



INTERNATIONAL CIVIL AVIATION ORGANIZATION

WESTERN AND CENTRAL AFRICAN OFFICE

**REPORT OF THE TWENTY-THIRD MEETING ON THE IMPROVEMENT
OF AIR TRAFFIC SERVICES OVER THE SOUTH ATLANTIC
(SAT/24)**

(Luanda, Angola 05-07 June 2019)

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PART I: HISTORY OF THE MEETING

1 Place and duration of the meeting

The Twenty Fourth Informal Coordination Meeting on the improvement of air traffic services over the South Atlantic (**SAT/24**) was held at **EPIC SANA** Hotel, in Luanda, Republic of Angola, from **05 to 07 June 2019** back to back with the SAT FANS/1 Interoperability Team (SAT/FIT) 14th meeting held in parallel with the CAFSAT Network Management Committee (CNMC)9th meeting from **03 to 04** June 2019, at the kind invitation of the of **Empresa Nacional de Exploração de Aeroportos e Navegação Aérea (ENANA)** of Angola.

2. Opening ceremony

2.1 The meeting was officially opened on the 03th June 2019 by Mr. **Ricardo Viegas de ABREU**, Honorable Minister of State in charge of Transport. He was assisted by **Dr Antonio, Joaquim Da CRUZ LIMA** of the Office of State Secretary for the Civil Aviation, Maritime and Port Sectors, **Dr Gaspar DOS SANTOS**, Director General of the National Institute of Civil Aviation, **Dr Mario Miguel DOMINGUERS**, Coordinator of the Management of Committee of ENANA-EP, **Dr Julio FURTADO**, Assistant coordinator of the ENANA-EP Management Committee, **Dr Helder Da Silva**, President of the Board of Directors of TAAG and Eng. **Natanael DOMINGOS**, Member of the Management of Committee of ENANA-EP

2.2 Honorable **Viegas de ABREU** firstly welcomed the participants to the three meetings (**CNMC/9, SATFIT/14** and **SAT/24**) being held back to back and renewed the great honor and commitment for Angola to host these important events.

2.3 He outlined the particular importance of these events for Angola civil aviation, as they happen in a special moment when major social and economic changes occur to which the civil aviation cannot be excluded indicating that the goal of the Authorities of Angola is to make aviation sector more competitive, granting the appropriate conditions for the continuous improvement of its performance in compliance to new requirements in line with international standards, enabling it to be representative in the economy diversification efforts, fostering the growth of other sectors in terms of revenue and job creation

2.4 He briefed the meeting on current and future projects the government of Angola initiated or is intending to plan and implement for the development of the aviation sector.

He indicated in this regard that in the domain of connectivity, policies and concrete actions are being implemented, aiming to place the Republic of Angola in the continental and world tourism road map, with focus in the materialization of the vision to transform Luanda in an international hub and ensure that other major provinces of the country have the appropriate conditions and certification to be air navigation references and Luanda alternate airports.

2.5 He informed the meeting that the Angola civil aviation sector undergoes a major change with the enactment in May 23rd of a new civil aviation law 14 of 2019, which transforms the former national civil aviation institute into a National Civil Aviation Authority, and creates a National Specialized Authority for Aircraft Incidents and Accidents Investigation, granting them more autonomy and independence, conforming the Angolan legal framework to the International Civil Aviation

Organization principles and recommendations. Consequently, the transformation of the National Airports and Air Navigation Company ENANA-EP, whose air navigation services will be thereon provided by a State owned company - ENNA, while the airport management services will be vested on a commercial anonymous society which, similar to Angola Airlines the national flag carrier, open it to private investment and capital was approved by the fourth session of the Council of Ministers' Economic Committee held in April 26th.

2.6 He outlined that the assurance of Angola connectivity, be it through the necessary means and systems supporting air navigation, or through the civil aviation supporting infrastructure aiming a safe, regular and economic air transport, integrates the strategic objectives of the Angolan Executive in line with the objectives laid down in Article 44 of the Chicago Convention of 1944 on International Civil Aviation.

He wished to all participant a pleasant stay in Luanda and declared the meetings open.

2.7 The meetings were officially closed on 07 June 2019 by **Dr Antonio, Joaquim Da CRUZ LIMA** of the Office of State Secretary for the Civil Aviation, Maritime and Port Sectors.

3. Organization, Secretariat and attendance

3.1 Mr. **Francisco Carvalho**, Senior Advisor to the Managing Board on Air Navigation and Airport Matters, ENANA was unanimously elected as Chairperson of the SAT meeting. He therefore chaired and moderated its plenary sessions.

3.2 MM. **François-Xavier Salambanga**, Regional Officer CNS ICAO WACAF Office, **Albert Aidoo Taylor**, Regional Officer ATM & SAR, ICAO WACAF Office, served as the Secretary of the meeting and accordingly prepared and aligned the Working and Information papers. They were assisted by MM. **Harvey Gabriel Lekamisy**, Regional Officer CNS ICAO ESAF Office, Mr **Francisco Almeida da Silva**, Regional Officer ICAO SAM Office and Mrs Keziah Ogutu, Regional Officer ICAO ATM ESAF Office.

3.3 The meeting was attended by Eighty-One (81) participants from Thirteen (13) States of the ICAO AFI, EUR and SAM regions namely, **Angola, Brazil, Cabo Verde, Côte d'Ivoire, France, Ghana, Mauritania, Portugal, Sao Tomé & Principe, Senegal, South Africa, Spain, United States of America** including their Air Navigation Service providers (**ASECNA, ASA, DECEA, ENAIRE, ENANA, ENASA, NAV Control, FAA**) and six (06) representatives of the aeronautical industry (**AIREON, ANGOLA TELECOM, IATA, INFRASAT, FREQUENTIS, AZIMUT**).

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

4. Working languages

The meeting was conducted in the English language and the documentation was presented in this language.

5. Agenda of the meeting

The meeting adopted the following agenda and discussed its items when appropriate, within the ATM Working Group, the CNS Working Group or during the plenary sessions.

- Agenda Item 1: Election of the chairperson and adoption of the agenda (Plenary session)**
- Agenda Item 2: ATM and CNS issues**
- 2.1 Report of the Atlantic Ocean Coordination Meetings and follow up Activities Missing Flight Plans**
- 2.2 PBCS planning, Implementation and Monitoring**
- Agenda Item 3: Air Traffic Management (ATM)**
- 3.1 Status of implementation of SAT/23 Conclusions pertaining to the ATM field**
- 3.2 Review of Regional Monitoring Agencies report on Traffic Statistics, Safety procedures and operational procedures**
- 3.3 SAT Area Risk Assessment and LHD Monitoring**
- 3.4 Airspace Structure and ATM Operational Improvements**
- 3.5 ATM Contingency Plan Over the Atlantic Ocean**
- 3.7 Terms of Reference, Work Programme**
- 3.8 Any other ATM business**
- Agenda Item 4: Communications, Navigation and Surveillance (CNS)**
- 4.1 Status of implementation of SAT/23 Conclusions pertaining to the CNS field**
- 4.2 Review of the performance of SAT CNS Infrastructure and systems**
- 4.3 Improvement of the CNS systems in the SAT Region (AMHS, AIDC, ADS-C&B)**
- 4.4 Interconnection and interoperability of CNS/ATM systems**
- 4.5 Terms of Reference, Work Programme and Composition of the SAT CNS Working Group (CNS/WG)**
- 4.6 Any other CNS business**
- Agenda Item 5: ATM and CNS Issues**
- 5.1 Endorsement of the conclusions/decisions of the fourteenth meeting of the SAT/ FANS 1/A Interoperability Team (SAT/FIT/14).**
- 5.2 Endorsement of the Conclusions/Decisions of CNMC/9 meeting**

Agenda Item 6: SAT Handbook (SAT Terms of Reference, SAT Working Methodology & Arrangements, Rules of procedures of SAT meetings, SAT Contributory Bodies, Composition of the Group, Reporting) and Future Work programme of the SAT Group (Plenary session)

Agenda Item 7: Any other business (Plenary session)

Agenda Item 8: Adoption of the Conclusions/Decisions of the SAT/24 meeting (Plenary session)

6. Conclusions and Decisions of the meeting

The meeting adopted **twenty (20)** Conclusions and **six (06)** Decisions listed as following:

Agenda Item 2: ATM and CNS issues

Conclusion 24/01: *Endorsement of the Conclusions of the First Atlantic Coordination Meeting (ACM)*

Conclusion 24/02: *Planning, Implementation and Monitoring of PBCS*

Decision 24/03: *Endorsement of the amended ToRs of SATMA*

Conclusion 24/04: *Harmonization of the functions of RMAs in the SAT area in support of PBCS implementation*

Agenda Item 3: Air traffic management (ATM)

3.1 Status of implementation of SAT/23 Conclusions pertaining to the ATM field

Conclusion 24/05: *Implementation of SAT/23 Conclusions & Decisions pertaining to the ATM Field*

3.2 Review of Regional Monitoring Agencies report on Traffic Statistics, Safety procedures and operational procedures.

Conclusion 24/06: *Traffic Statistics*

3.3 SAT Area Risk Assessment and LHD Monitoring

Conclusion 24/07: *Reduction in Collision Risk Assessment and Large Height Deviation LHD*

3.4 Airspace Structure and ATM Operational Improvements

Conclusion 24/08: *SAT Vision, CONOPS and Implementation Plans*

Conclusion 24/09: *EUR/SAM Airspace Concept Implementation*

Conclusion 24/10: *Implementation of Amendment to PANS ATM DOC 4444 and Implementation of SLOP*

Conclusion 24/11: *Optimization of Airspace and Flight Levels in the EUR/SAM Corridor*

Conclusion 24/12: *Carriage of Suitable Communication*

Conclusion 24/13: *Implementation of ASEPS and other Systems*

3.5 ATM Contingency Plan Over the Atlantic Ocean

Decision 24/14: *ATM Contingency Plan for the SAT Area*

Conclusion 24/15: *Adoption, Approval and Update of SAT ATM Contingency Plan Harmonized with NAT*

3.7 Terms of Reference, Work Programme

3.8 Any other ATM business

Agenda Item 4: Communications, navigation and surveillance (CNS)

4.1 Follow up of SAT/23 Conclusions & Decisions pertaining to the CNS field

Conclusion 24/16: *Implementation of SAT/23 Conclusions & Decisions pertaining to the CNS Field*

4.2 Review of the performance of SAT CNS Infrastructure and systems

Conclusion 24/17: *Conduct and reporting on the assessment and the mitigation of missing Flight Plans*

Decision 24/18: *Adoption of the revised matrix for the reporting on the performance of CNS Infrastructure and Systems*

Conclusion 24/19: *Ad'hoc Group for Cyber Safety and Resilience of SAT CNS Infrastructure and Systems*

4.3 Improvement of CNS system in the SAT Region (AMHS, AIDC,

Conclusion 24/20: *Bilateral and multilateral initiatives for the implementation of SAT CNS infrastructure and systems*

4.4 Interconnection and interoperability of CNS/ATM systems

Conclusion 24/21: *Formalization of AMHS and AIDC interconnection*

Conclusion 24/22: *Training, implementation, operation and monitoring of AIDC*

Conclusion 24/23: *Effective implementation of AMHS and AIDC between SAT ATCs*

4.5 Terms of Reference, Work Programme and Composition of the SAT CNS Working Group (CNS/WG)

-NIL-

4.6 Any other CNS business

Decision 24/24: *Adoption of the Conclusions/Decisions of the 9th meeting of the CAFSAT Network Management Committee (CNMC/9)*

Agenda Item 5: ATM and CNS Issues

5.1 Endorsement of the conclusions/decisions of the fourteenth meeting of the SAT/ FANS 1/A Interoperability Team (SAT/FIT/14).

5.2 Endorsement of the Conclusions/Decisions of CNMC/9 meeting

Decision 24/25: *Adoption of the Conclusions/Decisions of the 9th meeting of the CAFSAT Network Management Committee (CNMC/9)*

Agenda Item 6: SAT Handbook (SAT Terms of Reference, SAT Working Methodology & Arrangements, Rules of procedures of SAT meetings, SAT Contributory Bodies, Composition of the Group, Reporting) and Future Work programme of the SAT Group (Plenary session)

Decision 24/26: *Endorsement of SAT Draft Handbook*

Agenda Item 7: Any other business (Plenary session)

Agenda Item 8: Adoption of the Conclusions/Decisions of the SAT/24 meeting (Plenary session)

Part II: REPORT ON THE AGENDA ITEMS

Agenda Item 1:

Election of the chairperson and adoption of the agenda

1.1 Under this agenda item the meeting unanimously elected. Mr. **Francisco Carvalho**, ENANA as Chairperson of the SAT meeting. He therefore chaired and moderated its plenary sessions and was assisted by the Secretariat.

1.2 The meeting reviewed and adopted the draft agenda and work programme proposed by the Secretariat.

Agenda Item 2:

ATM and CNS issues

Atlantic Ocean Coordination Meeting (ACM) and follow up Activities

2.1 Under this agenda item the meeting discussed issues on the cooperation between SAT and NAT. The Secretariat briefed the meeting (**WP02**) on the actions undertaken for the implementation of the Decisions of SAT/23 pertaining to the subject:

- **Decision 23/19: *Improvement of coordination and cooperation with adjacent PIRGs*** calling the SAT to support the improvement of coordination and cooperation with the adjacent PIRGs, especially with the NATSPG and
- **Decision 23/20: *Preparation for the convening of the Atlantic Coordination meeting*** inviting the ICAO Secretariat (WACAF Office) with support from the other involved ROs) to prepare the convening and to develop the necessary working arrangements for an Atlantic Coordination meeting before the end of 2018.

2.2 The meeting was informed of the outcome of the preliminary discussions related to the improvement of communication and coordination in the Atlantic Area among the SAT Group, NATSPG, APIRG and GREPECAS held on 18th October 2018 in Montreal by a side meeting of the 13th Air Navigation Conference, in preparation of the Atlantic Coordination Meeting (ACM) to be convened on 31st January 2019 in Paris back-to-back with the NAT Vision 2030 meeting to address the need for enhanced coordination and cooperation between various ICAO Regional Offices and working arrangements involved in the planning and implementation activities in the high-sea airspace over the Atlantic Ocean.

2.3 It was reported that during these preliminary discussions it was agreed that the final goal of these activities is to improve and enhance the current working arrangement of the parties involved in the Atlantic coordination, and does not seek to disband any of the current established coordination groups dealing with air traffic management over the Atlantic Ocean nor establish a new group with additional bureaucratic layers.

