

1.3.11 The meeting discussed various LHD reports and as a result, encouraged ACCs and aircraft operators to reinforce the policy of reporting as a way to detect, solve and implement common safety solutions along the EUR-SAM Corridor.

1.3.12 To this effect the meeting formulated the following conclusions:

Conclusion SAT16/06: Common additional procedures to prevent LHD,s

That the modification to ICAO Doc.7030 proposed under Conclusion SAT/15/05 is amended as follows:
Supplementary safety procedures for aircrafts in cases of air/ground communications problems (radio or CPDLC) and relay with other aircrafts is not available.
Procedures for aircrafts flying along the EUR-SAM Corridor, aircrafts will perform SLOP in cases where:
a) A Impossible, difficult or incomprehensive radio or CPDLC communications with the relevant ACC after trying to establish the communications at least during 10 minutes.
b) Doubts and impossible confirmation of a clearance issued by ATC.
c) When performing an ATC clearance with additional restriction (time to reach the cleared flight level, Mach number, etc.) and the position of the aircraft is 10 minutes or less to the next boundary.

Conclusion SAT16/07: LHD monitoring team

That as per conclusion SAT14TF1/08 and Decision SAT15/01, States must continue sending to SATMA the monthly reports about deviations detected.

1.3.13 The meeting acknowledged that the introduction of FANS in EUR/SAM Corridor is an important LHD/LD mitigation factor. So, in order to accurately measure the impact of ADS/CPDLC operations on EUR/SAM Safety TLS figures, the LHD Monitoring Team should have enough information thereon.

1.3.14 The meeting therefore agreed to amend the Altitude Deviation Reporting form in order to facilitate the investigations to be carried out by LHD Monitoring Team, and formulated the decision:

Decision SAT 16 /01: LHD reporting

That the SATMA Altitude Deviation Form as amended and shown at Appendix C is adopted.

1.4. ATS Contingency planning

1.3.15 As per Conclusion SAT15/06, **South** Africa presented to the meeting a draft comprehensive ATS contingency plan for the SAT airspace based on the existing EUR-SAM corridor contingency plan and in accordance with ICAO Annex 11 provisions.

1.3.16 The meeting was of the view that all SAT member States should be given time to review and amend this draft before agreement to a common contingency plan to be adopted and implemented.

1.3.17 Hence the conclusion:

Conclusion SAT16/08: Contingency plan for the SAT Area

That:

1. Each SAT Member State designates a contact person responsible for the development of a common Contingency Plan for the SAT area.

2. South Africa circulate the draft Contingency Plan presented under WP05 to all SAT members for review and inputs, and present a final draft by end of June 2011.

1.5 Any other ATM business

SAIRE INITIATIVE

1.3.18 Further to Decision SATFIT 6/3 which referred the issue to SAT16, the meeting was presented with the South-Atlantic Interoperability Initiative to Reduce Emissions (SAIRE) initiative, which will aim, similar to the EU/US initiative AIRE (Atlantic Interoperability Initiative to Reduce Emissions) to improve energy efficiency and lower aircraft noise through the development and implementation of environmentally friendly procedures for all phases of flight.

1.3.19 SAT16 meeting was invited to discuss the practical aspects of the SAIRE establishment in the Region and prepare the ground for national commitment. The following improvement areas/solutions were given as examples:

a) Oceanic trajectory optimization (horizontal, vertical, longitudinal);
b) Reduced separations for RNP 4 equipped aircrafts (lateral, longitudinal);
c) Optimized Oceanic Entry/Exit transition;
d) Better use of Meteorological information;
e) Continuous Descent Operations (CDO) procedures;
f) Continuous Climb procedures;
g) Optimized departure routings;
h) Collaborative decision support systems that increase aircraft taxi time predictability allowing airlines to capitalize on use of fuel saving procedures such as reduced engine taxi out

1.3.20 Other ATM initiatives were presented to the meeting, all aiming at the improvement of the safety and the efficiency of operations:

- The **In**dian Ocean **S**trategic **P**artnership to **R**educe **E**missions (INSPIRE) : The INSPIRE partnership is intended to be collaborative network of partners across the Arabian Sea and Indian Ocean region dedicated to improving the efficiency and sustainability of aviation;

- The OPTIMI (Oceanic Position Tracking Improvement & Monitoring): The aim of the OPTIMI project is to assess and trial the feasibility of implementing oceanic flight tracking services in the Atlantic (NAT, EUR and AFI regions) in order to improve the accuracy with which aircraft position is known, allowing better coordination and ATS service provision in normal operations and also in cases in which an unusual event occurs;

- The Iflex project: implementation of a flexible route network framework that will enable airlines to leverage the prevailing upper wind conditions and seize opportunities for fuel and CO2 savings at the flight planning phase.

1.3.21 The meeting endorsed all these initiatives and called upon SAT members to support any actions required within the framework thereof.

1.3.22 To this effect, the meeting adopted the following conclusion:

<u>Conclusion SAT16/09</u>: South-Atlantic Interoperability Initiative to Reduce Emissions (SAIRE)

That, SAT members

a) support the SAIRE and any other initiative (Iflex, OPTIMI, INSPIRE, etc...) to improve energy efficiency and lower aircraft noise through the development and implementation of environmentally friendly procedures for all phases of flight;

b) make any effort to participate in any initiative within the framework of the SAIRE project.

Agenda Item 2: Communications, Navigation and Surveillance (CNS)

2.1 Follow up of SAT/14 Conclusions pertaining to the CNS field

Follow up Conclusion SAT/15/09: Implementation of ATS/DS circuit for Luanda/Atlántico

2.1.1 The meeting examined the status of implementation of the CAFSAT node in Luanda to establish the ATS/DS direct link between Recife and Luanda as agreed by Conclusion SAT/15/9.

2.1.2 The meeting was informed by Angola and Brazil on their common actions taken with the supplier (INSA) to establish this link by purchasing a CAFSAT node tin Luanda and complementary equipment for the Atlántico.

2.1.3 The meeting was informed that CAFSAT modernization and re-engineering exercise will be conducted by a Joint Technical Team established by CNMC 1st meeting and leaded by Spain. It was therefore agreed that Angola and Brazil should take benefit of its outcome when implementing the link. Spain was requested to provided Angola and Brazil with the guidelines for planning of CAFSAT modernization plan by end of June 2011.

Commitment was taken by Angola and Brazil to implement the link by the end of April 2012. The following conclusion was therefore formulated:

<u>Conclusion SAT/16/10:</u> Implementation of the ATS/DS Circuit between Luanda and Atlántico

That:

a. In the framework of the Joint Technical Team for CAFSAT evaluation and re-engineering Spain, Team Leader , provide Brazil and Angola with the guidelines for planning of CAFSAT modernization plan by end of June 2011;
b. Considering the a) results Angola and Brazil implement and operate the Luanda Atlántico ATS/DS circuit by the end of April 2012.

