International Civil Aviation Organization

AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP
SIXTEENTH MEETING (APIRG/16)
(Kigali, Rwanda 19-23 November 2007)

Agenda Item 3: Global and Inter-regional activities

3.6: Outcome of the Thirteenth Informal Coordination Meeting on the Improvement of Air Traffic Services over the South Atlantic (SAT/13) and related follow up activities

CNS related issues

(Presented by the Secretariat)

SUMMARY
This paper presents the outcome of the Thirteenth Informal Coordination Meeting on the Improvement of Air Traffic Services over the South Atlantic in respect of CNS systems for review by APIRG.
Action by the meeting is at paragraph 3.
References : [1] – SAT/13 Report (Principal reference) [2] – APIRG/15 Report. *Note: References [1] and [2] can be downloaded from:* ***http://www.icao.int****.*
Related ICAO Strategic Objectives: A, D.

1. Introduction

1.1 The Thirteenth Informal Coordination Meeting on the improvement of air traffic services over the South Atlantic (SAT/13) was held in Las Palmas, Canary Island (Spain), from 24 to 27 April 2006. The meeting was hosted by AENA, Spain and was held at the New Area Control Centre. This paper provides APIRG/16 with the outcome of SAT/13 in respect of communications, navigation and surveillance issues. **Appendix A** hereto contains the SAT/13 Conclusions and Decisions pertaining referred to in this paper.

2. Discussions

2.1 Follow up of SAT/12 Conclusions pertaining to the CNS field

2.1.1 Under this agenda item, the meeting reviewed the implementation status of the conclusions and decisions adopted by the Twelfth Meeting on the improvement of air traffic services over the South Atlantic (SAT/12), which was held in Sal Island, Cape Verde Archipelago, 15 – 17 December 2004, and follow-up action taken thereon by SAT Members and the Secretariat.

2.2 Review of the Report of the SAT/12 CNS Working Group

2.2.1 Under this Agenda item, the meeting reviewed the Report on the SAT/12 Task Force Meeting (Rio de Janeiro, Brazil, from 5 to 9 September 2005) as summarized by the Secretariat. The meeting analyzed the SAT/12 Task Force draft conclusions and decisions covering operational and technical issues, and endorsed most of these conclusions and decisions.

2.3 Review of AFS performance

Interconnection between CAFSAT and SADC networks: ATS/DS Link Atlantico/Luanda

2.3.1 The meeting acknowledged the need for a proper ATS/DS link between Atlantico and Luanda ACCs, and came to the realization that a dedicated CAFSAT node may not be cost-effective due to the level of traffic and distance between the two ACCs. It therefore suggested that Angola, Brazil and South Africa consider implementing this requirement through an interconnection between CAFSAT and SADC networks. Meanwhile, a PSTN link should be used. (**Conclusion SAT 13/11)**

Interconnection between CAFSAT and AFISNET networks: ATS/DS Links Las Palmas/ Nouadhibou and Las Palmas/Nouakchott

2.3.2 The meeting was informed of a technical meeting that took place in Las Palmas from 26 to 27 October 2005, with the participation of Cape Verde, Portugal, Spain, ASECNA and industry providers, which identified as a matter of urgency the need for achieving interconnection between AFISNET and CAFSAT networks. It was provided with detailed information on a proposed technical solution combining an RF subsystem using AFISNET space segment capacity on Satellite IS 10-02, and a baseband subsystem using CAFSAT system.