2.4 The meeting also took note that the said discussions also agreed that the NAT Vision 2030 Workshop as already planned with the addition of a side-bar meeting on Atlantic coordination issues

would lead to improved communication and coordination in the area and give opportunities to identify common issues amongst the role players and find ways to eliminate shortcomings related to coordination and communication. It was stressed that this side-bar meeting will not discuss any structural changes to any group.

2.5 The meeting was furthermore provided with a summary report on the first Atlantic Coordination Meeting(ACM/1), held in Paris France on 31st January 2019 and the deliberations from which the following conclusions were formulated:

- Acknowledgement of the good work and achievements of the SAT and NAT working groups in ensuring safety and efficiency of operations;
- Recognition that the Atlantic airspace is a homogeneous area with similar issues and solutions due to the inherent nature of oceanic airspace;
- Support to the need for further improvement of coordination and cooperation between NAT and SAT;
- Identification the following priority topics for potential joint projects aiming at further harmonization to achieve seamless operations:

First priority

1. Contingency plans harmonization;
2. Performance based (PBCS/PBN) separation minima implementation;
3. Space based ADS-B implementation and operation.

Second priority

4. AIDC/AMHS implementation;
5. Harmonization of NAT and SAT CONOPS elements to the extent possible;
6. Assignment of flight levels;
7. HF communication issues (urgent safety issue);
8. Agreement that the project leads (ICAO ROs to further coordinate with NAT/SAT representatives to co-lead, UK contributor for contingencies) will draft a list of coordination actions and coordinate by e-mail;
9. Agreement to recommend to the NAT SPG and SAT that ACMs should be conducted annually to review the progress of implementation with the next meeting in February 2020 in a location to be determined.

2.6 The meeting applauded these outcomes, endorsed the conclusions and agreed on the priorities identified for cooperation between SAT and NAT. The meeting outlined that these priorities and their categorization stand for the cooperation between SAT and NAT, while within SAT, some items such as HF communication issues, assignment of Flight Levels, AIDC/AMHS implementation can be assigned SAT internal higher priorities for implementation.

2.7 The meeting requested ICAO Secretariat to facilitate the appointment of the focal points for the identified projects. Meanwhile, the meeting considered that Spain is a member of both EUR/NAT and SAT regions and therefore agreed that Spain be appointed as the first primary focal point for the SAT Group to facilitate coordination with the NAT Group.

The following Decision was formulated:

Conclusion 24/01: Endorsement of the Conclusions of the First Atlantic Coordination Meeting (ACM)	
That; a) The conclusions and priority areas of cooperation between the SAT and the NAT identified by the first meeting of the Atlantic Coordination Meeting (ACM) are approved as attached in Appendix B to this report; b) The Secretariat coordinate and facilitate the appointment of SAT ANSPs focal points for the implementation of the identified projects subject to cooperation between the SAT and the NAT; c) Spain is appointed as the first primary focal point for the SAT Group to facilitate coordination with the NAT Group.	Expected impact: <input type="checkbox"/> Polítical / Global <input checked="" type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To enhance cooperation between SAT and NAT	
When: Continuously	Status: Valid
Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input checked="" type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

PBCS planning implementation and monitoring

2.8 Under this Agenda item the meeting was provided with the ongoing development related to Performance Based Communication and Surveillance (**PBCS**) planning, implementation and monitoring.

2.9 In this regard, the meeting was reminded by FAA (**WP18A**) on the specific references in ICAO documentation for the State in terms of requirements and the guidance to support determination of compliance for an ANSP and aircraft operator with ICAO SARPs (*Annex 11, Air Traffic Services – Paragraph 2.8.1 and 2.8.2 for RCP prescription; Paragraphs 2.9.1 through 2.9.3 for RSP; Paragraph 3.3.5.2 for RCP and RSP monitoring requirements- Doc 4444, Procedures for Air Navigation Services -Paragraph 5.4.1.2.1.6 on lateral separation minima for which RCP and RSP are currently applicable and 5.4.2.9.2 on longitudinal separation minima for which RCP and RSP are currently applicable.*).

2.10 Reference was also made to guidance materials provided by Annex 11 to the Chicago Convention and ICAO Doc 9869, Edition 2, PBCS Manual to support compliance with these requirements as well as to the ongoing work of the PBCS Project Team under the ICAO Communications Panel Operational Data Link Working Group (CP-OPDLWG) to amend the current edition.

2.11 The issue on PBCS monitoring was addressed by the meeting. In this regard ARMA reminded the meeting (**WP18B**) that globally and historically, Regional Monitoring Agencies (RMAs) have been

mandated by their respective PIRGs to conduct RVSM system monitoring. RMAs have now been requested to add PBCS monitoring as an additional function after being mandated by the respective PIRGs.

2.12 ARMA reported on the steps it has been following to complete its Term of Reference (ToRs) to embrace the monitoring of PBCS in the AFI Region. It appears that a mandate from APIRG is expected for ARMA to formally resume the monitoring exercise.

2.13 The meeting also noted the low pace of implementation of PBCS operation in the AFI Region and took note that the NAT region has experienced 7 months after PBCS implementation that States were still not able to produce PBCS approvals and recognized that setting up the process to transmit PBCS/RCP/RSP approvals is expected to be slow in the AFI region. It was therefore recommended to urge this region to begin the process as soon as possible.

The following Conclusion was formulated:

Conclusion 24/02: Planning, Implementation and Monitoring of PBCS	
<p>That;</p> <ul style="list-style-type: none"> a) The Secretariat bring to APIRG structures the adequate arrangements to issue the mandate to ARMA for PBCS Monitoring in the AFI Region. b) AFI States start pre-implementation as RCP/RSP specifications have been defined to establish PBCS policies for ANSP, Operators and Airworthiness. Publish the PBCS requirements in Aeronautical Information Publication; c) SAT States/ANSPs adopt RCP 240 and RSP 180 for implementation in the SAT area and establish a line of communication with accredited Regional Monitoring Agencies regarding non-compliance; d) ANSPs establish mechanisms to recognize RCP/RSP Capabilities in ATC automation and provide RCP/RSP compliant air traffic services; and e) Operators prepare to file RCP/RSP capabilities in flight plans and participate in PBCS Implementation and Monitoring programs 	<p>Expected impact:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Polítical / Global <input type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational

Why: To foster PBCS Planning, Implementation and Monitoring	
When: Continuously	Status: Valid
Who: <input type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ARMA	

2.14 The meeting also discussed provision from SATMA (**WP18C**) related to the monitoring of PBCS. SATMA reported that the last Regional Monitoring Agencies Coordination Group (RMACG) meeting (Salvador, Brazil, 11 to 15 June 2018) noted that RMAs support in Performance-based Communication and Surveillance (PBCS) in their Region might be a benefit for performance monitoring and was highly recommended by ICAO Secretariat that RMAs could play a valuable role in supporting safe operations in the horizontal plane in PBCS airspace by accommodating PBCS approval data and serving as a liaison between ANSPs and relevant States.

2.15 The meeting applauded the proposal that RMAs may support the regional PBCS monitoring programs by the following:

- a) Receiving reports of non-compliance with RSP180 and RCP240 from ANSPs associated with current airspace responsibility and transmitting these reports to the respective State or the appropriate RMA;
- b) Receiving and maintaining RCP and RSP approvals issued by States of Operator/Registry associated with current State responsibility and incorporating into expanded RVSM/PBCS approvals database;
- c) Verifying compliance with State PBCS requirements (applicable to RMAs with designated areas of responsibility that include airspace where PBCS is implemented); and
- d) Sharing RCP and RSP approvals between RMAs in line with current sharing practices of RVSM approvals for the ability of States/ANSPs to verify that aircraft operators filing PBCS capabilities in the flight plan are authorized to do so.

2.16 The meeting noted the alignment of this proposal with Conclusion SAT/FIT/13/02, that requested SATMA to initiate the process to update its ToRs for PBCS monitoring in the EUR/SAM corridor; and invited SAT States to support the PIRGs activities in updating the RMA ToRs accordingly for PBCS monitoring and enhance the coordination & collaboration between the involved RMAs, especially ARMA, CARSAMMA, DLMA”

The following conclusions and conclusion were formulated:

Decision 24/03: Endorsement of the amended ToRs of SATMA	
That; In order to improve the effectiveness and efficiency of PBCS implementation the proposed amendment of SATMA Terms of Reference to include monitoring support for PBCS in implementation in the EUR/SAM Corridor is approved as presented in Appendix C.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational

Why: To foster PBCS Planning Monitoring	
When: Continuously	Status: Valid
Who: <input type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: SATMA, ARMA, CARSAMA	

Conclusion 24/05: Harmonization of the functions of RMAs in the SAT area in support of PBCS implementation,	
That; In order to harmonize the functions of RMAs in the SAT area in support to PBCS implementation, The Secretariat of SAT bring to the attention of APIRG and GREEPECAS, the amended Terms of Reference of SATMA for consideration and similar amendment to the Terms of Reference of ARMA and CARSAMMA including PBCS monitoring function,	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To foster PBCS Planning Monitoring	
When: Continuously	Status: Valid
Who: <input type="checkbox"/> Coordinators <input type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ARMA, CARSAMA	

2.17 National PBCS Implementation Plans and Experiences

2.17.1 South Africa/ATNS reported ongoing activities with regards to PBCS implementation and informed the meeting of their decision to migrate from RNAV 10 in oceanic airspace to RNP4.

2.17.2 The Brazilian Airspace Control Department (**DECEA**) informed the meeting about the establishment an ad hoc Group from the Brazilian Airspace Planning Study Group (**GEPEA**) to facilitate implementation of 30NM separation minima based on PBCS in the Oceanic Brazilian FIR. Brazil reported that the reduction of the longitudinal separation in the Oceanic Brazilian FIR will provide greater airspace availability in situations which the ITCZ (Intertropical Convergence Zone) causes deviations in certain areas of the FIR.

2.17.3 DECEA advocated for the establishment of a SAT region-wide PBCS implementation plan in order to provide benefits to operators and air navigation service providers in the homogeneous SAT airspace.

Agenda Item 3:

Air Traffic Management (ATM)

3.1 Status of implementation of SAT/23 Conclusions pertaining to the ATM field

3.1.1 Mr. Simon Zwane, Senior Manager: ATM Research and Planning, ATNS was unanimously elected as Chairperson of the SAT 24 ATM Group meeting. He therefore chaired and moderated the sessions of the ATM Working Group.

3.1.2 Mr. Albert Aidoo Taylor, Regional Officer Air Traffic Management /Search and Rescue, ICAO Western and Central Africa Office, was the Secretary of the meeting and was assisted by Ms. Keziah Ogutu, Regional Officer Air Traffic Management /Search and Rescue, ICAO Eastern and Southern Africa Regional Office.

3.1.3 The meeting reviewed the Conclusions and Decisions pertaining to the ATM field which were adopted by the SAT 23 meeting held in Durban, South Africa, from 6 to 10 June 2018 and noted the action items that were either closed, still valid or transferred to be addressed as part of the restructuring of the SAT Group. The updated status is found in **Appendix D.1** to this report.

3.2 Review of Regional Monitoring Agencies report on Traffic Statistics, Safety procedures and operational procedures:

3.2.1 SATMA - EUR/SAM corridor

3.2.1.1 The meeting analyzed the traffic statistics for 2018 and observed that air traffic movement had increased about 13% along the corridor. Furthermore, the preliminary figures projected for 2018 showed an increase in comparison to 2017. As an example, the consolidated trend and preliminary projected figures in advance of 2019 analysis showed a sharp increase in trend compared to previous years. For instance, the daily average demand in 2018 has been 99 which is higher than the previous record of 72 registered in 2016. Therefore, the upward trend of traffic in the EURSAM corridor is significant and consolidated.

3.2.1.2 Regarding the usage of airways, all ATS routes in the EUR/SAM corridor recorded significant increases. However, UN873 recorded the highest frequency of flights and remains the busiest route in the corridor.

3.2.1.3 The top two departure and destination aerodromes operated by flights along the EUR/SAM corridor are airports located in Brazil and Portugal.

3.2.1.4 Air Portugal (TAP) and Iberia (IBE) have remained as the dominant airlines operating in the corridor and have kept their positions as the first and second respectively in ranking. Therefore, the meeting commended the active participation of Spain in the activities of the SAT Group, and urged that Portugal should be encouraged to return to the Group. Furthermore, it was noted that the fall of Thomsonfly (TOM) had given rise to LATAM (TAM).

3.2.1.5 The actual statistical traffic data and analysis for the EUR/SAM corridor are presented in the graphs and figures attached to this report in **Appendix E1**.

3.2.2 ARMA – AFI

3.2.2.1 The AFI Regional Monitoring Agency (AFI) attended the meeting for the first time and presented traffic statistics to the SAT meeting, as recommended by SAT/23.

3.2.2.2 ARMA examined the SAT airspace as an isolated block with its own statistical parameters and analyzed data from 325,092.08 flight hours related to transit aircraft using sections of AFI FIRs and operating between flight level 290 and 410 in the SAT Area.

3.2.2.3 The monitoring groups' probability densities density $f_i^{ASE}(a)$, $i = 1, \dots, n_{MG}$ are to be estimated on the basis of height monitoring data of RVSM approved aircraft. Height monitoring data can be collected by ground-based Height Monitoring Units (HMUs), Aircraft Geometric Height Monitoring Elements (AGHMEs), or by air portable GPS Monitoring Units (GMUs). Ground-based HMUs or AGMEs are not available in the AFI region. However, as the normal height-keeping performance of RVSM approved aircraft is not dependent on the region of operation, HMU data collected in other ICAO Regions may be used for the modelling of a monitoring group's ASE probability density density $f_i^{ASE}(a)$. The overall ASE probability density defined by eq. (A.1) will therefore vary from region to region due to differences in the weighting factors β_i resulting from the particular composition of each region's aircraft population.

3.2.2.4 For the current post-implementation CRA 12 2017, ASE probability densities $f_i^{ASE}(a)$, $i = 1, \dots, n_{MG}$, from the latest RVSM safety assessment for the EUR region have been used, based on height monitoring data for the period 1st January 2016 – 31 December 2017.

3.2.2.5 Ideally, the three different types of passing frequencies should be determined for each ACC in the AFI Region over a one-year period and be used as a basis to identify the three busiest adjacent ACCs. Thus, as a part of the AFI RVSM programme, States in the AFI Region have been requested by ICAO State letter to provide monthly traffic flow data to the African Regional Monitoring Agency ARMA.

3.2.2.6 Many, but not all, States have provided the monthly traffic flow data in one form or other. Prior to any data being available for the first pre-implementation collision risk assessment CRA 1, some operational judgement was applied to identify the three busiest adjacent ACCs by specifying the following four clusters of adjacent States as candidates for the ultimate passing frequency averaging.