Follow up Conclusion SAT/15/10: ATS-Voice Numbering Plan for AFI and Conclusion SAT/15/11: Trials for extension of ATS-N5 Voice switching protocol

2.1.4 The meeting was informed on APIRG/17 deliberation through its Conclusion 17/20 tasking the AFI CNS/SG to include in his mandate the study for the development and implementation of ATS Voice Numbering Plan revising its Work Programme accordingly.

2.1.5 The meeting noted that the updated form containing the technical requirements for VCSSs capability to support ATS-N5 voice switching protocol has not been yet developed by Spain and provided to States so that no report could be conducted as requested by Conclusion SAT/15.

2.1.6 Spain informed the meeting that the development of this form relies on complementary development and trials that will be conducted by the end of June 2011. The meeting encouraged Administration/Organizations to pursue their efforts for the implementation of Conclusion SATATS Voice numbering Plan within SAT Region. The following conclusion was adopted:

Conclusion SAT/16/11: Trials for extension of ATS-N5 Voice switching protocol

That in accordance with the recommendation contained within the ICAO Manual on ATS Ground-Ground Voice Switching and Signalling (Doc 9804, Chapter 2 Section 2.3), SAT States pursue their effort to conducting the ATS-N5 Voice switching protocol through the following steps:

a) Spain provides an update procedure for the implementation of ATS-N5 voice switching protocol in EUR/SAM area by 30th June 2011;
b) Other SAT States report current VCCS capability to support ATS-N5 by 29 July 2011;
c) Spain develops and conducts trials with the SAT States that comply with b) in coordination with the Joint Technical Team for CAFSAT modernization and re-engineering.

***Follow up Decision SAT/15/02: ADS* Data Sharing**

2.1.7 The meeting examined the status of implementation of Decision SAT/15/02 calling for the determination by SAT ATM WG of a consolidated list of operational requirements to facilitate the development of ADS C data sharing process within SAT Region. The following Decision was approved:

Decision SAT/16/02: Operational Requirements for ADS Data Sharing

That in order to establish technical, financial and legal aspects, SAT ATM/WG is urged to implement Decision SAT/15/02*: ADS Data Sharing, *by conducting the study on the operational requirements to be provided to the SAT CNS/WG for consideration during the next SAT/17 Meeting.

Follow up Conclusion SAT/15/12: Implementation and Interconnection of AMHS systems

2.1.7 The meeting was provided with the status of implementation of AMHS in SAT region. In particular it was noted that some states of SAM Region namely, have been implementing AMHS systems and conducting bilateral trials (Brazil/Argentina).

2.1.8 The meeting was also informed on APIRG deliberation on the implementation of AMHS within AFI region. In particular APIRG/17 through Conclusion 17/12 called for an AMHS implementation governed by a cooperative approach to ensure the continuity of Aeronautical Fixed Service during the transition time from AFTN to AMHS. APIRG/17 therefore created through Conclusion 17/17 the AFI AMHS Implementation Task Force which is organizing a Workshop from 17 to 18 and its first meeting from 19 to 20 in Nairobi, Kenya.

2.1 9 Taking into consideration the experience gained by the SAM region the meeting recognized that the harmonization of the implementation should be conducted through Memorandum of Understanding aiming to ensuring the interoperability between the interconnected systems.
The following conclusion was formulated:

Conclusion SAT/16/12: Development of Memorandum of Understanding for AMHS interconnection

That in order to ensure a coordinated AMHS interconnection, SAT States are encouraged to develop, if necessary, bilateral Memorandum of Understanding taking into consideration all the technical operational and administrative requirements.

2.1.10 The meeting also raised up the issue related to the training for operational and maintenance personnel and urged SAT States to ensure the suitable provision for the effective participation of their personnel in the regional training session (Seminars, workshops, symposium) organized by ICAO in the matter. The following conclusion was formulated:

Conclusion SAT/16/13: Implementation AMHS within the SAT region

That in order to take the benefit of ICAO provision in AMHS implementation process, SAT States who have not implemented AMHS, endeavor to participate in the forthcoming regional seminars and workshops organized by ICAO to support the implementation of AMHS regional Plans requirements.

2.2 Review of AFS Performance

2.2.1 The secretariat presented to the meeting the AFS (ATS/DS & AFTN) performance data collected from some States, in particular from Cote d'Ivoire, Senegal, Mauritania (through ASECNA) and Morocco.

2.2.2 The meeting noted that the Service availability has been satisfactory in general, during year 2010 and for the first quarter of year 2011 for ATS/DS. AFTN circuits operation was also satisfactory in general along year 2010 except some dysfunctions between Dakar and Rio that affected the availability rate on October (**96.10%**) and December 2010 (**96.12%**) Dakar and Johannesburg on January 2010 (**90.39%**) and March 2011 (**86.59%**).

2.2.3 Considering the collection of Aeronautical Fixed Service statistic Data, the meeting noted that, in spite of recommendation **9/4 of RAN AFI/7** (***Performances of AFTN circuits***) and decision **16 /12 of APIRG/16** (***Follow up of the performances of the Aeronautical Fixed Service***), most of the States still do not submit the necessary information in due time.

2.2.4 It was reported to the meeting the deliberation of APIRG/17 on this issue which noted that only 20 percent of States in the AFI Region responded to AFI/7 recommendations calling Sates to send the monthly AFTN availability statistics to the ICAO Regional Offices.
APIRG/17 Conclusion 17/14 respectively encouraging States to implement these conclusions and requesting ICAO to develop a web based data collection centre where States can directly key in the AFTN statistical data for compilation and analysis was presented to the meeting.

The meeting therefore requested Administration/Organization to collect and send to ICAO Regional Offices the monthly diagram of availability commencing by first of June 2011. The following Conclusion was formulated:

Conclusion SAT/16/14: Regular Evaluation of AFS performance

That SAT States forward the monthly availability of AFS (AFTN & ATS/DS) to the respective ICAO Regional Offices for compilation and analysis starting from first of June 2011 or commence the delivery of such information as soon as possible thereafter, while advising the relevant ICAO office of the intended date on which delivery of the information will commence.

Follow up Conclusion SAT/15/13: Investigation of missing Flight Plans

2.2.5 The meeting discussed the issue of the investigation on the missing flight Plans. It was recognized that this pending concern should be tackle in order to provide the ATM automated system with reliable and available row materials, namely flight plans in order to ensure efficient automated ATM operations.

The meeting recognized that the mitigation of the missing flight plan can be performed by the usage of a consolidated procedure and tasked ASECNA to submit a draft by the end of year 2011. The following Conclusion was adopted:

Conclusion SAT/16/15: Development of a consolidated procedure for the analysis of missing Flight Plans

That in accordance with the Terms of Reference of SAT/CNS/WG, a draft consolidated procedure should be developed by ASECNA, by the end of year 2O11, in order to properly mitigate the missing flight plans.