2.3.3 Issues related to equipment selection and system control and monitoring were also analyzed to ensure system compatibility at FR level and modem level, including NMS software adjustments. (**Conclusion SAT 13/12)**

2.4 Interoperability between aeronautical VSAT networks and potential use of digital VSAT networks to support ATM applications

VSAT Integration

2.4.1 A comprehensive presentation by the ICAO Secretariat provided the meeting with an overview of the issues associated with the implementation, operation and evolution of the communication networks that are based on very small aperture terminal (VSAT) technology and are used in some ICAO Regions mainly to support the provision of the aeronautical fixed service (AFS). Emphasis was put on the following:

Interconnection problems

2.4.2 Interconnection between two VSAT networks is in general more complex, especially if the networks use different satellites, access schemes and protocols. In general, interconnection of VSAT networks increases complexity/cost and degrades the overall performance (especially for voice communications). As such, ideally where there is proper satellite coverage over a certain area, efforts should be made to implement a single VSAT network. Unfortunately, in practice this principle has not always been followed mainly on non-technical grounds. Hence the need for a solution to the growing problem of interconnection between neighbouring digital networks, especially if one or more are VSAT- based.

Use of Internet Protocol (IP) technology

2.4.3 The meeting agreed that Internet Protocol (IP)-based networks provide the optimum means of establishing regional/inter-regional aviation intranets that would enable access by all users to vast resources available on the Internet (e.g. aeronautical meteorology and other data bases). Another point considered was the need to exploit all the possibilities that modern technology offers. For example, the exchange of OPMET data by table-driven codes that will be phased in through amendments to Annex 3 — *Meteorological Service for International Air Navigation* between 2007 and 2016*)* cannot be accomplished by AFTN protocols. As such, the use of the Internet Protocol Suite (IPS) and associated Internet-based software (e.g. e-mail) should be further encouraged.

Standardization issues

2.4.4 The meeting noted that the choice of the medium (e.g. terrestrial or satellite) for the provision of the AFS had never been the subject of Standardization by ICAO, and recognized that it was not practical for ICAO to develop provisions covering all possible types of physical and protocol interfaces. However, certain performance-based provisions could be developed to govern the end-to-end requirements and to narrow the choices for technologies employed. Additionally, the meeting noted that ICAO had completed its work on provisions relating

to the use of public Internet for aeronautical applications (Note[1]). Provisions relating to the use of an IP network as a subnetwork of the aeronautical telecommunication network (ATN) had already been developed.

2.4.5 The meeting came to the realization that, although not yet standardized by ICAO, IP was the most widely method of networking that provided global connectivity in the most economical manner. Moreover, all indications were that IP will (in the form of IP Version 6 with its enhanced security features) continue to be the dominant technology of the foreseeable future. Therefore, where available and cost effective, the alternative of leasing an IP-based virtual private network (VPN) for aeronautical applications should be duly considered. Again, a universally agreed set of end-to-end performance requirements would greatly facilitate the formulation and administration of contracts for obtaining such services. (**Conclusions SAT 13/13, 13/14 and 13/15)**

Numbering Plan for the AFI Region

2.4.6 The meeting acknowledged the importance of a numbering plan in a switched communication system. A numbering plan identifies all users and provides necessary information to the switching equipment for the routing of the traffic. Numbering plans in general have to balance the desire to keep the number of digits dialed for a call to the minimum while including the possibility of expansion beyond the planned capacity without changing the basic structure of the plan. The need to carry out technical studies on the implementation of ATS voice numbering plans for AFI and SAM Regions was agreed. (**Conclusion SAT13/16)**

ATS-N5 protocol proposal in EUR-SAM corridor

2.4.7 The meeting acknowledged the advantages of using an ATS Ground Voice Switching Network such as:

1) Reduction of the number of circuits (Ground-Ground links are shared by a number of users);
2) More than one link to access to a user;
3) Direct route and alternate routes are configured among VCSs for call routing;
4) Normal and Priority calls;
5) Automatic line checking.

2.4.8 Following a comparative analysis of the ATS-R2 or ATS-N5 signalling systems and based on the experience gained in EUR Region, the meeting recognized the need for a common call signalling protocol in the SAT area, and agreed that the ATS-N5 signalling system was specially useful in those ground lines where propagation delays are high (greater than 35 ms), or where satellite links are (to be) used. A detailed description of ATS-N5 signalling system was provided to the meeting. (**Conclusion SAT 13/17)**

Interconnection between AFISNET, SADC/2 and NAFISAT networks

2.4.9 ATNS, South Africa provided the meeting with updated information on SADC/2 and NAFISAT projects. The meeting was informed that ATNS ha issued a "Request for Tender" during December 2005 to a selected shortlist of tenderers, after completion of a "Registration of Interest" phase. The tender responses were under evaluation and it was expected that a contract would be entered into towards the end of April 2006. The "Request for Tender" documentation included a suggested remote VSAT terminal configuration for integration and interoperable functionality with the AFISNET VSAT network.