3.2.2.7 Another look at the ACCs covering the region's busiest traffic flows or highest passing frequencies had been selected based on the six Areas of Routing (ARs) to, from, and within Africa, defined by the Africa - Indian Ocean Planning and Implementation Group (APIRG) namely:

- AR-1: Europe South Atlantic;
- AR-2: Atlantic Ocean;
- AR-3: Europe – Eastern Africa (including Oceanic Areas);
- AR-4: Europe – Southern Africa, including continental Southern Africa routes;
- AR-5: Continental Western Africa including coastal areas; and
- AR-6: Trans-Indian Ocean.

3.2.2.8 The three continental Areas of Routing AR-3, AR-4, and AR-5 are of relevance to the passing frequency assessment as prescribed by reference 2. The FIR/UIRs making up these three Areas of Routing are:

- AR-3: Addis Ababa, Asmara, Cairo, Dar Es Salaam, Entebbe, Khartoum, Mogadishu, Nairobi, and Tripoli;
- AR-4: Brazzaville, Cape Town, Gaborone, Harare, Johannesburg, Kano, Kinshasa, Luanda, Lusaka, N'Djamena, Niamey, Tripoli, and Windhoek; and
- AR-5: Accra, Brazzaville, Dakar, Kano, Niamey, N'Djamena, and Roberts.

3.2.2.9 In accordance with the cruising levels (at or above FL290) in use in (most of) the FIR/UIRs in the AFI Region under RVSM, a negligible number of same-direction passing between aircraft at adjacent flight levels should be expected, i.e. n_x (same) in the collision risk model of eqs.

(2.8) and (2.9). Some such same-direction passing, however, have been found in the traffic flow data provided in ARMA Form 4 and have been included in the computation of the equivalent opposite-direction passing frequency defined by eq. (2.8). Table 2.3 summarizes the opposite-direction and equivalent opposite-direction passing frequencies obtained from the ARMA Form 4 traffic flow data for the various FIR/UIRs. Notice that (useable) data for the passing frequency calculations.

3.2.2.10 The current CRA 12 2017 passing frequencies may be compared with the previous ones utilized in CRA 11 2016. As can be seen in table 2.3, the passing frequency increased or decreased with more than 50% for four FIRs/UIRs, namely Accra (-83%), Johannesburg (-89%), N'Djamena (-53%) and Niamey (-64%). It is not clear whether these changes are due to actual changes in traffic patterns or due to changes or limitations in the ARMA Form 4 traffic flow data. Although these changes are quit significant in some cases, the effect on the estimated passing frequency for the AFI Region is limited.

3.2.2.11 The actual statistical traffic data and analysis presented AFI FIRs in the SAT area presented in the graphs and figures attached to this report in **Appendix E2**.

3.2.3 CARSAMMA - CAR/SAM

3.2.3.1 The Caribbean and South America Regional Monitoring Agency (CARSAMMA) submitted the traffic statistics for The Atlantico FIR RVSM airspace to the SAT Group, for the first time, as recommended by SAT/23. CARSAMMA examined the Atlantico as an isolated block with its own statistical parameters traffic statistics, in its report to the SAT.

3.2.3.2 The CARSAMMA analyzed data for 29,767.94 flight hours related to the transit of aircraft using sections of Atlantico FIR by flights operating between flight level 290 and 410.

3.2.3.3 The data sample used to estimate the passing frequency and the physical and dynamic parameters of the typical aircraft to assess the collision risk was collected in the period from December 1 to 31, 2018. Afterwards, aircraft movement data received from ATLANTICO FIR were used to evaluate the safety of RVSM airspace as recommended by ICAO.

3.2.3.4 It is essential to note that 100% of the approved RVSM aircraft population met RVSM requirements. And during this safety assessment, CARSAMMA did not detect any aircraft that did not appear in its RVSM database and which used the ATLANTICO FIR airspace during the year 2018. The traffic statistics for the Atlantico FIR is presented in **Appendix E3** to this report.

3.2.3.5 The FAA provided the meeting with the feedback it received from the mathematicians accredited to the NAT region and who are involved in computing the Target Levels of Safety (TLS) and Collision Risk Assessment (CRA) in the NAT area. The feedback identified portions of the ARMA and CARSAMMA reports on traffic statistics and analysis which could be improved upon to provide a more accurate analysis to be done in the entire SAT area.

3.2.3.6 The meeting acknowledged the inputs from ARMA and CARSAMMA as useful to give a broader and better picture of traffic in the SAT area. However, the SAT group observed there were differences in the format of statistics which were presented by ARMA and CARSAMMA and urged all RMAs accredited to States in the SAT area to try and harmonize the format on the common aspects of statistical reportage for the SAT area. From the aforementioned, the following conclusions were adopted by SAT/24.

CONCLUSION 24/06: TRAFFIC STATISTICS

That,

- a) ASECNA and SATMA are requested to conduct and provide statistic on navigation specifications of aircraft which operate in the EUR/SAM corridor and report to SAT 25;
- b) FAA is requested to share global traffic forecast to assist SAT Group with forward planning, and the SAT Group to obtain from the NAT its existing programmes in traffic forecasting and statistical analysis tools;
- c) ARMA and CARSAMMA to explore the possibility of providing the SAT with additional traffic statistics and analysis to enable the SAT Group to make more accurate and predictable planning decisions;
- d) All SAT States/FIRs in the AFI Region which have not done so, are requested to provide traffic data from January 2017 to March 2019 to ARMA, not later than 30 June 2019, to be included in the Collision Risk Assessment 13 which commences on 1 July 2019; and
- e) SAT Regional Monitoring Agencies are urged to consider as far as practicable, harmonization of reporting subjects and/or format for traffic statistics, taking into consideration the feedback provided by the mathematicians computing the TLs, and in collaboration with the NAT where feasible.

Note: It is recommended to use ICAO sources of statistical forecast as bases for Regional planning decisions.

3.3 SAT Area Risk Assessment and LHD Monitoring

3.3.1 SATMA – EUR/SAM Corridor

3.3.1.1 SATMA, as monitoring Agency, was assigned by SAT group to conduct studies and required assessments to analyze the conditions necessary for the safe implementation of RVSM and RNP10 in EUR/SAM Corridor. The EUR/SAM corridor became an RVSM and RNP10 area in January 2002 after an initial Safety Assessment. It became mandatory for SATMA to perform and present periodically, RVSM and RNP-10 Post-Implementation Analysis about the situation in the EUR/SAM Corridor in order to ensure, that critical parameters stay within limits of safe figures, and that required Target Level of Safety keeps below allowed figures.

3.3.1.2 Since 2016, the Large Height Deviation (LHD) default time -value to be applied when real data was not available was revised accordingly (5 minutes if not available) as new systems, aircraft capabilities, coverage and procedures (OLDI, ADS, Satellite) have improved ATC provision in the corridor. Further considerations regarding that subject will be considered in PBCS implementation, as ADS-C (RSP180) brings a higher surveillance precision that may help to revise some LHD considerations.

3.3.1.3 Lack of information is considered the worst enemy for conducting Collision Risk Modelling, in particular, the model adopted by ICAO for EUR/SAM RVSM and RNP10 Safety Assessments. When no data is available to input as parameters, the values for hypothesis must be taken

from the most conservative figures, and this, of course, impacts on the results and conclusions. This is especially important for Oceanic areas, as data estimations must be applied to large distances.

3.3.1.4 Currently, almost all medium to long term projects under consideration by the SAT group are targeting reductions in the spacing between aircraft distances, searching for optimal use of Flight levels and longitudinal separations in the corridor. Consequently, it becomes essential to reinforce LHD investigations in order to minimize the need to use those conservative values.

3.3.1.5 The EUR/SAM corridor new airspace concept introduces new challenges for the next years, not only in operations and procedures, but also in assessments. In this regard, further actions must be applied for the observance of LHDs/LD, as States/ANSPs delivering just LHD reports to SATMA (before 5th of month) appears not to be enough. It is essential that each State/ANSP sends LHD reports with all fields filled and detailed, and where data was not available, the deviation is investigated within the collateral limits or with concerned company.

3.3.1.6 To meet the 2019 Data Set Requirements for Safety Assessment, States/ANSPs should send traffic data and LHD reports to SATMA on monthly basis as soon as they become available. Traffic Data received later than 31 December 2018 will not be included in the 2019 Study. The meeting therefore reminded States/ANSPs to:

- **send completed and correctly filled LHD reports (1-10 monthly);**
- **take note of the traffic data delivery schedule for 2019 Safety Assessment in EURSAM Corridor; and**
- **remember that DATA to be sent are included in the document “DATA NEEDED FOR EUR/SAM MONITORING AND ASESSEMENTS” published in SATMA website.**

3.3.1.7 Preliminary overview of the 2018 EUR/SAM Corridor Safety assessment is presented in **Appendix F1** to this report, and the full report will be available via www.satmasat.com once completed.

3.3.2 CARSAMMA- CAR/SAM

3.3.3.1 CARSAMMA conducts collision risk assessment in the Caribbean and South America for the safe use of RVSM airspace using quantitative evaluation- the REICH Collision Risk Model - as recommended by ICAO. It is an intensive mathematically based model where, at the end of the processing of aircraft movement data received from relevant CAR / SAM Region FIRs (sheets containing flight data), the Vertical Collision Risk to be compared to the Target Level of Safety of the flight information region is calculated. This method is used to determine if the safety of the system is acceptable as an absolute method. Several different calculation tools, databases, and many man-hours of expert analysis are needed to complete the work.

3.3.3.2 The data of the Large Height Deviation (LHD) issued during the year 2018 by the Atlantico FIR are compiled and analyzed during the monthly conference calls that took place with the participation of experts from the FIRs involved, officers from the ICAO Offices of Lima and Mexico, and CARSAMMA. During the Teleconferences, the LHDs are analyzed and validated, with the parameter values found, merged and inserted into the General Formula of the Reich Collision Risk Model.

3.3.3.3 The summary of the results of the Safety Assessment (CRM) of the Reduced Vertical Separation Minimum of 300 meters (1000 feet) in the Atlantico FIR airspace in 2018 is presented in **Appendix F2** to this report.

3.3.3 ARMA – AFI

3.3.3.1 ARMA presented the ninth post-implementation collision risk assessment for RVSM in AFI region. The assessment and subsequent report addressed two of the AFI RVSM Safety Policy objectives, namely an assessment of the technical vertical collision risk measured against a Target Level of Safety (TLS) of 2.5×10^{-9} fatal accidents per flight hour, and an assessment of the total vertical collision risk measured against a TLS of 5×10^{-9} fatal accidents per flight hour.

The technical and total vertical collision risk assessments are based on the data and information available from AFI RVSM operations during the calendar year 2017 as collected and collated by ARMA.

3.3.3.2 The AFI CRA 12

The CRA 12 2017 estimate of the total vertical collision risk was 58.6×10^{-9} fatal accidents per flight hour, i.e. 12 times the total vertical TLS. It was approximately 1.6 times larger than its CRA 11 2016 counterpart. The increase in the CRA 12 2017 estimate of the total vertical collision risk represented the combined effect of increases in the probabilities of vertical overlap due to improper flight level crossings and flying at wrong flight levels. The former increased by a factor of approximately 1.2 and the latter by a factor of approximately 1.8.

3.3.3.3 The revised RVSM Large Height Deviation definition now includes the resultant outcome of coordination failures and reads as follows:

Large Height Deviation (LHD). A vertical deviation from an ATC assigned or coordinated altitude that results in an error of 300 ft. or more. The deviation may be the result of human error, equipment malfunction or environmental factors such as turbulence, and should be reported in accordance with the LHD types.

3.3.3.4 A new trend of LHD, Code E - Coordination errors in the ATC-to-ATC transfer or control responsibility as a result of Human Factors (e.g. late or non-existent coordination; incorrect time estimate/actual; flight level, ATS route, etc. not in accordance with agreed parameter) was identified as a major causal factor in LHD related incident in the AFI region.

3.3.3.5 The Collision Risk Assessment for the AFI Region is attached in **Appendix F3** to this report.

3.3.3.6 The meeting expressed grave concerns about the increasing TLS in the AFI region and called for urgent actions by all stakeholders to address the risk and unsatisfactory condition reports. In particular, the SAT Group was informed of lack Strategic Lateral Offset Procedures (SLOP) implementation in some FIRs and called for education and implementation on SLOP in the FIRs concerned.

3.3.3.7 The SAT Group noted that ongoing efforts by States/ANSPs in the SAT area to implement AIDC will positively contribute to reduce the high level of coordination failures between Air Traffic Control centres. The meeting urged States/ANSPs to ensure that appropriate training and other human performance issues relating to effective use of AIDC by operational personnel are addressed.

3.3.3.8 From the foregoing, the SAT Group adopted the following conclusions:

CONCLUSION 24/07: REDUCTION IN COLLISION RISK ASSESSMENT AND LARGE HEIGHT DEVIATION LHD

That,

- a) **Civil Aviation Authorities of SAT member States/FIRs are requested to ensure that height monitoring is conducted regularly for all aircraft on their registry.**
- b) **SAT States/FIRs that have not done so are requested to implement AIDC and to address the Human Factors in Coordination Failures which are factors impacting negatively on the Target Levels of Safety and report to SAT 25.**
- c) **SAT States/FIRs are urged to give priority attention to addressing Coordination Failures between ACCs in order to enhance RVSM safety, including the implementation of awareness programmes to mitigate human error induced Coordination Failures, and conduct remedial actions to mitigate the risks.**

3.4 Airspace Structure and ATM Operational Improvements

3.4.1 SAT Concept of Operations CONOPS

3.4.1.1 The meeting recalled that the SAT area comprises two homogeneous ATM areas and major traffic flows/routing areas, namely, Europe — South America (EUR/SAM) (oceanic) - Area of Routing One (AR1) consisting of Atlantico, Canarias, Casablanca, Dakar Oceanic, Recife Flight Information Regions (FIRs), and Atlantic Ocean interface between the AFI, NAT and SAM Regions – Area 2 (AR2) consisting of Accra, Dakar, Johannesburg Oceanic, Luanda, and Sal FIRs. The AR1 is made up of an Oceanic en-route low density in the southern part and oceanic high density in the northern part which constitutes the major EUR/SAM traffic flow along EUR/SAM Corridor. The AR2 is made up of an Oceanic en-route low density and constitutes the major traffic flow to and from three homogeneous ATM area in the AFI/NAT/SAM regions.