2.2.6 The secretariat presented to the meeting some ATS voice circuits implemented in SAM region through the MEVA II / REDDIG interconnection using double hoop satellite circuits.

2.2.7 The meeting was recalled that According to CAR/SAM ANP FASID Table CNS 1C - ATS direct speech circuits plan, the following ATS speech direct circuits are required between the CAR/SAM and AFI Regions:

a) Atlantico ACC-Dakar ACC;
b) Atlantico ACC–Johannesburg ACC;
c) Ezeiza ACC-Johannesburg ACC;
d) Montevideo ACC-Johannesburg ACC;
e) Piarco ACC–Santa Maria ACC; and
f) Rochambeau ACC –Dakar ACC.

2.2.8 The meeting noted that in spite of this required planed direct circuits, the ATS Voice service was implemented using the international direct dialling (IDD) telephone calls except Atlántico ACC-Dakar ACC, Atlántico ACC-Johannesburg ACC and Ezeiza ACC-Johannesburg ACC circuits implemented through the CAFSAT network.

2.2.9 The meeting noted the benefit for concerned ACC Administration to analyze the possibility of carrying out trials on ATS speech circuits implementation using a double hoop satellite link through the REDDIG and CAFSAT networks, and approved the action plan present in the **Appendix D** to this report. The following conclusion was adopted:

Conclusion SAT/16/16: ATS voice circuits implementation via REDDIG and CAFSAT VSAT networks

That Argentina, Brazil, French Guyana, Santa Maria, Senegal, South Africa, Trinidad &Tobago and Uruguay inform to the respective ICAO regional offices by the fifteen June 2011 their intention to implement ATS voice trials using a double hoop satellite link through the REDDIG and CAFSAT networks following the draft Action Plan presented as Appendix D to this report, in order to complete the pending direct circuit implementation between CAR /SAM and AFI region specified in their respective Air Navigation Plan (DOC 8733 & 7474).

2.2.10 The meeting was informed by Cote d'Ivoire and Brazil on the need for a coordination direct link between Abidjan and Atlántico in order to ensure direct traffic ATS voice coordination. Taking into consideration the issue analysed in 2.2.9 the meeting agreed on this request and tasked Cote d'Ivoire and Brazil to conduct trials on interconnection between the two CAFSAT and AFISNET nodes. The following Conclusion was adopted:

Conclusion SAT/16/17: ATS voice circuits implementation via AFISNET and CAFSAT VSAT networks

That considering the operational coordination requirement, Brazil and Côte D'Ivoire, inform to their respective ICAO regional offices by the fifteen June 2011 through an agreed planning, their intention to implement ATS voice trials using a double hoop satellite link through the AFISNET and CAFASAT networks in order to satisfy the ATS coordination requirement between Abidjan and Atlántico ACCs.

2.3 Review of CNMC report

Review of the Report of the first meeting of CNMC

Follow up Decision SAT/15/03: Adoption of the Terms of Reference of CAFSAT Network Management Committee

2.3.1 The secretariat submitted to the meeting the draft report on the first meeting of the CAFSAT Network, Management Committee (CNMC) held in Recife, on 02 May 2011. This meeting was attended by all the States hosting CAFSAT nodes except and Mauritania (node managed by ASECNA) and Morocco.

2.3.2 The CNMC first meeting was attended by twenty nine (**29)** participants from nine (**09)** States (Angola, Brazil, Cape Verde, Cote d'Ivoire, Portugal, Senegal, South Africa, Spain, Uruguay) , two (**02**) Air Navigation Service Providers, namely ASECNA and ATNS, one international organization (ARINC) and a Communication Integrator Company INSA (Spain). The deliberation of the meeting adopted three (03) Decisions and six (06) Conclusions.

The meeting adopted the draft report by formulating the following Decision:

Decision SAT/16/03: Adoption of the Report of the first meeting of CNMC

***That the Report of the first meeting of CAFSTAT Network Management Committee (CNMC) is adopted as attached in* APPENDIX E.**

2.3.3 The meeting recognized that for the successful development of CNMC current and future activities in accordance with its Terms of Reference, the Members, administrations/organizations should actively participate in the regular meetings and specialized technical Task forces and study Groups.

In this regard the following draft conclusion was formulated:

Conclusion SAT/16/18: Active participation in CNMC meetings by CNMC members

That CNMC Members should endeavour to actively:

a) Participate in CNMC regular meetings and technical specialized Task Forsces/Study Groups and therefore,

a) ***Provide the suitable support to their nominated delegates in accordance with the commitment they have taken under the Terms of Reference and Work Programme of CNMC.***

Follow up Conclusion SAT/15/14: ***Harmonization of AFS maintenance procedures and AFS statistics data collection***

2.3.4 The meeting noted that the CAFSAT network involves various technical components which contribute to the Quality of the Aeronautical Fixed Service provision. ICAO reminded the meeting that, due to the wide variety of network architectures, type of access used by VSAT industries worldwide, ICAO has not standardized the physical layer of communication.

2.3.5 The meeting was reminded with the Guidelines on Performance of Very Small Aperture Terminal (VSAT) networks aiming at supporting States/Organization for the implementation and the operation of VSAT Networks developed by ICAO and therefore analyzed and approved the principle of developing a **P**erformance **D**ata **C**ollection **F**orm **(PDCF)** aiming to facilitating the automation of the survey of CAFSAT network Earth Stations basics parameters as well as the nomination of ASECNA and Ghana, already tasked by SNMC to conduct similar development.

2.3.7 Meanwhile, it was agreed to use the proposed templates as presented in **Appendix C of the report of CNMC/1 meeting** for the collection of CAFSAT nodes parameters for a quarterly report to the secretariat. The following Conclusion and Decision were adopted:

Conclusion SAT/16/19: **Development of CAFSAT Earth Stations Performance Data Collection Form (PDCF)**

That in accordance with ICAO guidelines on Performance of Very Small Aperture Terminals (VSAT), ASECNA and GHANA, already tasked by SNMC Conclusion 18/ 02 for the matter, develop and submit to next CNMC meeting, a draft Earth Stations Performance Data Collection Form (PDCF) aiming to facilitating the future automation of the collection and the monitoring of CAFSAT stations performance data, taking into consideration the most sensitive components of the network.

Note: List of sensitive components: Modems, UP/down Converters, SSPA , Antenna Feed….

Decision SAT/16/04: **Utilization of provisional templates for the collection of the Performance data statistic of CAFSAT nodes**

That meanwhile the complete development of the PDCF (Conclusion SAT/16/CNS/ WG-12 refers) for the automation of the monitoring of the Network Performance, CAFSAT members adopt the templates attached in Appendix F to this report and report quarterly to the current CNMC manager with copy to relevant ICAO Regional Offices.