Amendment proposals to AFI and SAM AFTN Routing Directories

2.4.10 The meeting recalled Annex 10, Volume II, Para. **4.4.1.3.1** *requesting that "all communications be routed by the most expeditious route available to effect delivery to the addressee"*, and it recognized that Johannesburg CAFSAT Station offered possibilities of improving the transit of AFTN messages between AFI and SAM Regions. The meeting therefore endorsed an amendment proposal to the AFI and SAM AFTN Routing Directories. (**Conclusion SAT 13/18)**

2.5 CNS/ATM systems

Harmonization of ADS/CPDLC programmes: Review of the Report of the FANS/1-A Interoperability Team

[1] *Note: ICAO Doc 9855 – Use of Public Internet for Aviation Applications.*

2.5.1 The meeting reviewed the Report of the First Meeting of SAT FANS/1-A Interoperability Team (SAT/TF/1) and noted that this meeting discussed among other issues all the aspects of the SAT FANS/1-A Operational Manual (FOM), the FANS 1/A implementation activities in the South Atlantic, the system performance monitoring and maintenance, and the future work programme of the Team. SAT/TF/1 Report has been made available on the ICAO public website: http://www.icao.int . (**Conclusions SAT 13/19, 13/20, 13/21 and 13/22)**

Harmonization of CNS/ATM systems evolution tables

2.5.2 The meeting did not review the AFI and SAM CNS/ATM systems evolution tables. The Secretariat was requested to prepare updated tables for the next meeting to ensure harmonization thereof.

Implementation of ATS Messaging Handling System (AHMS)

2.5.3 The meeting noted the experience gained by Argentina and Spain in the development of AMHS applications and called for SAT States and Organizations to take advantage of their experience by conducting joint trials. **(Conclusion SAT 13/25)**

2.6 Future work programme

2.6.1 The meeting adopted the SAT Group future work programme in the field of CNS as shown at **Appendix B** to this paper.

3. Action by APIRG

3.1 The meeting is invited to:

a) Note the information contained in this paper;
b) Note the work carried out by the SAT Informal Group as a key interregional mechanism between AFI, EUR, NAM and SAM Regions;
c) Encourage States and Organizations concerned to provided continued support to SAT implementation activities; and
d) Recommend that the work programmes of the relevant PIRGs and their auxiliary bodies include common issues such as harmonization of air navigation plans, implementation of global plan initiatives, and development of performance objectives.

Appendix A

LIST OF SAT/13 CONCLUSIONS AND DECISIONS PERTAINING TO COMMUNICATIONS, NAVIGATION AND SURVEILLANCE

CONCLUSION SAT13/11: IMPLEMENTATION OF ATLANTICO/LUANDA ATS/DS CIRCUIT

THAT ANGOLA, BRAZIL AND SOUTH AFRICA CONSIDER THE IMPLEMENTATION OF ATLANTICO/LUANDA ATS/DS LINK VIA JOHANNESBURG THROUGH CAFSAT/SADC INTERCONNECTION.

CONCLUSION SAT13/12: IMPLEMENTATION OF LAS PALMAS/NOUADHIBOU AND LAS PALMAS/NOUAKCHOTT ATS/DS LINKS

THAT AENA (SPAIN) AND ASECNA EXPLORE WAYS AND MEANS OF SOLVING AS SOON AS POSSIBLE THE ATS/DS DEFICIENCIES BETWEEN LAS PALMAS AND NOUKCHOTT AND BETWEEN LAS PALMAS AND NOUADHIBOU ATS UNITS, BASED ON THE AGREED PRINCIPLE OF INTERCONNECTING AFISNET-CAFSAT AS THE OPTIMAL TECHNICAL SOLUTION.