3.4.1.2 The SAT Group had chalked some successes in the implementation of ATS improvements including but not limited to:

- Reduced Vertical Separation Minimum (RVSM);
- Unidirectional RNAV routes UN741 and UN866 and bidirectional route UN873 and UN857 in the EUR/SAM Corridor;
- Atlantic Ocean Random Routing Area (AORRA) in four phases and introduced Entry Points, Transitional and Flexible Routes;
- Ongoing implementation of EUR/SAM Corridor New Airspace Concept; and
- CNS infrastructure including ADS-C/CPDLC, CAFSAT, AIDC.

3.4.1.3 An invitation was extended to SAT Member States and SAT Group to participate in the ICAO NAT 2030 Vision Workshop in the ICAO EUR/NAT Office in Paris, France, from 29 to 30

January 2019 to afford the SAT Group to be abreast with the NAT programme for ATS improvements over the Atlantic. The workshop provided an opportunity to identify areas of collaboration in the provision of a safe, efficient, environmentally responsible and more cost effective ATS service over the entire Atlantic Ocean.

3.4.1.4 Whilst it is undeniable that the volume of air traffic in the SAT airspace is far below that currently operating in the NAT area, statistics show that a majority of the fleet operate in both airspaces and are appropriately equipped to take full advantage of the considerable investments made by airspace users. Additionally, global traffic is projected to double by 2030 and the SAT area is likely to experience significant increases of which forward planning now would be prudent.

3.4.1.5 It was evident from the lessons learned that a properly developed vision document along with its associated Concepts of Operation (CONOPs) for the SAT area with an implementation roadmap, and harmonized with the NAT 2030 Vision programme where feasible and mutually beneficial, would have to be considered and decided upon by SAT.

3.4.1.6 The SAT Group was encouraged to consider the option of either leapfrogging to a new era with a dedicated vision document and CONOPs for the SAT area where implementation decisions by the SAT Group would be based on a well-thought-out plan from a clearly defined vision, or decide on programmes where collaboration with the NAT and other groups would inure to its benefit, leveraging on the knowledge, expertise and experiences available in the NAT Group and other organization.

3.4.1.7 The meeting recalled that the SAT Group had provision for conducting studies on the improvement of the airspace structure. It was noted, however, that the SAT Study Group on the Improvement of the Airspace Structure with its current Terms of Reference, work programme and composition was limited in scope and was unable to provide the SAT Group with expertise in the effective and timely implementation of new and emerging operational concepts, systems and technologies for the whole SAT area.

3.4.1.8 In consideration of the aforementioned, the SAT Group decided to reconstitute the study Group on the Improvement of the Airspace Structure and amend its Terms of Reference, work programme and composition to incorporate the development and adoption of a SAT Vision document, Concepts of Operation and an implementation roadmap for the entire SAT area. Consequently, the following was adopted:

CONCLUSION 24/08: SAT VISION, CONOPS AND IMPLEMENTATION PLANS:

That,

- a) The SAT Group identify initiatives in the NAT Vision 2030 project in order to harmonize operations, infrastructure and programmes with the aim of achieving a safer, more efficient, environmentally responsible and more cost effective ATS service over the entire Atlantic Ocean;**
- b) Reconstitute the SAT Study Group on the Improvement of the Airspace Structure to coordinate the development and adoption of a SAT Vision document, Concepts of Operation and an implementation roadmap;**

- c) **Rename the SAT Study Group on the Improvement of Airspace Structure (IAS/SG) to SAT Atlantic Implementation Management Group (SAT IMG) and request the Secretariat to align its Terms of Reference and work programme accordingly;**
- d) **SAT Group assigns the responsibility for PBCS implementation in the SAT area, beginning with the EUR/SAM corridor as a priority, to the IMG.**

3.4.1.9 Spain was the Rapporteur for the IAS Group of which a decision was made to transform it to the Implementation Management Group (IMG). Spain brief the group of its resources challenges and therefore, unable to provide an expert to take on that additional responsibility.

3.4.1.10 ASECNA thus offered to lead the IMG for the development of SAT Vision Document, SAT CONOPS and Implementation Roadmap. ASECNA expected to formally nominate the IMG lead and inform the Secretariat as well as members of the newly reconstituted IMG comprising Brazil, Cape Verde, France, Portugal, Senegal, Spain, South Africa, Trinidad and Tobago, United States, ASECNA and IATA.

3.4.2 EUR/SAM Corridor New Airspace Concept Project (Report of ESCIT)

3.4.2.1 The meeting was appraised on the status of implementation of the EUR/SAM Corridor New Airspace Concept Project (presented in **Appendix G** to this report) and the activities of the implementation team (ESCIT). The ESCIT efforts are focused on implementation of PBCS concept in the EUR/SAM Corridor, establishing clear objectives and goals targeting not only EUR/SAM States, but all SAT States in the near future.

3.4.2.2 The ESCIT reminded the SAT Group of its two main conclusions relating to PBCS implementation which the ESCIT followed, namely:

SAT/23/06: Implement reduced separation minima in the Region via PBCS:

That,

- a) *All SAT Region States will conduct an analysis to determine needs and enhancements necessary to implement PBCS in the SAT Region and to identify appropriate airspace for implementation of reduced separation minima;*
- b) *All SAT States shall agree to phased in approach of reduce separation in appropriate SAT Region airspace (PH1–EURSAM Corridor) and identify required components to implement reduced separation minima in EUR/SAM corridor;*
- c) *In coordination with the ICAO NAT Region identify and develop specific areas required for PBCS implementation and propose to acquire PBCS guidance documents and materials, (ANSP requirements, RMA requirements, Operator requirements and State requirements), implementation plan, lessons-learnt, business case and best practices from the NAT Region; and*
- d) *Review and assess implementation requirements and tasks at SAT 24. Provide guidance concerning additional activities necessary to facilitate PBCS implementation in the Sat Region.*

SAT/23/14: Development of ToR for investigation on RCP and RSP:

That:

The joint Technical team expands its work program to include the development of Terms of Reference for the investigation into the current systems to establish performance baseline (Transaction time, Continuity, Availability and Integrity) in preparation of the implementation and operation of RCP and RSP.

3.4.2.3 The ESCIT provided the actions below as update of its activities:

At its teleconference held in April 2019, the ESCIT urged States to provide the status of their PBCS National Plan, regarding three key steps proposed by ENAIRE and established in point 2.4.9 of SAT23 Report:

The three key steps for implementation of the EUR/SAM airspace project regarding “5 minutes LSM based on RSP/RCP/RNP10” are:

- *EUR/SAM_1.1: Doc4444 5.4.2.9 “Longitudinal Sep. Minima in National Regulations;*
- *EUR/SAM_1.2: RNP10/RSP180/RCP240 (ANSP Requirements & Operators Requirements);*
- *EUR/SAM_1.3: Evaluation of ADS-C/CPDLC Ground Systems (RCP/RSP) for DLink Mandate.*

3.4.2.4 A summary of the ESCIT teleconference discussions are listed hereunder:

Spain:

- Doc 4444 amendments already included PBCS monitoring in the national normative;
- Although SACTA-FANS already incorporates RSP/RCP specifications, a legislative internal Certification as System to provide Reduced Separation is compulsory and demanded by the National Spanish Safety regulator (AESA). This is in process; and
- Operators PBCS certification procedure already published by National Regulator. Main operators already certified.

Brazil/Cape Verde:

- A first meeting about FANS-RSP/RCP for reduced longitudinal separation took place in early April between some Portuguese-language spoken States;
- A second meeting is to be prepared;
- Urged to publish Operators PBCS certification procedure;
- Cape Verde also attended the teleconference and therefore expected that both FIRs will move in a similar margin; and
- Brazil was asked to present/send a paper in SAT24 with estimation and status for FANS – RSP/RCP in Atlántico FIR.

ASECNA

- ASECNA provided a briefing on the progress of FANS utilization and reported the difficulties on finding a proper way to measure the RSP/RCP;

- It was proposed that ENAIRE send to ASECNA information regarding SACTA basic specifications so the ground system may analyse, in real time, the RSP performance of the aircraft (Document sent by ENAIRE 16 May 2019);
- Urged to publish Operators PBCS certification procedure; and
- The Post-monitoring tasks would be covered by the Monitoring Agency, as suggested by ARMA.

RMAAs (ARMA/SATMA)

- ARMA raised the need for PBCS monitoring to be provided by existing RMAAs;
- SATMA recalled that all Monitoring Agencies will meet (RMACG14.Las Palmas.17-21June) to discuss about global PBCS monitoring, as ICAO had determined that already existing RVSM Monitoring Agencies extend their responsibilities to PBCS. That includes a database for PBCS certified aircraft (to be issued by States) and monitoring studies about PBCS behaviour (as done with RVSM nowadays).

3.4.2.5 Several SAT States already have plans or signed contracts for ADS-B implementation in the medium term. ESCIT considers it good news, taking into account of European Commission Regulation n° 1207/2011 which requires that all European operators must be ADS-B equipped in a very short term, meaning, that a significant percentage of EUR/SAM corridor traffic will be equipped. However, the initial implementation target date is likely to be delayed mainly because, there is currently no direct means of communication associated with ADS-B, as it is case for ADS-C which can be coupled with CPDLC as its communication component.

3.4.2.6 The SAT Group was reminded that both surveillance systems –ADS-C and ADS-B- will coexist in the future, and will have to realize that the major part of its work in coming years will focus on this coexistence. SAT meetings will have to expect the emergence of new concepts and technologies, and the challenges which comes with them. From the foregoing, the hereunder conclusion was formulated.

CONCLUSION 24/09: EUR/SAM AIRSPACE CONCEPT IMPLEMENTATION

That,

Urge EUR/SAM States/ANSPs upgrade their ATM/CNS systems to comply with steps EUR/SAM_1.1; EUR/SAM_1.2 and EUR/SAM_1.3 of EUR/SAM Corridor New Airspace Concept project approved by SAT23.

3.4.3 Proposal for Amendment PANS ATM Doc 4444 Strategic Lateral Offset Procedure (SLOP)

3.4.3.1 The SAT Group has been discussing various operational concepts which are likely to provide safety, capacity improvements in the management of air traffic in the airspace over the South Atlantic Ocean. The SAT Group has been considering reduction in separation minima such as the application of Performance-Based Longitudinal Separation Minima, Performance Based

Communication and Surveillance (PBCS), ATM contingency plan for the SAT area, and more awareness in the implementation of Strategic Lateral Offset Procedures (SLOP) in the AFI region.

3.4.3.2 The SAT Group referenced the PANS-ATM relating to reduced separation minima, special procedures for in-flight contingencies in oceanic airspace and SLOP, and took note of information with great interest especially due to its consideration of potentially implementing SLOP for the SAT in the future.

3.4.3.3 The Air Navigation Commission, at the seventh meeting of its 210th Session held on 7 March 2019, considered proposals developed by the second meeting of the Separation and Airspace Safety Panel (SASP/2) to amend the Procedures for Air Navigation Services — Air Traffic Management (PANS-ATM, Doc 4444). The Commission authorized their transmission to Member States and appropriate international organizations for comments. The proposed amendments to the PANS-ATM are envisaged for applicability on 5 November 2020.

3.4.3.4 The SAT Group considered it timely to study the amendment proposals, determine how they will impart ATM operations in the SAT area, encourage SAT member States to respond as appropriate, and urge SAT States / ANSPs to factor them as appropriate in their forward planning and implementation programmes.

3.4.3.5 The meeting recalled the lack of implementation of SLOP, particularly in some FIRs in the AFI region, contributing negatively to previous and the upcoming Collision Risk Assessment 13 for the AFI region. Consequently, the SAT Group adopted the following conclusions:

CONCLUSION 24/10: IMPLEMENTATION OF AMENDMENT TO PANS ATM DOC 4444 AND IMPLEMENTATION OF SLOP

That,

- a) SAT States/FIRs note the implementation date of PANS ATM being 5 November 2020, specifically concerning SLOP and inclusion elements of the proposal for amendment in the SAT programme, and as appropriate, in their forward planning and implementation regional programmes;**
- b) SAT members are urged to ensure that States respond to the proposal for amendment on SLOP which was issued as Attachment A to State letter AN 13/2.5 - 19/32 by ICAO Secretary General;**
- c) States/FIR which have not already done so publish AIP Supplements for implementation of SLOP by 30 June 2019, and in the interim, publish NOTAM in respect of SLOP implementation in view of the Collision Risk Assessment 13 which commences on 1 July 2019.**

3.4.4 Flight Level Occupancy and Airspace Optimization

3.4.4.1 The importance of SATMA's collection and analysis of statistical data of air traffic movements along the EUR-SAM Corridor over the years, had been highly acknowledged in previous

SAT meetings as being relevant to take both proactive and preventive actions. Nevertheless, some issues were raised by SAT/23 with regards to the statistical data as follows:

- figures provided do not represent whole the EUR/SAM Corridor since data was based exclusively on traffic that flew over Canarias FIR; and
- SAT 22 ATM WG, requested the inclusion of information about Flight Level occupancy.

3.4.4.2 The SATMA report to SAT 24 therefore sought to address both issues alongside others detected by SATMA as part of its performance monitoring functions in the EUR-SAM Corridor.

3.4.4.3 In accordance with SAT19/01 conclusion, SATMA was assigned responsibility to gather relevant traffic data for airspace planning, safety assessments and statistics in the EUR/SAM Corridor. In order to achieve this objective, Brazil, Cape Verde, Spain and Senegal were requested to collect Air Traffic Movement data from their ATM Systems every six months in accordance with the pre-established format agreed with each State.

3.4.4.4 To date, SAT members have provided annually this information to perform the safety analysis. In addition, a preliminary analysis of the global figures per ACCs is conducted to determine which months will be representative of the yearly trend, based on the most relevant traffic figures and its data consistency per FIR. Traffic figures for March 2018 was selected to conduct the safety assessment in 2018.

3.4.4.5 Even though global figures and conclusions should be obtained directly from the data provided by each ANPS with an easy and simple process, the data provided are inconsistent among ANSPs. For instance, there are flight plans that were not registered by all ATS units involved. Available operational information show differences in terms of time, flight levels or coordination points, including instances where flight plans for the same day were reported by the same ANSP with same times but with different flight trajectories.

3.4.4.6 Therefore, and in order to increase the consistency of this operational data, several hypothesis and assumptions had been considered.

3.4.4.7 The original information supplied by each ANSP was treated as partial to obtain its operational indicators. However, the data was considered globally to complement for the lack of information from some flights and FIRs but were reported by other adjacent FIRs.

3.4.4.8 A total of 30,000 position reports were provided. However, additional information had been extrapolated from the original data to increase the reports to 71,000 position reports. Likewise, coordinates reports have been associated with the closer waypoint possible.