Follow up Conclusion SAT/15/15: ***Modernization of CAFSAT Network***

2.3.8 The meeting noted that CFSAT network has been operating since 2001 over three continents (EUR, SAM, and AFI) and recognized that it modernization and re-engineering should be initiated through an harmonized approach that should involve all the stakeholders in order to ensure seamless provision of Aeronautical fixed service (AFTN, ATS/DS) supported by the Network along the EUR/SAM corridor while interfacing with AFI for a safer Air navigation service provision.

2.3.9 Moreover, the meeting also recognized that the forthcoming implementation of CNS/ATM components with time critical or sensitive applications (Automation of ATM in the frame of ICAO New Flight Plan Format, Sharing Surveillance data, Implementation of AMHS…) may require the modernization/re-engineering of the current VSAT Networks taking into consideration the flexibility gained with the emerging technologies and bearing in mind the necessity to ensure a comprehensive safety of the data across the Networks and a costs effectiveness of the operation for the VSAT managers.

2.3.10 The meeting agreed with the principle of the development of a Roadmap for CAFSAT joint technical evaluation and re-engineering proposed by CNM meeting and therefore formulated the following Conclusion:

Conclusion SAT/16/20: **Development of a Roadmap for CAFSAT joint technical evaluation and re-engineering**

That in accordance with ICAO guidance materials (*Annexe X, Vol 1, Attachment F: Guidance material concerning reliability and availability of radiocommunications and navigation aids; ICAO Guidelines on Performance of Very Small Aperture Terminal (VSAT) Networks*) *CNMC member states develop a Roadmap for a Joint Technical Evaluation and re-engineering in the view of ensuring an efficient and optimized modernization of CAFSAT Network taking into consideration:

a. Required service performance level of the network to support the operation and development of sensitive current and forthcoming CNS/ATM components;
b. CAFSAT interoperability with its neighboring networks;
c. Maintenance fundamental parameters governing service availability, continuity and integrity such as: reliability, turn over statistics, maintenance personnel expertise;
d. Cost-effectiveness.

2.3.11 The meeting examined in length a draft Term of Reference Composition and Work Programme of a Joint Technical Team for CAFSAT Network Evaluation and Re-engineering proposed by CNMC first meeting and agreed on the amended version attached in **Appendix D to the Report of CNMC/1 meeting** Spain was nominated to be the Team Leader of the Team whose duration is estimated to be six (06) months. Therefore the following Decision was formulated:

Decision SAT/16/05: **Establishment of a Joint Technical Team for CAFSAT Network evaluation and re-engineering**

That a Joint Technical Team for CAFSAT network evaluation and re-engineering (JTT) is established with Terms of Reference and Work Programme presented in Appendix G to this report.

2.4 Any other CNS business

Follow up Conclusion SAT/15/16: Implementation of AIDC /OLDI in SAT

2.4.1 The meeting was informed that Administrations/Organizations in SAM Region have been developing **I**nterface **C**ommunication **D**ocuments (**ICD**) aiming to facilitate a harmonized implementation of **A**TS **I**nterfacilities **D**ata **C**ommunication (**AIDC**).

2.4.2 The meeting recognized that although some implementation projects are ongoing in AFI the AFI Surveillance Implementation Plan is at the updating step with a Task Force planned to be held from 22 to 24 June 2011. It was agreed that the development of ICD for AFI States should be considered by the forthcoming AFI Aeronautical Surveillance Implementation Task force (ASI/TF) meeting. The following conclusion was formulated:

Conclusion SAT/16/21: Development of a harmonized Interface Communication Documentation

That in accordance with their Regional Plan AFI SAT States develop Interface Communication Documents (ICD) taking in consideration the existing ICD in the SAM Region in order to facilitate a harmonized AIDC implementation and operation in the SAT region.

Agenda Item 3: Communications, navigation and surveillance/Air Traffic Management (CNS/ATM) Systems

3.1 Harmonization of ADS/CPDLC programmes

• Review of the Report of the Sixth SAT FANS 1/A Interoperability Team (SAT/FIT/)

3.1.1 The Rapporteur of the SATFIT presented to the meeting the report of the SAT/FIT/6 meeting which was held on the 3rd May 2011 in Recife, just before the SAT 16 meeting. The SAT16 meeting reviewed the list of conclusions and decisions adopted by the FIT and endorsed them; hence the following decision:

Decision SAT 16/06: SAT/FIT/6 Report

That the SAT/16 Meeting approved the SAT/FIT/6 Report and its conclusions

3.2 Performance Based Navigation (PBN) in the South Atlantic

3.2.1 The meeting considered the issue of the implementation of RNP4 in the EUR/SAM Corridor and the transition from the current RNP10 with 10 minutes longitudinal spacing and 50NM lateral spacing to RNP4 30/30 NM.

3.2.2 It was recalled that the SAT14 meeting (Montevideo, Uruguay, from 7 to 9 May 2008) noting the unexpected increase of the air traffic flows had considered the implementation of RNP4 along the EUR-SAM Corridor as a relevant target. Thereafter, the SAT14/TF1 meeting held in Sal, Cape Verde, from 10 to 12 June 2009 deemed necessary that a study/assessment be conducted on the transition from the current RNP10 with 10 minutes longitudinal spacing and 50NM lateral spacing to RNP4 30/30 NM in order to assess the safety of the operations as well as the expected economical advantages.

3.2.3 In view of the above and after discussion on the current operational environment prevailing in the EUR/SAM corridor and the relevance of the application of RNP4 therein, the meeting tasked Spain as rapporteur of IAS/WG to draft an initial report in order to develop a project for the medium/long term implementation of RNP-4 along the EUR_SAM Corridor. The report made by Spain and endorsed by the SAT Group is summarized in the following paragraphs:

3.2.4 *It is agreed by all EUR SAM States that consolidation of FAN1/A aircraft facilities, prior to RNP4 fleet certifications, should be a prerequisite for the implementation of RNP 4 in the area.*

3.2.5 *On the other hand, schedule and plans presented by States during FIT meeting allow us to be optimist about a full operational FAN1/A EURSAM Corridor in a relative short term, so first steps aimed to a future RNP4 implementation might be studied and debated.*

3.2.6 *SATMA will contact States and IATA to compile data and information required to achieve a cost/benefit study based on the following hypothesis:*

a) *Results in terms of time and average of FANS1/A equipped & RNP4 certified aircraft on traffic growth expected*

b) *Impact of "FL, Route or Airspace" restrictions for low average of FANS1/A equipped & RNP4 certified aircraft*

c) *Increase average of optimal levels per period /peak time sets*

d) *ATC/Pilots Work load impact*

3.2.7 *The cost/benefit analysis will be submitted to SAT Group for further actions*"

Agenda Item 4: Terms of reference and Future Work Programme

4.1.1 Under this part of the agenda, the Terms of Reference and the work Programme, of the SAT Group and respective IAS/SG, ATM/WG and CNS/WG were presented. The meeting updated and amended the work programmes of the ATM/WG and the CNS/WG, and decided:

Decision SAT 16 /07: Amendment to the work programmes of the SAT WORKING GROUPS

That the work programmes of ATM/WG and CNS/WG are amended as shown at Appendix H to this report.