CONCLUSION SAT13/13: AERONAUTICAL COMMUNICATIONS NETWORK DEVELOPMENT STRATEGIES

THAT SAT STATES AND ORGANIZATIONS CONCERNED:

a) TAKE THE PROPER ACTIONS TO ACHIEVE AND APPLY COMPREHENSIVE STRATEGIES FOR THE INTERCONNECTION OF VSAT NETWORKS TO MEET ATS REQUIREMENTS IN THE SOUTH ATLANTIC AREA;

b) WORK TOWARDS SEAMLESS REGIONAL/INTER-REGIONAL DIGITAL COMMUNICATION NETWORKS BASED ON THE INTERNET PROTOCOL SUITE (IPS);

c) GIVE DUE CONSIDERATION TO MANAGED NETWORK SERVICES (E.G. A VIRTUAL PRIVATE NETWORK (VPN)) SUBJECT TO AVAILABILITY AND COST EFFECTIVENESS.

CONCLUSION SAT13/14: STANDARDIZATION OF THE INTERNET PROTOCOL SUITE AND NEED FOR END-TO-END PERFORMANCE REQUIREMENTS

THAT ICAO BE REQUESTED TO EXPEDITE ITS WORK ON:

a) THE STANDARDIZATION OF THE INTERNET PROTOCOL SUITE FOR THE STATES AND ORGANIZATIONS TO IMPLEMENT IT IN CONFORMITY WITH ARTICLE 28 OF THE CHICAGO CONVENTION; AND

b) THE ESTABLISHMENT OF A UNIVERSALLY AGREED SET OF END-TO-END PERFORMANCE REQUIREMENTS TO FACILITATE THE FORMULATION AND ADMINISTRATION OF CONTRACTS FOR OBTAINING MANAGED NETWORK SERVICES.

CONCLUSION SAT13/15: COMMUNICATIONS SYSTEMS UPGRADING AND MAINTENANCE

THAT SAT STATES AND ORGANIZATIONS CONCERNED TAKE THE NECESSARY STEPS TO UPGRADE AS REQUIRED AND SECURE SPARE PARTS OF OPERATIONAL EQUIPMENT IN ORDER TO MINIMIZE ANY POTENTIAL CRITICAL IMPACT ON THE CURRENT COMMUNICATIONS SYSTEM.

CONCLUSION SAT13/16: ATS VOICE NUMBERING PLANS FOR AFI AND SAM REGIONS

THAT SAT STATES, ORGANIZATIONS CONCERNED AND ICAO REGIONAL OFFICES, DAKAR AND LIMA TAKE THE NECESSARY STEPS TO INCLUDE IN GREPECAS AND APIRG WORK PROGRAMMES STUDIES ON THE IMPLEMENTATION OF ATS VOICE NUMBERING PLANS FOR AFI AND SAM REGIONS, AS DEFINED BY THE RECOMMENDATION CONTAINED WITHIN THE *ICAO MANUAL ON ATS GROUND-GROUND VOICE SWITCHING AND SIGNALLING* (DOC 9804, CHAPTER 2 SECTION 2.3).

CONCLUSION SAT13/17: IMPLEMENTATION OF ATS NO.5 PROTOCOL

THAT:

a) CONSIDERING THE EXPERIENCE GAINED IN EUR REGION, SAT STATES AND ORGANIZATIONS BE ENCOURAGED TO CARRY OUT TECHNICAL RESEARCH AND IN-DEPTH INVESTIGATIONS ON THEIR SYSTEMS IN VIEW OF A SUCCESSFUL IMPLEMENTATION OF THE ATS NO.5 PROTOCOL IN THE SAT AREA, IN ACCORDANCE WITH ICAO GUIDANCE MATERIAL CONTAINED IN ANNEX 10 AND DOC 9804;