3.4.4.9 Whereas sourced flight plan information had only initial and final points, the flight plan had to be extrapolated to be closer to the route. For example, if the initial flight plan was TENPA - SAMAR, the extrapolated final flight plan would be TENPA-USOTI-APASO-VIDRI-GDV-SAMAR.

3.4.4.10 Although the provided data of traffic outside of the EUR-SAM corridor were not relevant for this safety and statistical assessments, all data had been processed similarly. Finally, it was necessary to explain some terms in order to understand the figures presented in this working paper:

- It was considered “EUR/SAM traffic” for traffic which had flown at least a leg of the following airways in SBAO/GOOO/GVSC FIRs: UN741, UN866, UN873 and UN857.
- It was considered “EUR/SAM Area” where the information had been reported to SATMA.

3.4.4.11 The map of the EUR/SAM Area and statistics including flight level occupancy is presented in **Appendix H** to this report.

3.4.4.11 ASECNA informed the SAT Group of the continuous growth of air traffic in the EUR-SAM corridor and with it comes major airspace capacity issue, hence, the need to find efficient solutions to meet the demand for optimum flight levels for long-haul flights in the EUR/SAM Corridor. In this regards, policies decisions should incorporate development of operating systems and applicable procedures in order to find solutions for improving flight trajectories and optimize airspace and ATS route network.

3.4.4.12 Currently, ten (10) minutes longitudinal separation using the Mach number technique is applied to aircraft operating in the EUR/SAM Corridor. Most commercial aircraft generally fly between FL310 and FL390, and usually request higher flight levels as the flight progresses and their weight decreases. This scenario is the common trend in Dakar Oceanic airspace which is located midway between Europe and South America.

3.4.4.13 In 2018, 52% of the fleet used random routing (west of UN741) whereas 47% used established routes along the EUR/SAM corridor. Most of the airlines are using the similar software which allocate the same tracks (random routing or ATS routes) taking advantage to the most favourable meteorological conditions. Aircraft operating between Europe and South America have comparable performance and have almost identical slot times. They are therefore vertically stacked in flight levels, and as a result, cannot always have their optimum requested flight levels due to the system limitations to provide additional longitudinal spacing. ASECNA was of the opinion that the software should take into account the constraints and propose alternative tracks.

3.4.4.14 RNP4 implementation in the EUR / SAM corridor with 5-minutes longitudinal separation will improve airspace capacity, accommodation of more aircraft to operate at optimum flight levels, allow for application of 30 NM lateral separation, and establishment of more flexible ATS routes along the corridor.

3.4.4.15 In summary, ASECNA stated that the main reasons why some flights are not allocated their optimum required flight levels are:

- Similar track allocation by the software used by airlines which does not take into account the time slot; and
- Limitations due to application of 10-minutes longitudinal separation in the corridor.

3.4.4.16 Cayenne FIR reported a decrease of about 10% in traffic movement, observed that the traffic was operating randomly to the East of their FIR and recommended the expansion in the width of the EUR/SAM corridor, and establishment of more ATS routes to give more flexibility to flights.

3.4.4.17 The meeting noted that RNP 4 does not by itself provide surveillance. Besides, the ultimate goal going forward was the removal of established ATS routes. Therefore, the opportunity offered to implement reduction in Lateral Separation Minimum, should not necessarily lead to the

establishment of new ATS routes to increase capacity; rather it provides more opportunities to utilize advanced airborne capabilities of fleet and implement emerging operational concepts such as PBCS.

3.4.4.18 From the foregoing, the following conclusions were adopted:

CONCLUSION 24/11: OPTIMIZATION OF AIRSPACE AND FLIGHT LEVELS IN THE EUR/SAM CORRIDOR

That,

- a) **IATA is requested to liaise with airlines regarding the need for coordinated use of Flight Planning software to reduce the impact of flight level constraints in the EUR/SAM corridor;**
- b) **The SAT region should consider the implementation of Air Traffic Flow Management (ATFM) to address the capacity constraints along busy air traffic routes and airspace; and**
- c) **Feasibility studies for implementation of ATFM be included in the work programme of the Implementation Management Group.**

3.4.5 Recurrence of flights in Dakar Oceanic Airspace without contact

3.4.5.1 ASECNA noted that the South Atlantic is a wide remote oceanic airspace, and currently, there is no capability for providing full VHF coverage. ATS routes in the EUR/SAM Corridor are crossed by flights operating between Africa and North America.

3.4.5.2 It is important to pointed out that, from flight level 195 to unlimited, all airspace managed by ASECNA is class A. The conditions applicable to the flights operating within the classes of airspace in force in Dakar FIR/UIR are in accordance with requirements in Annex 11, Appendix 4 to the Chicago Convention. In accordance with the ICAO Regional Supplementary Procedures in force (Doc 7030), a two-way contact is mandatory within Dakar FIR/UIR (*Ref. ASECNA AIP 9 ENR 1-4-01*).

3.4.5.3 ATCs rely on pilot position reports obtained by monitoring ADS/C-CPDLC and/or H.F radio frequency as means of separating traffic in the EUR/SAM corridor. However, some of the light and medium aircraft operating in the lower airspace between South America and West Africa lack suitable HF radios or CPDLC to establish two-way contacts with the relevant ATC centres, as a result of them operating with only VHF radios. This is a serious safety concern and a leading cause of frequent activation of Alert Phases along the corridor.

3.4.5.4 The table below presents ten (10) reported cases since the beginning of 2019:

	CALL SIGN	AIRCRAFT TYPE	DEPARTURE	DESTINATION	DATE
1	ECHMZ	AT8T	GVAC	SBRF	19/01/2019
2	RRR5818	C130	GVAC	FHAW	07/02/2019
3	FGPHR	M20P	GVNP	SBSG	26/02/2019
4	GCW1210	AT45	GVNP	SBFZ	07/03/2019
5	PRRDD	GLF5	OJAQ	SBGL	07/03/2019
6	N3796B	CL30	GVAC	TBPR	15/03/2019

7	ONE9580	A332	SBBR	LFBT	30/03/2019
8	CTM2044	CN35	GVSV	SBSV	19/04/2019
9	YV3016	E190	GVAC	SUMU	07/05/2019
10	- PRCRC	G280	SBRF	GVAC	15/05/2019

3.4.5.5 The activation of Alert Phases always entails the mobilization of significant human and material resources which concerned centres may not always readily afford, and therefore requires a concerted action to workable finding solutions to the safety risk.

3.4.5.6 **The SAT Group expressed great concerns to risks posed to flights operating in the SAT area and reiterate the need for urgent action to be taken as a matter of priority to address the situation.**

3.4.5.7 The SAT Group recalled that the issue was addressed by SAT/21 and noted that the conclusions below which were adopted by SAT/21 were still valid and called for action by all the SAT States/ANSPs to implement them and provide feedback to the Group:

Con 21/10: Safety Risk to flights due to lack of communications by flights over high seas

That,

In consideration of the serious safety risks posed by flights which operate in the SAT region without contacting the appropriate ATS units:

- a) ACCs in the SAT area are urged to increase the level of coordination and collaboration to reduce the risks;*
- b) Brazil, Cape Verde and Senegal compile and investigate deliberate violations of ATC procedures by such flights and inform the States of Registry for the aircraft concerned; and*
- c) Compile the number of aircraft involved in the violations above, perform the appropriate analysis, determine emerging trends and inform the respective ICAO Regional Office of the potential risk to flights operating on the high seas in the SAT region for necessary action.*

3.4.5.8 In addition to the **SAT/21 Conclusions** above which were reemphasized, the SAT Group adopted an addition conclusion as follows:

CONCLUSION 24/12: CARRIAGE OF SUITABLE COMMUNICATION

That,

States/ATS units should ensure that aircraft carry suitable means of communication in line with the requirements of the airspace and the type of flight they operate.

3.4.6 Coordination Failures in the AORRA Airspace

ATNS noted that the continued growth of civil aviation coupled with the introduction of new air traffic management systems have increased the complexity of the Air Traffic Management system, thus requiring more adaptable patterns of control and coordination. There is a need to look deeper into the

patterns of control, the transfer of control and coordination across boundaries (FIRs) and the adaptation to unexpected scenarios that may contribute to ‘loss of control’ events.

The meeting noted the updates on coordination failures in the AORRA airspace managed by Johannesburg and the improvements recorded as a result of actions taken by previous SAT meetings. The meeting noted further, that the discussions and **Conclusions 24/07** on coordination failures as in **paragraph 3.3.3.4** of this report will suffice.

3.4.7 Update on the ASEPS (Advanced Surveillance-Enhanced Procedural Separation) using ADS-B trials in parts of the NAT airspace

3.4.7.1 The North Atlantic Implementation Management Group meeting (NAT IMG/52 in April 2018) had agreed that the Implementation Plan, Task List and Concept of Operations (CONOPS) for Spaced-Based (SB) Automatic Dependent Surveillance-Broadcast (ADS-B) and associated Advanced Surveillance-Enhanced Procedural Separation (ASEPS) trials must fulfil the prerequisites for the operational trial as provided in NAT Systems Planning Group SPG (NAT SPG/53 in June 2017) Conclusion 53/5:

NAT SPG Conclusion 53/5: Prerequisites for SB ADS-B Operational Trial

That the following prerequisites are to be fulfilled in order to enable an operational trial to use Space-Based Automatic Dependent Surveillance-Broadcast (SB ADS-B):

- a) the Separation and Airspace Safety Panel (SASP) agreed minima and associated requirements for Advanced Surveillance-Enabled Procedural Separation (ASEPS);
- b) implementing Air Navigation Services Providers (ANSP) have:
 - i) completed ASEPS implementation plans aligned to the NAT SB ADS-B Concept of Operations (CONOPS) and the SASP output referred to in a) above;
 - ii) confirmed their SB ADS-B service meets identified performance requirements;
 - iii) completed safety management activities as required by their respective regulatory authorities; and
 - iv) confirmed that the Performance Based Communication and Surveillance (PBCS) performance is measured and reported in the same manner as other applications of reduced separation in the NAT;
- c) the plans and the outputs of the safety management activities referred to in b) above have been reviewed by the NAT Implementation Management Group (NAT IMG) and the NAT Safety Oversight Group (NAT SOG);
- d) the NAT IMG and NAT SOG identify success criteria and trial duration;
- e) neither the NAT IMG nor the NAT SOG identifies an issue that, in their opinion, requires resolution before an operational trial should commence;
- f) the NAT IMG has confirmed that implementing ANSPs have completed all required implementation activities; and

- g) NAT SPG has approved the implementation plan and supporting task list that would also include the above listed prerequisites to enable a trial for implementation of SB ADS-B in the NAT.

3.4.7.2 In addition to the above, NAT SPG/54 (in June 2018) had been provided with the latest version of the Implementation Plan and Task List as well as the provisional version of the NAT SB ADS-B Concept of Operations (CONOPS). The NAT SPG had also agreed that the foregoing documents should be further refined by the NAT IMG and NAT SOG contributory bodies. Under the assumption that all of the pre-requisites have been met, it was envisaged that the trial would then commence on AIRAC 28 March 2019.

3.4.7.3 In view of the timespan between the planned commencement of the ASEPS trials in March 2019 and the effective date of new ASEPS provisions in PANS-ATM from November 2020 onwards, and to take advantage of the added safety benefits of these new procedures, the Groups agreed that the NAT Operations Bulletins should be issued and that these procedures should become effective on the day of the commencement of the ASEPS trials in March 2019.

3.4.7.4 This would also include revised Special Procedures for In-flight Contingencies procedures that would be applicable in the entire NAT Region as well as the West Atlantic Route System (WATRS). In agreeing to the foregoing, the States were cognisant that they would need to publish the difference with PANS-ATM in their State Aeronautical Information Publication (AIP).

3.4.7.5 Based on the discussions and recommendations of the NAT working groups, it was agreed that the operational trial should commence on 28 March 2019 and continue until 5 November 2020 or the effective date of ASEPS provisions in the Procedures for Air Navigation Services - Air Traffic Management (PANS-ATM, Doc 4444), whichever is later.

3.4.7.6 Nevertheless, it must be noted that additional activities are still ongoing for the expansion of the operational trial of Advanced Surveillance Enhanced Procedural Separation (ASEPS) using Space Based Automatic Dependent Surveillance – Broadcast (ADS-B) to include lateral spacing of 19NM between non-intersecting tracks. This expansion will be presented to NAT SPG/55 meeting for endorsement and the publication of the OPS Bulletin, as well as the national AICs, are scheduled for AIRAC 15 August 2019 with a commencement of ASEPS operational trial lateral spacing of 19 NM between non-intersecting tracks from AIRAC 19 OCT 2019 onwards.

3.4.7.7 The SAT Group took note of the work related to the trial implementation of Advanced Surveillance-Enhanced Procedural Separation (ASEPS) using Automatic Dependent Surveillance Broadcast (ADS-B) in the Shanwick, Gander and Santa Maria Oceanic Control Areas, and the below listed Appendices as references for further studies by the SAT IMG for consideration in its forward planning and implementation:

- **Appendix I1:** *Implementation Plan and Task List for an Operational Trial of Advanced Surveillance-Enhanced Procedural Separation (ASEPS) Using Automatic Dependent Surveillance-Broadcast (ADS-B)*
- **Appendix I2:** *Concept of Operations (CONOPS) On Provision of Space Based Ads-B Services in The North Atlantic Region*
- **Appendix I3:** *NAT OPS Bulletin – on Trial Implementation of ASEPS using ADS-B (Serial no: 2018_006)*

- **Appendix I4:** *NAT OPS Bulletin – on Special Procedures for In-flight Contingencies (Serial no: 2018_005)*
- **Appendix I5:** *NAT Doc 007 - NAT Operations and Airspace Manual (V2019_1)*

3.4.7.8 ASECNA and ENAIRE informed the meeting that they are participating in the ongoing ASEPS using ADS-B trials, and underscored ASEPS as one of the areas where collaboration with the NAT would be beneficial.

3.4.7.9 The SAT Group noted that though planning and implementation of ASEPS in the SAT area will take some time to actualize, aircraft which are registered in SAT member States would require regulatory approvals in order to operate into the NAT area where ASEPS are applied, otherwise operators of such aircraft may incur restrictions which are likely to impact negatively on their operations.

3.4.7.10 In order to ensure the realization of full benefits of new technologies, systems and procedures deployed in the SAT area, the Group reiterated the need for prior consultation with airspace users to ensure that operators plan equipage of their fleet and training of pilots in advance of implementation times. Furthermore, the SAT emphasized the need to conduct Cost Benefit Analysis as part of implementation plans for news technology and systems.