All the terms of reference are shown in **Appendix H** to this report.

Agenda Item 5: Any other business.

Dates and venue of SAT/17 meeting

5.1.1 The meeting welcomed the offer of Spain to host the forthcoming SAT/17 meeting, tentatively scheduled for April or May 2012. ICAO will coordinate the venue and dates with the host State and SAT members will be informed in due course.

APPENDIX A
INTERNATIONAL CIVIL AVIATION ORGANIZATION
Western and Central African Office

Sixteenth Meeting on the Improvement of Air Traffic Services over the South Atlantic (SAT/16)
(Recife, Brazil, 04-06 May 2011)

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APPENDIX B
Status of Conclusions and Decisions related to SAT/15 Meeting

Conclusions and Decisions	Implementation Status	Remarks
Conclusion SAT 15/01: Implementation of Phases 3 and 4 of AORRA Airspace ***That States concerned publish by the AIRAC date of 05 July, 2010 a common AIP Supplement for implementing phases 3 and 4 of AORRA airspace by 26 August, 2010.***	**Completed**	**Publications made on or prior to Airac date 29 July 2010**
Conclusion SAT15/02: Direct transitions to/from AORRA airspace ***That a coordination meeting be held by the end of June 2010 between Angola, Brazil, Côte d'Ivoire, Ghana, Sao Tome and Principe, Senegal, ASECNA, Roberts FIR and IATA to discuss the direct transitions to/from AORRA airspace as proposed by IATA in Appendix D to this report.*** ***Note: Ghana accepted the request to host the meeting; date and venue to be confirmed***	**completed**	**Meeting held in Accra (Ghana) 29 – 30 June 2010**
Conclusion SAT15/03: Proposed amendment to doc 7030 ***That SAT members forward to the secretariat their comments on the proposed amendment to doc 7030 as shown in Appendix E to this report, by the end of June 2010***	**Still valid**	**The secretariat will initiate the formal process for the approval of the amendment**
Conclusion SAT15/04: Operational Procedure ***That Brazil, Cape Verde, Senegal and Spain will implement on AIRAC date 12 January 2011 the operational procedure based on ADS-C/CPDLC reflected in Appendix F to this SAT 15 report***	**ongoing**	**Sates concerned will coordinate the implementa-tion of the procedures**
Conclusion SAT15/05: Common additional procedures to prevent LHDs **That** ***SAT/15 Meeting expressed its concern about the LHDs due to operational coordination errors in the ATC unit to unit coordination and impels to ACC,s the application of the coordination procedures about flight level changes near the common boundaries reflected on their respective LoAs and decided to propose the modification to ICAO Doc.7030 as follows*****:** *1.1 Supplementary safety procedures for aircrafts in cases of air/ground communications problems (radio or CPDLC) and relay with other aircrafts is not available.* *1.2 Procedures for aircrafts flying along the EUR-SAM Corridor, aircrafts will perform SLOP in cases where:*	**ongoing**	**Superseded by Conclusion SAT16/06**

Conclusions and Decisions	Implementation Status	Remarks
a) Impossible, difficult or incomprehensive radio or CPDLC communications with the relevant ACC after trying to establish the communications at least during 10 minutes; *b) Doubts and impossible confirmation of a clearance issued by ATC;* *c) When performing an ATC clearance with additional restriction (time to reach the cleared flight level, Mach number, etc.) and the position of the aircraft is 10 minutes or less to the next boundary.* 1.3 *In all cases, aircrafts will inform the ATC about this lateral offset as soon as suitable communications were re-established.*		
Decision SAT 15 01: LHD reporting *That SATMA as coordinator of LHD Monitoring Team will send to ACCs involved in one specific deviation the LHD report received, for its investigation*	**implemented**	
Conclusion SAT15/06: Contingency plan for the SAT Area *That South Africa coordinates with other SAT members the development of a comprehensive ATS contingency plan for the SAT airspace based on the existing EUR-SAM corridor contingency plan and in accordance with ICAO Annex 11 provisions, and presents the final draft to the next SAT 16 meeting.*	**Still valid**	**Superseded by Conclusion SAT16/08**
Conclusion SAT15/07: Unknown traffic in the South Atlantic *That:* • *the SAT Group expresses its concern about the unknown traffic coming to/from Malvinas Islands, Ascension Island and other uncontrolled flights in the South Atlantic, and calls for the involvement of ICAO to find a solution* • *Argentina, Brazil and Uruguay agree to hold a coordination meeting to improve operational procedures in order to enhance safety in the area concerned*	**ongoing**	**Superseded by Conclusion SAT16/01**
Conclusion SAT15/08: ATS deficiencies in the SAT area *That, based on the projected increase in traffic provided by IATA and the deficiencies reported, the SAT group agrees to develop an airspace infrastructure plan along the line of the Global PBN Plan.*	**ongoing**	**The secretariat will propose a form for the reporting of deficiencies and the follow-up of the implementation of remedies**
Conclusion SAT/15/09: Implementation of ATS/DS circuit for Luanda/Atlantico	**Ongoing**	**Replaced by**

Conclusions and Decisions	Implementation Status	Remarks
That: *Angola and Brazil hold a technical coordinating meeting to conduct the implementation process of a CAFSAT node in Luanda in order to clear out before the forthcoming SAT meeting, the pending Luanda/Recife ATS/DS circuit deficiency;* *ASECNA as team leader of Task 2 of CNS/WG Work Programme assist, if necessary Angola and Brazil for the technical study;* *ICAO to continue to support Angola and Brazil by coordinating the implementation process.*		**Conclusion SAT/16/11** **Purchasing process in progress. Target expected date of implementation: End of April 2012**
Conclusion SAT/15/10: ATS-Voice Numbering Plan for AFI *That:* *APIRG to create an AFI Working Group to conduct the technical study for the development of a global ATS voice numbering plan for AFI Region and harmonize its implementation frame;* *Meanwhile, SAT States be encouraged to pursue their efforts on bilateral ATS voice numbering trials and provide the AFI working group with available relevant material;* *ICAO continue to support the development of an ATS voice numbering plan for AFI as stated by the recommendation contained within the ICAO Manual on ATS Ground-Ground Voice Switching and Signaling (Doc 9804,Chapter 2 Section 2.3).*	**On going**	**APIRG through conclusion 17/20 tasked the CNS/SG to include in his mandate the study for the development and implementation of ATS Voice Numbering Plan revise its Work Programme accordingly**
Conclusion SAT/15/11: Trials for extension of ATS-N5 Voice switching protocol *That:* *SAT States continue their collaborative technical arrangements to conduct trials for extension of ATS-N5 voice switching protocol by adopting the following steps:* *Spain to provide an updated form containing the technical requirements for VCSSs capability to support ATS-N5 voice switching protocol;* *Other SAT States to assess their current VCSSs capability in line with the technical requirements provided by Spain and take into account these requirements when updating their VCSSs and report the assessment results to ICAO;* *ICAO to coordinate the process by compiling the available information to be forwarded to all stakeholders.*	**Still valid** **Not implemented**	**Survey form not provided to States so that no report could be developed by States and forwarded to ICAO** **Replaced by Conclusion SAT/16/11**