b) CAPE VERDE, PORTUGAL, SPAIN AND ASECNA IMPLEMENT TRIALS IN ORDER TO ESTABLISH THE PREREQUISITES RELATED TO THE IMPLEMENTATION OF ATS-N5 SIGNALLING USING VSAT LINKS AND APPROPRIATE CODECS (AS REQUIRED); AND

c) SAT CNS WORKING GROUP WORK PROGRAMME BE AMENDED TO INCLUDE THE ANALYSIS OF ALL ASPECTS RELATED TO THE IMPLEMENTATION OF ATS NO.5 PROTOCOL.

CONCLUSION SAT13/18: AMENDMENT PROPOSALS TO AFI AND SAM AFTN ROUTING DIRECTORIES

THAT AFI AND SAM AFTN ROUTING DIRECTORIES BE AMENDED TO INCORPORATE EZEIZA/JOHANNESBURG AND JOHANNESBURG/RECIFE CIRCUITS.

CONCLUSION SAT13/19: IMPLEMENTATION OF ADS/CPDLC PLANS BY SAT STATES

THAT SAT STATES AND ORGANIZATIONS BE ENCOURAGED TO COMPLY WITH THEIR ADS/CPDLC IMPLEMENTATION PLANS IN A TIMELY MANNER.

CONCLUSION SAT13/20: IMPLEMENTATION OF ADS/CPDLC PLANS BY SAT STATES

THAT SAT STATES AND ORGANIZATIONS BE ENCOURAGED TO COMPLY WITH THEIR ADS/CPDLC IMPLEMENTATION PLANS IN A TIMELY MANNER.

CONCLUSION SAT13/21: NEED FOR A CONSOLIDATED DATABASE FOR FANS1/A EQUIPPED AIRCRAFT

THAT A CONSOLIDATED DATABASE BE CREATED TO IDENTIFY FANS1/A EQUIPPED AIRCRAFT OPERATING IN THE SOUTH ATLANTIC.

CONCLUSION SAT13/22: PARTICIPATION OF REGULATORS AND MAIN AIRLINES IN SAT/FIT MEETINGS

THAT:

a) IN CASES WHERE THE REGULATORS ARE DIFFERENT THAN THE AIR NAVIGATION SERVICE PROVIDERS, SAT STATES SHOULD ENSURE PARTICIPATION OF REGULATORS IN SAT/FIT MEETINGS IN ORDER TO HAVE FULL COMMITMENT TO THE IMPLEMENTATION PLAN; AND

b) MAIN AIRLINES REPRESENTATIVES SHOULD ALSO PARTICIPATE IN SAT/FIT MEETINGS.

CONCLUSION SAT13/25: IMPLEMENTATION OF AMHS

THAT:

a) SAT STATES AND ORGANIZATIONS TAKE ADVANTAGE OF THE EXPERIENCE GAINED BY ARGENTINA AND SPAIN IN THE DEPLOYMENT OF AMHS SYSTEMS IN THE SAT AREA; AND

b) ARGENTINA, CAPE VERDE AND SPAIN ARRANGE FOR THE INTERCONNECTION OF THEIR AHMS SYSTEMS, ON A TRIAL BASIS, AND PRESENT THE RESULTS TO THE NEXT SAT MEETING.

Appendix B

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.	Carry out, as required, studies on the use of existing VSAT networks potentialities to cater for aeronautical telecommunication requirements in the SAT area. Such studies should include coordination issues, service channel interfaces, monitoring and control, system architecture, new services, user interfaces and bandwidth monitoring.	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/14
5.	Evaluate the feasibility of using existing or emerging digital VSAT networks (AFISNET, CAFSAT, REDDIG, SADC, etc.) to support ATS data link applications in an ATN environment.	SAT/14
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, harmonize the technical aspects of ADS/CPDLC programmes developed by SAT States/FIRs and, in this connection, address issues such as use of common standards, transmission protocols, data formats, procedures, methods of work, etc.	SAT/14

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.

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