3.4.7.11 Finally, the SAT Group called for education on ASEPS in order to provide SAT States, ANSPs and users with the requisite knowledge, understanding of the concept and its application in airspace over the high seas.

3.4.7.12 From the foregoing, the SAT Group adopted the following conclusions:

CONCLUSION 24/13: IMPLEMENTATION OF ASEPS AND OTHER SYSTEMS

That,

- a) SAT/FIRs should monitor and support the ongoing Advanced Surveillance-Enhanced Procedural Separation (ASEPS) using ADS-B trials in parts of the NAT airspace and in some SAT FIRs, for consideration in their future planning requirements;**
- b) The deployment of technology in the SAT area and its associated operational benefits should be considered in a collaborative process taking into consideration the lessons learned from other regions, the end-to-end cost, efficiency and safety benefits for all stakeholders.**
- c) SAT States should ensure ASEPS regulatory approvals for aircraft on their register to ensure that operators are not unduly disadvantaged by the implementation time tables;**
- d) Secretariat coordinate with the SAT IMG to provide education on ASEPS in order to provide SAT States, ANSPs and users with the requisite knowledge and understanding of the concept and its application in airspace over the high seas.**

3.6 ATM Contingency Plan Over the Atlantic Ocean

3.6.1 Updates on ATM Contingency Plan for the SAT Area

3.6.1.1 The need for establishing an ATM Contingency Plan is a requirement in Annex 11 to the Chicago Convention. SAT /21 adopted the draft contingency plan by Decision 21/07 and tasked Focal Points of SAT States/ANSPs to review and submit their final comments to the Team Leaders namely, South Africa and ASECNA by 30th September 2016; and Secretariat to submit final draft ATM Contingency Plan for the SAT region to the ICAO Council by 31st December 2016 for consideration and approval.

3.6.1.2 During its 23rd meeting held in Durban in June 2018, the SAT Group agreed that the ATM Contingency Plan for the SAT area which was attached to the SAT/23 report as Appendix H should be validated by the member States/ANSPs who were present at the SAT 23 meeting in Durban, South Africa. The meeting requested ASECNA as the Lead to resend the document to all stakeholders and to collate and include all feedback received by 30 November 2018.

3.6.1.3 In parallel, ICAO Secretariat was requested to upload the updated ATM Contingency Plan for the SAT area at the ICAO website no later than 30 June 2018 and request States and other Stakeholder to respond by November 2018. The SAT Group agreed that the ATM Contingency Plan for the SAT area should be validated by 15 January 2019.

3.6.1.4 During the Atlantic Coordination Meeting (ACM) held in Paris, France on 31 January 2019, and in recognition of the fact that the Atlantic airspace is a homogenous area with similar issues and solutions due to its inherent nature of the Oceanic airspace, understanding was reached for the harmonization of NAT and SAT ATM Contingency Plans as one of the potential areas for NAT/SAT collaboration to facilitate seamless operations.

3.6.1.5 Following from paragraph the above, ICAO Headquarters initiated an inter-regional Special Implementation Project (SIP) for development of a common contingency plan that will cover North and South Atlantic FIRs. The SAT Group analyzed the status of the SAT Contingency Plan and the updates provided regarding collaboration with the NAT and the initiative from the ICAO HQ and decided to end the ongoing work development of SAT specific Contingency Plan in favour of a harmonized one for the Atlantic Ocean.

3.6.1.6 Consequently, the SAT Group adopted the following decision:

DECISION 24/14: ATM CONTINGENCY PLAN FOR THE SAT AREA

That,

The ongoing work by the SAT Group regarding the establishment of a SAT specific Contingency Plan is concluded in favour of adopting a harmonized SAT Contingency Plan with the NAT Contingency Plan.

3.6.2 Harmonization of SAT ATMCP with EUR/NAT ATMCP

3.6.2.1 The First Atlantic Coordination Meeting (ACM) was held in Paris, France on 31 January 2019 directly after the NAT 2030 vision workshop. The Workshop was attended by representatives from fourteen (14) States and six (6) Organizations/Industries. The meeting participants identified the need to harmonize the Contingency plan of the South Atlantic area with that of the North Atlantic to further ensure seamless operations in the Atlantic area. It was noted that the proposed action was not in conflict with the on-going work in the SAT, but rather complementing it at the regional Atlantic level.

3.6.2.2 At that time, the United Kingdom kindly agreed to provide an expert on contingency planning to collaborate with an ICAO HQ appointed expert to harmonize the South Atlantic (SAT) contingency plan with that of North Atlantic. The International Federation of Airline Dispatchers (IFALDA) offered to contribute with a focus on the ICAO Global Aeronautical Distress and Safety System (GADSS) and the new tracking requirements. In general, the initiative was supported.

3.6.2.3 The following steps were identified in order to align the SAT Contingency Plan with the NAT Contingency Plan (Doc 006):

- The first step in the process will be to obtain agreement from the SAT 24 to harmonize the draft South Atlantic Oceanic FIRs ATM contingency plan with the North Atlantic (NAT) contingency plan.
- The second step will be to execute a GAP analyses between the current approved NAT Contingency Plan (Doc 006) and the draft South Atlantic Oceanic FIRs ATM contingency plan. It is proposed that the draft SAT contingency plan be re arranged to mirror Doc 006. The majority of the alignment will be related to the draft SAT contingency plan. The timeframe will be established after completion of the GAP analyses.
- This will be followed by the drafting of an updated SAT Contingency Plan following the Doc 006 format and identify required updates that may be required to the NAT contingency plan to ensure harmonization.
- The Special Implementation Project will be under the umbrella of the Programmes Coordination and Implementation Section (PCI) at ICAO Headquarters, supported by the Paris, Dakar, Nairobi and Lima Regional offices as custodians of the AFI Planning and Implementation Regional Group (APIRG), North Atlantic Special planning group (NATSPG) and CAR/SAM Regional Planning and Implementation Group (GREPECAS).
- Regular updates will be provided electronically to the appropriate States and bodies on the progress of the harmonization project.

3.6.2.4 The SAT/24 meeting reviewed and adopted the attached Draft SAT Contingency Plan drafted with assistance from a representative of the United Kingdom, an expert appointed through Special Implementation Project, and with inputs from the ICAO regional offices, as presented in **Appendix J** to this report.

3.6.2.5 The SAT Group requested the SAT CCT to compile the contact details of members of CCT and also the focal point for the NAT CP by 31 July 2019.

3.6.2.6 The SAT Group requested the CCT to report progress made through ICAO to SAT States by 30 November 2019, and provide status to the next ACM, NAT SPG, and SAT/25 meetings.

3.6.2.7 The SAT Group agreed that:

- The draft harmonized SAT ATM Contingency plan be circulated electronically for approval;

- States will provide information as required, in a timely manner,
- participate in conference calls as required, to progress the work and provide updates;
- Provide the SAT Secretariat with the details of a focal point of contact related to the South Atlantic Oceanic FIRs ATM contingency plan.

3.6.2.8 From the foregoing, the SAT Group adopted the following conclusions:

CONCLUSION 24/15: ADOPTION, APPROVAL AND UPDATE OF SAT ATM CONTINGENCY PLAN HARMONIZED WITH NAT

That,

- a) **The South Atlantic Oceanic FIRs ATM Contingency Plan attached in Appendix J is adopted;**
- b) **the Secretariat is requested to take the necessary steps to make the SAT contingency plan available to the relevant stakeholders;**
- c) **A SAT Contingency Coordination Team (ASECNA-Team Leader, ATNS, Ghana CAA, Cape Verde, Spain –ENAI, Brazil-DECEA, France DSNA) is assigned the responsibility of liaising with ICAO Secretariat to ensure that the CP is updated and operationalized as living document for the SAT area;**
- d) **SAT States/ANSPs provide the SAT Secretariat with the contact details of a focal point to assist in the finalization and operationalization of the South Atlantic Oceanic FIRs ATM contingency plan; and**
- e) **Contingency Coordination Team to report progress made through ICAO to SAT States by 30 November 2019, and provide status to the next ACM, NAT SPG, and SAT/25 meetings.**

3.7 Terms of Reference, Work Programme

3.7.1 Terms of Reference, Work Programme and Composition of the SAT ATM Working Group (ATM/WG)

3.7.2 Terms of Reference, Working Programme and Composition of the SAT Study Group on the Improvement of the Airspace Structure (IAS/SG).

3.8 Any other ATM business

1.	Report necessary items of relevance to NAT SPG meetings.	
2.	Go-Team on ADS-C/CPDLC implementation provided updates	
3	Signed ATC Letters of Procedures: <ul style="list-style-type: none"> • Luanda and Accra FIRs signed LOP • Johannesburg and Atlantico • Johannesburg and Luanda 	

	<ul style="list-style-type: none"> • Luanda and Abidjan • Dakar and Atlantico • Sal and Dakar 	
4	The ATM WG recommends the combined multi-disciplinary WG made up of both ATM and CNS going forward to replace the SAT/FIT and CNMC WGs	
5	<p>Brazil and France agreed on actions to address safety and efficiency issues in the Amazonia:</p> <p>a) Skype call on July 2nd, 2019 at 13:00 UTC, to define the proposal of agenda</p> <p>b) meeting in CINDACTA IV, Manaus – Brazil, 3rd or 4th of September 2019</p> <p>c) ICAO Regional Office Lima to facilitate</p>	
6	<p>ARMA engaged with the States which were not providing the required monthly RVSM air traffic flow data.</p> <p>ARMA will forward the submission forms and provide guidance to the States to ensure that the requirements are met and submissions are made on time.</p> <p>The ARMA offered to support via quick communication platform on WhatsApp +2763 691 2295.</p> <p>States are to complete F1,F2,F3,F4 on a monthly basis and the data can be provided for by their ACC. Data for 2018 is still required and if States can make submissions before 30 June 2019.</p>	

Agenda Item 4:

Communications, Navigation and Surveillance (CNS)

Mr. **Seydou Ba**, CNS Manager ATSU Dakar, ASECNA Senegal, was appointed as Chairperson of the meeting of the SAT 24 CNS Working Group. He therefore chaired and moderated its sessions.

Mr. **Francois-Xavier Salambanga**, Regional Officer Communication Navigation and Surveillance, ICAO Western and Central Africa Office, was the Secretary of the meeting. He was assisted by Mr. **Harvey Gabriel Lekamisy**, Regional Officer CNS ICAO ESAF Office and Mr **Francisco Almeida da Silva**, Regional Officer ICAO SAM Office.

4.1 Follow up of SAT/23 Conclusions & Decisions pertaining to the CNS field

4.1.1 Under this Agenda item the meeting reviewed the status of implementation of the outcome of SAT 23rd meeting pertaining to aeronautical, Communication Navigation and Surveillance. The

Secretariat summarized and presented (**WP03 & Appendix B**), the available information collected from ANSPs on actions taken to implement the conclusions and decisions of the said meeting.

4.1.2 The meeting noted that while some conclusions were implemented others are still valid and need their achievement to be accelerated. The summarized list of conclusions/decisions of SAT/23 meeting is attached as **Appendix D.2** to this report.

The meeting commended the implemented actions and encouraged ANSPs to improve the pace of implementation of SAT 23rd and previous meetings.

The following conclusion was formulated:

Draft Conclusion 24/16: Implementation of SAT/23 Conclusions & Decisions pertaining to the CNS Field	
That; SAT ANSPs improve the pace of implementation of the Conclusions & Decisions of SAT 23 rd and previous meetings.	Expected impact: <input type="checkbox"/> Political / Global <input type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To implement SAT outstanding conclusion and improve ANS provision in the SAT	
When: Continuously	Status: Valid
Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

4.2 Review of the performance of SAT CNS Infrastructure and systems

4.2.1 Under this agenda item, the meeting discussed issues related to missing Flight Plans.

In this regard the meeting was reminded on the outcome of the twentieth SAT meeting, held from 01 to 05 June 2015 in Abidjan, Côte d'Ivoire:

- a) **Conclusion 20/12-Mitigation of missing Flight Plans**, calling upon SAT Administrations/Organizations who have not done so to establish the multidisciplinary local missing Flight Plans investigation groups including airlines and collect the data on missing Flight Plans to be sent to ASECNA for compilation with copy to their neighboring concerned centers and;
- b) **Conclusion 20/13- Sensitization of airlines on missing Flight Plans**, urging SAT ACCs to duly identify airlines involved in missing Flight Plans and inform their representatives and IATA, publish and share their statistics on missing flight plans.

4.2.2 Based on the above, and provided with by ASECNA (**WP 21A**), the meeting noted the effort paid by Portugal in reporting to ASECNA the data related to identification and mitigation of missing Flight Plans for Santa Maria FIR (second quarter 2018) and Lisbon FIR (two last quarter 2018). The meeting also took note of the SAL FIR reporting by mail to ASECNA stating to have no record of missing plan to report.

4.2.3 Furthermore ASECNA presented to the meeting detailed assessment data on missing Flight Plans experienced in its centers on the period from January 2018 to April 2019. Data was classified and categorized by area and by originating center, airlines, wrong addressing, time delay of more than 5 minutes.

4.2.4 The probable identified main causes were shared to the meeting and involve, but not limited to:

- Misunderstanding by users and flight plans operators, of air space organization inside some ASECNA FIRs;
- Omission of AFTN addresses some Air Traffic Service Units managing the concerned flights;
- Failure to respect operation routing procedures and ignorance of recipient addresses;
- Unstable circuits operation;
- Lack of vigilance of certain FPL operators (Human Factors).

4.2.5 Moreover remedial measures undertaken to mitigate missing Flight Plans were identified and positive results noted. These measures consist on by are not limited to:

- Sensitizing information to local staff on routing of FPL procedure;
- Broadcasting by centers concerned with wrong addresses of specific FPL recipient addresses and regular checking of the routing table of each center;
- Collaboration between centers to identify causes of messages transmission delay and implementation of appropriate necessary measures;
- Strengthening cooperation on missing flight Plans data exchange between concerned centers in accordance with SAT/20 Conclusion 20/12;
- Notification of missing FPL to originating center by AFTN message;
- Notification of missing FPL to local airlines representatives in accordance with SAT20 Conclusion 20/13.

4.2.6 The meeting applauded these experiences shared above from ASECNA and Portugal. However, the meeting pointed out the poor reporting by Administrations/Organizations to ASECNA on their data related data for compilation and assessment. SAT ANSPs were invited to reinforce their effort to reduce missing flights by implementing the identified procedures and implementing the adequate remedial actions.