Conclusions and Decisions	Implementation Status	Remarks
Decision SAT/15/02: ADS Data Sharing ***That:*** ***1) SAT Sates delay the ADS data sharing as stated by conclusion SAT 14/12 and conduct if necessary comprehensive complementary studies taking into account the ATM requirements and involving various technical, financial and legal aspects;*** ***2) The SAT ATM /WG conducts a study and provide the SAT CNS/WG with the operational requirements for ADS data sharing.***	**Implemented** **Still valid**	**Replased by Decision SAT/16/02** **ATM WG did not provide yet the operational requirement by SAT/16 meeting for consideration**
Conclusion SAT/15/12: Implementation and Interconnection of AMHS systems ***That:*** ***1) SAT States who have already implemented AMHS systems conduct trials for their interconnection and report to the other stakeholders;*** ***2) SAT States who have not implemented AMHS systems pursue their effort in modernizing their systems to support AMHS capability taking into account the experience gained by their neighbouring states;*** ***In the framework of regional collaboration, SAT States to report when requested, the results of the trials of interconnection of AMHS systems to AFI AMHS Implementation Task force in order to support AMHS implementation process in AFI region***	**Some states of SAM Region namely, Argentina, Brazil, Paraguay, Ecuador, Venezuela have implemented this conclusion by: Implementing AMHS systems and conducting bilateral trials (Brazil/Argentina) through MoUs for AMHS interconnection trials**	**▪ No report received from States;** **▪ APIRG/17 Through conclusion 17/12 to ensure continuity of service during the transition time from AFTN to AMHS;** **▪ Conclusion 17/17 establishing an AFI AMHS Implemantation TF (Workshop and 1st meeting 17-20May 2011)** **Replaced by Conclusions SAT/16/12 and SAT16/13**
Decision SAT/15/03: Adoption of the Terms of Reference of CAFSAT Network Management Committee ***That the CAFSAT Network Management Committee (CNMC) Terms of Reference be adopted as presented in Appendix G to the present report.***	**Implemented**	**CNMC 1st meeting held**
Conclusion SAT/15/13: Investigation of missing Flight Plans ***That SAT States set up a consolidated investigation form involving both technical and operational aspects to conduct periodic missing flight plans assessment.***	**Still valid** **On going**	**Need of an assessment procedure** **Replaced by Conclusion SAT/16/15**

Conclusions and Decisions	Implementation Status	Remarks
Conclusion SAT/15/14: Harmonization of AFS maintenance procedures and AFS statistics data collection ***That:*** ***1) SAT States endeavour to agree to minimize the Mean Time Between Failure (MTBF) of AFS systems by harmonizing their maintenance methodologies in terms of maintenance organization, procedures and maintenance personnel exchange;*** ***2) The statistics of AFS performance be collected and shared among SAT States with copy to ICAO for compilation and analysis.***	**On going**	**Being considered by CMNC**
Conclusion SAT/15/15: Modernization of CAFSAT Network ***That:*** ***In the framework of the Terms of Reference of the CAFSAT Management Committee, SAT States develop a joint technical evaluation for a comprehensive modernization and re-engineering of CAFSAT Network.*** ***The modernization process should ensure a balanced interconnection with existing networks and guarantee end to end operations interoperability.***	**Ongoing**	**Being considered by CMNC**
Conclusion SAT/15/16: Implementation of AIDC /OLDI in SAT ***That SAT States be encouraged to implement AIDC messages interchange where possible, as technical action to reduce human errors in coordination operations between neighbouring ACCs***	**Still valid**	**South Africa has conducted AIDC interconnection trials between two ACCs**

Appendix C
Altitude Deviation FORM

Report to SATMA of an altitude deviation of 300ft or more, including those due to TCAS, Turbulence and Contingency Events

1. Today's date:	**2. Reporting Unit:**		
DEVIATION details			
3. Operator Name:	**4. Call Sign:**	**5. Aircraft Type:** A340	**6. Mode C Displayed:**
7. Date of Occurrence:	**8. Time UTC:**	**9. Occurrence Position (lat/long or Fix):**	
10. Cleared Route of Flight:			
11. Cleared Flight Level:	**12. Estimate duration at Incorrect Flight Level (seconds**		**13. Observed Deviation** (+/-ft): -
14. Other Traffic Involved:			
15. Cause of Deviation (brief title):			
AFTER DEVIATION IS RESTORED			
16. Observed/Reported Final Flight Level*: (Pilot) *Please indicate the source of information – Pilot/Radar/FANS	**Mark the appropriate box:** **17. Is the FL above the cleared level: -** **18. Is the FL below the cleared level: _**		**19. Did this FL comply with the ICAO Annex 2 Tables of Cruising Levels?** _ Yes _ No
AIRCRAFT FANS EQUIPPED **ADS** __-- Yes __ No **CPDLC** __-- Yes __ No	**ADS/CPDLC Connected** **ADS** __-- Yes __ No **CPDLC** __-- Yes __ No		

Narrative
20. Detailed Description of Deviation (Please give your assessment of the actual track flown by the aircraft and the cause of the deviation.)

crew comments (if any)

When complete please forward the report(s) to:
South Atlantic Monitoring Agency (SATMA)
E-Mail: satma@aena.es

APPENDIX D

ACTION PLAN FOR THE IMPLMEMENTATION OF TRIALS FOR ATS SPEECH CIRCUITS THROUGH THE REDDIG CAFSAT NETWORK

ACTIVITY	RESPONSIBLE	IMPLEMENTATION DATE	REMARKS
Nomination of focal point to coordinate the implementation of local circuit connection to the respective VSAT node in the REDDIG and CAFSAT network	Argentina, Brazil, French Guyana (France), Santa Maria, Senegal, South Africa, Trinidad & Tobago and Uruguay	20 May 2011	
Implementation of the local circuit connection to the respective REDDIG VSAT node	French Guyana (France), Trinidad & Tobago and Uruguay	30 June 2011	
Implementation of the local circuit connection to the respective CAFSAT VSAT node	Santa Maria, Senegal and South Africa	30 June 2011	
Verification of availability of interface in the REDDIG nodes in order to implement the ATS speech circuits	REDDIG Administrator	20 May 2011	
Verification of availability of interface in the CAFSAT nodes in order to implement the ATS speech circuits	CAFSAT Administration	20 May 2011	
Program the following PVC in the REDDIG network: • Piarco –Recife • Rochambeau- Recife • Montevideo – Ezeiza	REDDIG Administrator	30 June 2011	
Program the following PVC in the CAFSAT network: • Recife Santa Maria • Recife Dakar • Ezeiza Johannesburg	CAFSAT Administrator	30 June 2011	
Implementation of the local connection in Recife from the REDDIG node to CAFSAT node	Brazil	15 July 2011	
Implementation of the local connection in Ezeiza from the REDDIG node to CAFSAT node	Argentina	15 July 2011	
Implementation of operational trials in the following circuits through the REDDIG CAFSAT connection**:** • Montevideo ACC- Johannesburg ACC • Piarco ACC –Santa Maria ACC • Rochambeau ACC –Dakar ACC	French Guyana (France), Santa Maria, Senegal , South Africa, Trinidad Tobago and Uruguay REDDIG Administrator and CAFSAT Administrator	29 July 2011	

APPENDIX E

INTERNATIONAL CIVIL AVIATION ORGANIZATION
WESTERN AND CENTRAL AFRICAN OFFICE

FIRST MEETING OF CAFSAT NETWORK MANAGEMENT COMMITTEE (CNMC/1)

FINAL REPORT

Recife, Brazil, 02 May 2011

THIS REPORT IS AVAILABLE ON ICAO WEBSITE AT

http://www.lima.icao.int/meetprog/MeetingProgramme.asp

APPENDIX F

Provisional Templates for the Collection of the Performance Statistic

APPENDIX F1

Provisional Templates for the Collection of the Performance Statistic Data

Center:

Date/

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

APPENDIX F2

Provisional Templates for the Collection of the Performance Statistic Data

Performance of AFTN

Centre : Atlántico
Date /

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

Qualitative performance of ATS/DS

Centre :
Date /

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

Qualitative performance of Future CNS Services

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

Appendix G

Central Atlantic Firs Satellite Telecommunication Network (CAFSAT) Network Management Committee (CNMC)

Terms of Reference Composition and Work Programme of the Joint Technical Evaluation and re-engineering

1 –Objectives:

1.1 The main objectives of the joint technical evaluation are to:

a) Identify CAFSAT service deficiencies elements/features in accordance with ICAO guideline metrics ;

b) Make recommendations and proposals concerning the short, mid and long term solutions and strategies to be implemented, such as using appropriate human resource management, training policies and modern technologies, for achieving an enhanced, efficient, high performance, secured, CNS/ATM capability and cost-effective network, meeting interoperability and seamlessness requirements ; and

c) Evaluate the anticipated costs in view of a comprehensive project document to support a collective financing mechanism.

2 – Expectations

The joint technical evaluation shall provide a detailed description and analysis of the current network features, performance and operating/maintenance costs. The following constituents shall be addressed:

2.1 - Technical

- Availability, continuity, integrity and reliability requirements;
- System maintainability;
- Frequency plan;
- Spectrum management;
- Adequacy of available bandwidth for AFTN, ATS/DS, service channels and other voice services;
- Architecture, satellite access techniques, protocols;
- Configuration management;
- Interoperability requirements;
- Ability to accommodate CNS/ATM emerging technologies (ATN applications), SUR and GNSS operations;
- Bit-oriented protocols (BOPs).

2.2 - Operational

This part of the joint technical evaluation shall clearly show up the advantages and disadvantages associated with the current network. In this connection, the following issues shall particularly be analyzed:

- Quality of Service (QoS) of ground-to-ground applications and if implemented, air-to-ground applications , based on ICAO and WMO requirements;
- Network security, confidentiality and data integrity;
- AFTN transit times against the agreed ICAO requirements;
- Implementation of TCP/IP protocol.

The joint technical evaluation shall clearly establish the extent to which the network performances

C-System configuration and performance assessment

The joint technical evaluation shall assess and provide advice on, and not limited to, the following:

AFTN

- Suitability of network topology taking into consideration ICAO specifications concerning continuity of services;
- Routing tables;
- Message switch performance assessment (dialogue, conflicts, etc.);
- Congestion, loss of AFTN messages, propagation times and quality of service (QoS).

ATS/DS

- Topology conformance to ICAO specifications to ensure continuity of services
- Implementation of voice links using Frame relay protocol stack.
- Priority management, connection time, and quality of service.
-

AMS

- Extended VHF coverage (if implemented) QoS and availability

CNS/ATM

Possibility of implementing a number of CNS/ATM functionalities (AMHS, AIDC, ADS/CPDLC, D-FIS, etc.) and meeting availability, reliability integrity and continuity performance criteria using the network infrastructure.

Enhancements

After a critical analysis of the network, showing the network capabilities and limitations, the joint technical evaluation shall propose corrective measures and/or adequate solutions to rectify any reported deviations (as required), and formulate proposals for the network re-engineering. These shall include use of appropriate human resource management policies, suitable technologies and topologies for ATS communications (ATSC) and aeronautical administrative correspondence (AAC), system reliability, data integrity, as well as network management, administration, operations, monitoring and maintenance policies, including development of a common software tool for technical statistics.

3 – Project requirements

3.1. Work programme

The work programme for the conduct of the joint technical evaluation shall include if necessary some site visits, taking into consideration their roles in the regional communication infrastructure (AFTN main centres) and/or air traffic management system (flight information centres, area control centres), or associated interface problems**.**
However in order to take into consideration the funding concerns, the basic exchanges medium will be E-Mailing and Skype exchange ; coordinating meetings aiming to validate a crucial step of the exercise could be held.

3.2 Duration

The joint technical evaluation shall be completed within six (06) months.

4. Composition

- **ENANA (Angola)**
- **ANAC (Argentina)**
- **ATLANTICO FIR (Brazil)**
- **ASA (Cape Verde)**
- **ASECNA (Côte d'Ivoire, Mauritanie, Sénégal)**
- **AENA (Spain) - Team Leader**
- **ONDA (Morocco)**
- **NAV Portugal (Portugal)**
- **ATNS (South Africa)**
- **ICAO**
- **IATA**

5 – Reference documentation

The joint technical evaluation shall be conducted using relevant provisions contained in ICAO, WMO and ITU standards, recommendations, regulations, manuals and procedures (ICAO Annexes, WMO Technical Manual on GTS – Doc 386, ITU Radio regulations), AFI EUR Navigation Plans (Doc 7474,), , APIRG Reports, CNMC Meeting Report, and any relevant document containing material that can contribute to the success of the exercise.