The following conclusion was formulated:

Conclusion 24/17: Conduct and reporting on the assessment and the mitigation of missing Flight Plans	
<p>That;</p> <p>1) SAT ANSPs reinforce their effort to reduce missing flights plan by:</p> <p>a) sensitizing staff on compliance to procedures;</p> <p>b) Improving the work programme of their local multidisciplinary group tasked to assess and mitigate missing Flight Plans;</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Polítical / Global</p> <p><input checked="" type="checkbox"/> Inter-regional</p> <p><input type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Technical/Operational</p>

<p>c) Regularly exchanging data on missing flight plan between centers for investigation;</p> <p>d) Collaborating with concerned centers for identification of causes and improvement of the availability of operational messages;</p> <p>2) In doing so, they should share the results of their investigation on missing flight Plans and the remedial measures undertaken and report quarterly to ASECNA, for coordination, analysis and reporting to SAT.</p>		
<p>Why: To reduce the number of missing Flight Plans and improve the reporting on the work of the multidisciplinary local Group for the assessment and the mitigation of missing Flight Plans</p>		
<p>When: 31 December 2020</p>		<p>Status: Valid</p>
<p>Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs</p>		

4.2.7 The meeting discussed issues related to the performance of SAT CNS Infrastructure and Systems. In this regards GCAA (Ghana) tasked to compile the Performance statistics forwarded by ANSPs presented (**WP21B**) the data compiled by the Accra FIR for the 3rd Quarter period of year 2018. ASECNA updated the meeting on the performance of SAT CNS Infrastructure and Systems in the ATSU of the Dakar FIR namely in the ACCs of Abidjan, Dakar and Nouakchott for the first Quarter of Year 2019. These compilations were developed on the basis of the matrix for the reporting on the performance of CNS Infrastructure and Systems approved by the SAT/23 meeting (Decisions 23/07) are presented in the tables below:

Performance Matrix of SAT CNS Infrastructure and Systems for Accra ACC

State: Ghana ANSP: GCAA Quarter: 3RD Year: 2018 FIR: ACCRA

SYSTEMS		Performance Indicators			REMARKS
		A (%)	MTBF (H)	MTTR (H)	
Communication	VHF	98.89	0(H)	24(H)	Due to planned maintenance
	HF	98.89	0(H)	24(H)	Due to planned maintenance
	AIDC/OLDI	100	0(H)	0(H)	
	CPDLC	100	0(H)	0(H)	
	AFTN/AMHS	100	0(H)	0(H)	
	VCCS	100	0(H)	0(H)	
Surveill Navigation	VOR	97.5	0(H)	10	Due to flight calibration checks
	DME	97.2	0(H)	10	Due to flight calibration checks
	NDB	100	0(H)	0	
	GNSS	n/a	n/a	n/a	n/a
	SSR	100	0(H)	0(H)	
	ADS-C	100	0(H)	0(H)	
	ADS-B	n/a	n/a	n/a	n/a

	MLAT	n/a	n/a	n/a	n/a
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Performance Matrix of SAT CNS Infrastructure and Systems in the Dakar FIR

State: Senegal- Cote d'Ivoire- Mauritania **ANSP:** ASECNA **Quarter:** 1 **Year:**2019_ **DAKAR FIR**

SYSTEMS		Performance Indicators (A%)		
		DAKAR	ABIDJAN	NOUAKCHOTT
Communication	VHF	100	100	100
	HF	99.3	100	100
	AIDC/OLDI	Not Available	100	Not Available
	CPDLC	100	100	100
	AFTN/AMHS	98.5	98.43	98.27
	VCS	100	100	100
Surveillance Navigation	VOR	100	99.8	100
	DME	100	100	100
	NDB	Not Applicable	Not Applicable	Not Applicable
	GNSS	Not Applicable	Not Applicable	Not Applicable
	SSR	100	98.83	100
	ADS-C	100	98,88	100
	ADS-B	100	100	100
	MLAT	Not Applicable	Not Applicable	Not Applicable

4.2.8 The meeting appreciated the work carried out by GCAA and ASECNA and discussed in length of the relevance of the indicators established by SAT/23. It was agreed that the definition of the different terms encompassed in the calculation needed to be clarified and the meeting also noted that most of the ground based facilities may not be used in the SAT operation. The meeting therefore established an ad'hoc working Group tasked to review the list and definition of the measurement parameters and highlight those applicable to the SAT.

4.2.9 The ad'hoc group conducted its assigned task and concluded that the performance matrix should be revised to consider the following:

- Separation of the individual VHF frequencies and calculation of the availability for their individual performance matrix;
- Calculation of the availability of all the HF frequencies that have been published and evaluation of a single average HF availability;
- Development of a distinct model for the assessment of the performance of AIDC, since system efficiency is complex to be assessed;
- Possible use of data obtained from SITA by States/ANSPs

4.2.10 The ad'hoc group agreed and proposed to keep in the same table the opportunity to assess the performance of outline facilities to which the assessment may not be applicable. The meeting endorsed the work carried out by the ad'hoc group and encouraged members to continue reporting quarterly to GCAA, on their CNS Infrastructure and Systems performance for assessment and reporting to SAT.

The following Decision was formulated:

Decision 24/18: Adoption of the revised matrix for the reporting on the performance of CNS Infrastructure and Systems	
That; a) The revised matrix for the reporting on the performance of SAT CNS Infrastructure and Systems is adopted as attached at Appendix K and; b) SAT Members continue to report quarterly to GCAA, on their CNS Infrastructure and Systems performance for assessment and reporting to SAT	Expected impact: <input type="checkbox"/> Polítical / Global <input checked="" type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To monitor the performance of SAT CNS infrastructure	
c) When: SAT 25	Status: Valid
Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

4.2.11 The meeting discussed issues related to Cyber Safety and Resilience of SAT CNS Infrastructure and Systems. In consideration of the status of implementation of SAT/23 **Conclusion 23/10-Cyber Safety and Resilience of SAT CNS Infrastructure and Systems** It was noted the low status of implementation of this conclusion. The meeting also noted institutional issues that could arise from the need to exchange information related to cyber safety that could be considered as sensitive and the necessary confidence between ATSU's prior to ensure interconnectivity and interoperability of automated ATM/CNS infrastructure and systems. In consideration of the new restructuring of the SAT and its contributory bodies that will dissolve the CNMC, the meeting agreed to establish an ad'hoc Group tasked to identify actions to be carried out within the SAT CNS Working Group at the aim to assessing guidelines, policies and best practices to be shared by SAT ANSPs on cyber protection and make proposals for harmonization of mitigating actions against Cyber risks.

The following Decision was formulated:

Conclusion 24/19: Ad'hoc Group for Cyber Safety and Resilience of SAT CNS Infrastructure and Systems	
That; a) An ad'hoc group comprising at least one representative of SAT ANSPs is established to identify the tasks to be carried out within the SAT CNS Working Group to address issues on Cyber Safety and Resilience of SAT CNS Infrastructure and Systems; b) Under the leadership of France, the ad'hoc group will assess guidelines, policies and best practices shared by ANSPs on cyber protection and make proposals for harmonization of mitigating actions against Cyber risks.	Expected impact: <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To identify, assess and mitigate Cyber threats	
When: SAT 25	Status: Valid
Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

4.3 Improvement of CNS system in the SAT Region (AMHS, AIDC, ADS-B)

4.3.1 Under this agenda item the meeting reviewed regional and interregional initiatives conducted or being conducted by SAT members for the improvement of CNS system in the SAT Region. The Secretariat provided to the meeting (**WP22**), a summary of bilateral and multilateral arrangements initiated with the aim to improve SAT CNS systems.

AFI North West Area Technical Group (ANWA TG) initiative

4.3.2 ISAT/24 was informed that in the framework of inter-regional cooperation for the improvement of Communications, Navigation, Surveillance and Air Traffic Management (CNS/ATM) infrastructure and systems in the AFI North West Area (**ANWA**), ENAIRE, arranged a call conference on 21st January 2019 with ASECNA and ICAO WACAF Office, Secretariat of the SAT. The call conference meeting identified the following initial areas for improvements:

- **Aeronautical Mobile Service:** Sharing, amongst ACCs, of locations of extended VHF Air/Ground radio communications stations frequencies aimed at enhancing aeronautical mobile service
- **Aeronautical Fixed Service:**
 - ✓ Implementation of modern ATS Ground Voice Network (AGVN) protocols and evolution to Voice over IP (**VoIP**).
 - ✓ Evolution of information transport backbone networks (AFISNET, CAFSAT) supporting IP services.
 - ✓ Interconnection of IP networks & systems.
 - ✓ Implementation of AIDC/OLDI services for ATS coordination.
 - ✓ Implementation of AMHS services as a migration from AFTN.

- **Surveillance data sharing**

4.3.3 The call conference agreed on the proposal by ENAIRE to create a Technical Working Group (TWG) to improve CNS (Communications, Navigation, and Surveillance) in the “AFI North West Area” (ANWA) including the air spaces of Canary FIR, SAL (Cabo Verde) FIR, and Dakar FIRs (Mauritania & Senegal). This ANWA TWG will be managed in the framework of the SAT Group activities under the ICAO umbrella and therefore, the ICAO WACAF Office was tasked to liaise with Cabo Verde to join this ANWA TECH WG. Unfortunately, all attempts of liaison with the known contact details in Cabo Verde were unsuccessful.

4.3.4 Further actions were identified such as future teleconferences, face-to-face meetings to identify and discuss concrete projects to cover the identified areas of improvements, reporting on this initiative to the Atlantic Coordination meeting held in Paris on 31st January 2019 and to this SAT/24 meeting.

AIDC Interconnection between Abidjan and Accra ACCs

4.3.5 The meeting was informed that the need of AIDC operation between Abidjan and Accra ATCs was made recently effective thanks to the cooperation between the two ANSPs who succeed in interconnecting recently the two ATM systems. Identified by a coordination meeting under the auspices of ICAO, held in Lomé, Togo from 2 to 4 May 2016 between ASECNA, GCAA (Ghana), NAMA (Nigeria), the Roberts FIR, the successful implementation of AIDC this service between Abidjan and Accra ATCUs will improve coordination and the lessons learnt from this exercise will enable a more efficient organization of similar interconnection in the future.

AMHS/AIDC Interconnection between Dakar and Recife ATCs

4.3.6 The meeting was reminded that this interconnection was identified years ago and although the SAT CNS WG held many teleconferences on 2016 and 2017, the interconnection was not possible due to a delay in finalizing the installation in the Dakar center. During the Atlantic Coordination meeting in Paris (31st January 2019) a side meeting between ASECNA and the ICAO Regional Offices of Dakar and Lima planned to go ahead with effective implementation and the exercise is ongoing.

The Secretariat presented a PowerPoint slide clarifying the Internet addresses to be used in order to finalize implementation, proceed with safety assessment prior to operation.

IATA initiative for AMHS/AIDC Interconnection between Casablanca and Nouakchott ACCs

4.3.7 The meeting was also informed that during the Workshop on Aviation Infrastructure Gap Analysis for Africa held in Abuja, Nigeria from 19 to 21 March 2019, a side meeting between the ICAO WACAF Office and the IATA Manager Safety and Flight Operations-ATM Infrastructure for West and Central Africa was held to discuss on the way for ICAO to facilitate the AIDC interconnection between Casablanca and the Nouakchott ACCs.

IATA reported to have initiated discussion with both sides and wishes the SAT Secretariat to facilitate the planning and implementation of the project. A formal request from IATA was sent on Friday preceding this SAT meeting in order to liaise with stakeholders and resume the process. Future actions will be planned and conducted for a successful implementation

4.3.8 The meeting appreciated these initiatives and encouraged concerned ANSPs to pursue implementation and requested the Secretariat to continue supporting the forthcoming activities through coordination and provision of guidelines.

The following conclusion was formulated:

Conclusion 24/20: Bilateral and multilateral initiatives for the implementation of SAT CNS infrastructure and systems	
That; a) Concerned ANSPs and stakeholders on the ongoing bilateral and multilateral cooperative initiatives* be reinforced for the implementation of SAT CNS infrastructure and systems; b) SAT Secretariat continue with the support of concerned ICAO Regional Offices to support the forthcoming activities for the effective implementation of the infrastructure and systems and report to SAT	Expected impact: <input type="checkbox"/> Polítical / Global <input checked="" type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To harmonize and expedite CNS Infrastructure and systems implementation	
When: Continuously	Status: Valid
Who: <input checked="" type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs * AFI North West Area (ANWA) Technical Group initiative; AMHS/AIDC Interconnection between Dakar and Recife ATCs; IATA initiative for AMHS/AIDC Interconnection between Casablanca and Nouakchott ACCs	

4.4 Interconnection and interoperability of CNS/ATM systems

4.4.1 Under this agenda item the meeting recognized that although SAT/23 meeting clearly identified necessary AMHS and AIDC circuits and tentative dates for their full implementation, it appeared that the percentage of effective implementation is low. It was recommendable to identify the hurdles encountered by ANSPs in order to clear them out and effectively implement the identified circuits.

4.4.2 The meeting noted that there was lack of formal bilateral/multilateral agreements comprising, technical documents, interconnection protocols and procedures in the conduct of interconnection. It was requested to ICAO concerned Regional Offices to provide guidance materials including regulatory framework, operational procedures and technical interface guidelines in order to formalize and facilitate SAT CNS AMHS and AIDC interconnection

The following conclusion was formulated:

Conclusion 24/21: Formalization of AMHS and AIDC interconnection	
<p>That;</p> <p>a) Concerned ANSPs with the assistance of their supplier develop bilateral agreements comprising protocols and procedures in order to formalize and facilitate SAT CNS AMHS and AIDC interconnection;</p> <p>b) Concerned ICAO Regional Offices provide guidance materials including regulatory framework, operational procedures and technical interface guidelines.</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input checked="" type="checkbox"/> Inter-regional</p> <p><input type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Technical/Operational</p>
Why: To ensure an ordered interconnection process for AMHS and AIDC	
When: 31/12/2019	Status: Valid
Who: <input type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

4.4.3 The meeting identified weaknesses related to capacity building for the implementation and operation of AIDC as result of the absence of Training Programmes and Training Plans developed the effective conduct of which should increase the competence of SAT ANSPs personnel (ATCOs and ATSEPs).

In this regard the meeting tasked ASECNA and GCAA to identify, with the assistance of the Secretariat, exhaustive training needs in AIDC for SAT concerned personnel and requested the conduct in the AFI SAT concerned Region of a regional workshop on AIDC with the support of the industry.