ATTACHMENT TO APPENDIX G

CAFSAT Network functionalities to be addressed by the Joint Technical Team

Functionalities

1. Original scope of CAFSAT network

The network was originally designed to support the following communication services in accordance with the regional Air navigation plan for the Africa-Indian Ocean (AFI), EUR/NAT and SAM Regions:

1) ATS Direct Speech between adjacent FIRs;
2) Aeronautical Fixed Telecommunications Network (AFTN);
3) Operational meteorological data exchanges (OPMET);
4) Operational Aeronautical Information Services exchanges.
5) Aeronautical Administrative support (AAC);

2. Current and future evolution of CAFSAT network

In addition to these services, the following communications are also being or will be progressively supported by the network:

1) Aeronautical Telecommunications Network (ATN) components
   - Air/ground data link applications : ADS/CPDLC, ADS-B, DFIS, VDL (if implemented) or SSR
   - Ground-ground applications: AMHS, AIDC.
2) *Computer-to-computer data exchange (ICC) between ATS Flight Data Processing Systems (FDPS); and*
3) GNSS augmentation data transmission and exchange.

APPENDIX H

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE SAT WORKING GROUPS

APPENDIX H1

TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE SAT ATM WORKING GROUP (ATM/WG)

- Considering the evolutionary implementation of CNS/ATM systems in areas of routing AR1/HA1 and AR2/HA8 *as defined in the Global Air Navigation Plan (ICAO Doc 9750)*, 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

TASK No.	SUBJECT	TARGET DATE
1.	Analyze ATM deficiencies and make proposals for their elimination.	Continuous
2.	Monitor pre-implementation/post-implementation safety assessments (as applicable) for RVSM and RNP operations in the South Atlantic, including adjacent areas.	**Continuous**
3.	Study and evaluate RVSM, RNP/RNAV procedures applicable in the AFI/CAR/SAM and EUR/SAM Interface areas.	Continuous
4.	Monitor flight plan availability and propose appropriate corrective measures.	Continuous
5.	Oversee FANS 1/A system performance monitoring to ensure that the system continues to meet safety and interoperability requirements and that operations and procedures are working as specified.	Continuous
6.	Carry out studies on the establishment of a central reporting agency (CRA) and related institutional issues	Completed
7.	Harmonize ADS/CPDLC programmes developed by SAT States/FIRs and analyze cost-benefit aspects related to their implementation.	Continuous
8.	Maintain ADS/CPDLC operational guidance material updated.	Continuous
9.	Conduct studies related to the implementation of the Global ATM Operational Concept and other enabling concepts within the SAT area.	Continuous
10.	4. Continue studies related to the extension of the AORRA airspace.	**SAT17**
11.	**Monitor the implementation of the ICAO New Flight Plan in the SAT Region.**	**15 November 2012**

- Note: The ATM/WG should take appropriate action on pressing issues and submit its proposal to the SAT/15 meeting.

COMPOSITION

- *The Task Force of multi-disciplinary nature shall comprise of experts from States responsible of FIRs in AFI and SAM routing areas AR1/AH2 and AR2/AH8 as defined in the Global Air Navigation Plan (ICAO Doc 9750), and experts from adjacent FIRs and international organizations.*
- ***Rapporteur:*** *Spain*
- *Tasks Nos. 5, 6, 7 and 8 are assigned to the SAT established FANS-1/A Interoperability Team (FIT) with South Africa as Team Leader.*

- ***Working arrangements****: The ATM/WG should complete its work and submit its proposal to the SAT Group. The ATM/WG should work through electronic correspondence prior to meetings.*

APPENDIX H2

TERMS OF REFERENCE, WORKING PROGRAMME AND COMPOSITION OF THE SAT STUDY GROUP ON THE IMPROVEMENT OF THE AIRSPACE STRUCTURE IN THE EUR/SAM CORRIDOR (IAS/SG)

- To develop a strategy for the short-term, mid-term and long term for the implementation of a new airspace structure in the EUR/SAM Corridor with the end to improve the capacity and efficiency of the operations and to meet users needs.

WORK PROGRAMME

TASK No.	SUBJECT	TARGET DATE
1.	Analyze the current operational situation within the EUR/SAM Corridor taking into account statistics and users needs.	Completed
2.	Explore ways and means to restructure the EUR/SAM Corridor airspace	Completed
3.	Develop a short term plan using the current separation standards based on RNP10, including the implementation of new ATS routes.	Completed
4.	Analyze the advantages of introducing unidirectional ATS routes.	Completed
5.	Study the feasibility of implementing RNP4, using ADS/CPDLC functionalities.	**SAT17**
6.	Continue studies to implement a random routing area, using ADS/CPDLC functionalities.	**SAT17**
7.	Develop necessary cost benefit analysis for the different options.	**SAT17**
8.	Establish means to develop the safety assessment for the different implementation options.	**SAT17**
9.	Develop an action plan for the different implementation options.	**SAT17**

COMPOSITION

- Brazil, Cape Verde, France, Portugal, Senegal, Spain, Trinidad and Tobago, United States, ASECNA and IATA.
- ***Rapporteur****: Spain.*

- ***Working arrangements****: The IAS/SG should take the appropriate action to complete its work and submit its proposals to the next meeting of the SAT Group. The IAS/SG should work through electronic correspondence prior to meetings.*

APPENDIX H3
TERMS OF REFERENCE, WORK PROGRAMME AND COMPOSITION OF THE SAT CNS WORKING GROUP (CNS/WG)

- Considering the CAR/.SAM and AFI Air Navigation Plans, the SAT CNS/WG should explore ways and means of achieving further enhancements in ATM efficiency within in areas of routing AR1/HA1 AR-2/HA8 *as defined in the Global Air Navigation Plan (ICAO Doc 9750),* 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

TASK No.	SUBJECT	TARGET DATE
1.	Analyze CNS deficiencies and make proposals for their elimination.	Continuous
2.	Review the report of the CAFSAT Network Management Committee	Continuous
3.	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).	Continuous
4.	Carry studies and make proposals to achieve end-to-end interoperability of ATM applications, in accordance with the ATM global operational concept.	**SAT/16**
5.	In accordance to CNMC conclusions and decisions evaluate the feasibility of using existing or emerging digital VSAT networks to support ATS data link applications in an ATN environment.	**SAT/16**
6.	Considering the implementation time-frames in the AFI and SAM CNS/ATM implementation plans, address cost-benefit aspects for the use of CNS/ATM applications (as required).	Continuous
7.	In coordination with SAT ATM/WG, share relevant technical aspects of different ADS/CPDLC Systems to be implemented by SAT States addressing issues regarding work methodology, procedures, data interchange, maintenance, etc.	**SAT/16**
8.	Analyze all aspects related to the implementation of ATS-N5 protocol in the SAT area in accordance with ICAO guidance material contained in Annex 10 and Doc. 9804	**SAT 16**

COMPOSITION

- The CNS/WG 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.2 and 4), South Africa (Task No.7)*
- ***Working arrangements****: The CNS/WG should complete its work and submit its proposal to the SAT. The CNS/WG should work through electronic correspondence prior to meetings.*