The following conclusion was formulated:

Conclusion 24/22: Training, implementation, operation and monitoring of AIDC	
<p>That, taking advantage of the lessons learnt in recent interconnection exercise:</p> <p>a) ASECNA and GCAA, with the assistance of SAT Secretariat, identify exhaustive AIDC training needs for SAT technical and operational personnel;</p> <p>b) A regional workshop on AIDC be conducted in the AFI SAT concerned region with the support of the industry before end of year 2019 in order to provide concerned technical and operational personnel with awareness on AIDC implementation and operation</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Political / Global</p> <p><input checked="" type="checkbox"/> Inter-regional</p> <p><input checked="" type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Technical/Operational</p>

Why: To facilitate the implementation of AIDC	
When: 31/12/2019	Status: Valid
Who: <input type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

4.4.4 Under this Agenda item the meeting was provided with the updated compilation of the Tables on the follow up of the implementation of AMHS and AIDC. The participants were invited to organize consultations in order to find consensual realistic deadlines for the identified AMHS and AIDC circuits. Based on ANPs latest inputs the Secretariat revised the tables as attached at **Appendix L** and **Appendix M**.

The following conclusion was formulated:

Conclusion 24/23: Effective implementation of AMHS and AIDC between SAT ATCs	
That; Concerned SAT ACCs conduct the appropriate actions to effectively implement the AFS (AMHS & AIDC) interconnections as identified in the revised table attached at Appendix L& M	Expected impact: <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input checked="" type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: To ensure effective implementation and operation of AMHS and AIDC	
When: 2018-2020	Status: Valid
Who: <input type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

4.5 Terms of Reference, Work Programme and Composition of the SAT CNS Working Group (CNS/WG)

4.5.1 This agenda item was not discussed since Terms of Reference, Work Programme and Composition of the SAT CNS Working Group were to be included in the Draft SAT Handbook and discussed under SAT/24 Agenda Item 6.

4.6 Any other CNS business

4.6.1 Under this Agenda item the meeting was informed by the Secretariat on Council request of proposal for the formalization of the SAT and on the structural evolution of the SAT that will be presented to the plenary.

Agenda Item 5:

ATM and CNS Issues

5.1 Endorsement of the conclusions/decisions of the fourteenth meeting of the SAT/ FANS 1/A Interoperability Team (SAT/FIT/14).

5.1.1 The meeting decided not to make any new conclusions and decision, and only record the summary of discussions. The outstanding decisions, conclusions and programmes were reviewed under the agenda items and were transferred to the SAT Air Traffic Management (ATM) Working Group (WG) for consideration as part of its work programme.

5.2 Endorsement of the Conclusions/Decisions of CNMC/9 meeting

5.2.1 Under this agenda item the meeting reviewed the outcome of the ninth meeting of the CAFSAT Network Management committee (CNMC/9) comprising. The CNMC /9 meeting deliberated on nine (09) agenda items through the review of Working and Information Papers.

5.2.2 Based on these deliberations, the Secretariat developed five (05) Conclusions and four (04) Decisions that were endorsed by the CNS Working Group and adopted by the SAT plenary. These Conclusions and Decisions are presented in **Appendix N** to this working paper.

The following conclusion was formulated:

Decision 24/24: Adoption of the Conclusions/Decisions of the 9th meeting of the CAFSAT Network Management Committee (CNMC/9)	
That; The Conclusions/Decisions of the 9th meeting of the CAFSAT Network Management Committee (CNMC/9) are adopted as attached in Appendix N	Expected impact: <input type="checkbox"/> Political / Global <input checked="" type="checkbox"/> Inter-regional <input type="checkbox"/> Economic <input type="checkbox"/> Environmental <input checked="" type="checkbox"/> Technical/Operational
Why: Adoption of conclusions of CNMC/9	
When: SAT/23	Status: Valid
Who: <input type="checkbox"/> Coordinators <input checked="" type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input checked="" type="checkbox"/> Others: ANSPs	

Agenda Item 6: SAT Handbook (SAT Terms of Reference, SAT Working Methodology & Arrangements, Rules of procedures of SAT meetings, SAT Contributory Bodies, Composition of the Group, Reporting) and Future Work programme of the SAT Group

6.1 Under this Agenda item the meeting discussed the future evolution of the SAT. ENAIRE presented to the meeting (**WP25**), provision re-examining the working structure and arrangements of the SAT Group and its associated SAT/FIT and CNMC bodies and formulating the following proposals in order to provide efficient arrangements and achieve the overall objective of the SAT Group, being, improvements in the provision of air traffic services over the South Atlantic:

- a) Inclusion of SAT/ FIT and CNMC issues in SAT ATM WG and SAT CNS WG agendas;
- b) Amendment and restructuration of SAT working arrangements, agendas and meeting dates, such that future meetings of SAT/FIT and CNMC are included in the SAT Group agenda items and working arrangements.

6.2 The Secretariat presented to the meeting (**WP30**) the summary of actions taken by the Council to review a consolidated annual report on Planning and Implementation Regional Groups (PIRGs) and Regional Aviation Safety Groups (RASGs), covering the period from April 2018 to March 2019 including a proposal by the Air Navigation Commission (ANC) to establish performance requirements for the Atlantic Group (SAT/NAT) to improve coordination between the SAT and NAT.

6.3 The meeting was reminded that the SAT area has an impact on the North Atlantic (NAT), Africa Indian Ocean (AFI), Caribbean (CAR) and South American (SAM) regions thus requiring coordination and harmonization of operations.

6.4 The meeting was also informed that the ANC recommended to ICAO Council that options be identified to formalize the SAT Group. The Commission did not specify on how to formalize the group. However, the Secretariat was requested to develop and present options for consideration by the ANC and Council. Accordingly, the SAT/24 Meeting was invited to identify possible ways to further formalize the SAT to improve coordination with the NAT.

6.5 In view of the above, the meeting discussed the way to improve efficiency in collaboration between the NAT and the SAT. In this regard, and in order to initiate the restructuring and formalization of SAT and its auxiliary bodies, the Secretariat submitted to the meeting (**WP26**) a Draft SAT Handbook comprising SAT Terms of Reference, SAT Working Methodology & Arrangements, Rules of procedures of SAT meetings, SAT Contributory Bodies, Composition of the Group, Reporting) and Future Work programme of the SAT Group for discussion and endorsement.

6.6 In order to assist members in making a decision on the proposals, the meeting was provided with the background of the SAT Group (establishment, functions and reporting lines...) and its auxiliary bodies including reference by AFI Regional Air Navigation meetings:

a) The Limited Africa/Indian Ocean (COM/MET/RAC) Regional Air Navigation Meeting (LIM/AFI, Lomé, Togo 12-27 April 1988), **Recommendation 3/13- Amendment of the AFI and SAM Regional Supplementary Procedures**- proposing amendment of the AFI and SAM regional Supplementary Procedures (**Doc 7034/4 Part I-Rules of the Air, Air Traffic Services and Search and Rescue**) to reduce the minimum of separation from 20 to 15 minutes using the Mach number technique in Canarias, Dakar Oceanic, Recife and Sal Oceanic FIRs;

b) LIM/AFI **Conclusion 3/14-SAT Co-ordination Meeting**- calling for the holding, under the auspices of ICAO, of co-ordination meetings of concerned States, international organization, and representatives from Administrations of Communication Service Providers in order to ensure a smooth transition to the application of reduced separation using the Mach number technique;

c) LIM/AFI **Conclusion 3/15-Continued improvement of Air Traffic Service overs the South Atlantic** that reads as follow reading that when necessary, informal meetings be convened under the auspices of ICAO with the States and international organizations concerned to examine any possible improvement of air traffic service over the south Atlantic;

d) The Seventh Africa/Indian Ocean Regional Air Navigation (RAN) Meeting (AFI RAN/7, Abuja, Nigeria, 12-23 Mai 1997 **Recommendation 5/11- Improvement of Air Traffic Service over the South Atlantic** stating that:

a) In order to ensure a continue development of air navigation system in the South Atlantic parties of the AFI and SAM Regions, the concerned States and interested international organization should meet under the auspices of ICAO at least once a year to:

- 1) study, monitor and asses the air navigation system in light of the evolution of traffic characteristics and technology;
- 2) coordinate the implementation of improvements in the air navigation system, including new CNS/ATM systems;
- 3) develop as required, proposals for amendment of air navigation plan and regional supplementary procedures

b) The AFI –Indian Ocean Planning and Implementation Regional Group(APIRG) and all user states should be kept informed of new developments.

6.7 The meeting recognized that the SAT Group has been working successfully with tangible achievements which contributed to the enhancement of air navigation safety capacity and efficiency over the South Atlantic (RVSM, reduced minima of separation, AORRA, Harmonized implementation of FANS/1....).

6.8 However, the meeting agreed that due to the continuous growth and complexity of air traffic over the SAT, and the need to harmonize operations with the North Atlantic Group, the current SAT structure needed to be reviewed with the view to mitigate the unclear definition of scope and limits of SAT activities resulting in duplication between contributory bodies and the Working Groups, and the lack of formalized cooperation with the neighboring regions, especially with the NAT

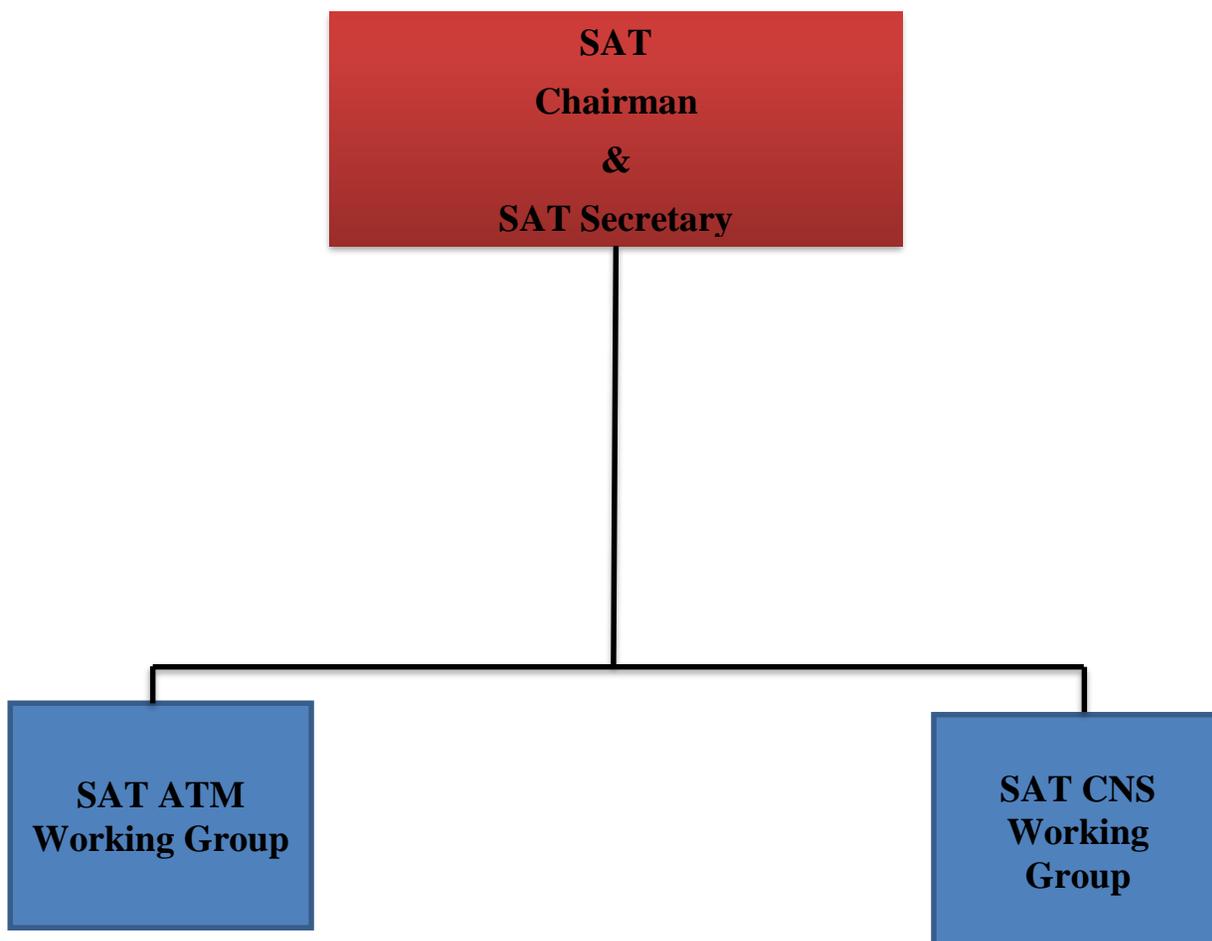
6.9 The meeting was therefore provided with a Draft SAT Handbook to formalize the organization, composition, work programme and working methodology of the SAT to provide more flexibility and efficiency in its work.

The new structure comprising of the main SAT organization with two (2) Working Groups (ATM/WG & CNS/WG) is based on the following changes:

- Merging of part of SAT/FIT items addressing operational and IAS/SGG issues in the new ATM/Working Group;
- Merging of part of the SAT/FIT and addressing infrastructure and systems (CNS) and the CNMC in the CNS/WG;
- Clear identification of operational requirements and targets by the ATM/WG and eligible technology to be planned and implemented by the CNS/WG; and
- Flexibility for every Working Group to establish an ad'hoc Group or Implementation Team.

6.10 The new chart is proposed as follows:

NEW SAT ORGANIZATIONAL CHART - 2019



The meeting applauded the provision of the Handbook.

6.11 However, IATA, Brazil and the FAA made alternate proposals consisting on establishing the

following auxiliary bodies to govern and conduct the SAT Future Work:

- A Group tasked for Implementation and;
- A Group tasked for Safety Oversight.

6.12 The attention of the meeting was drawn on the States responsibilities on Aviation **Safety Oversight** while at ANS implementation level, the conduct of **Safety Assessment** prior to implementation is a standardized requirement. It was therefore agreed to include in the mandate of the ATM and CNS Working Groups as well as any other SAT contributory study or ad'hoc group, the need to conduct safety assessment prior to any implementation that may bring important changes with impact on safety.

6.12 The Draft SAT Handbook is attached at **Appendix O**.

In view of the discussion the following Conclusions were formulated:

Conclusion 24/25: Endorsement of SAT Draft Handbook	
<p>That;</p> <p>a) The SAT Procedural Handbook comprising its Terms of Reference, Working Methodology & Arrangements, Rules of procedures of SAT meetings, SAT Contributory Bodies, Composition, Reporting) and Future Work programme of the SAT Group is endorsed;</p> <p>b) The Secretariat consider and include in the mandate of the Contributory Bodies, the Safety Assessment function of SAT Working Groups and report to APIRG</p>	<p>Expected impact:</p> <p><input type="checkbox"/> Polítical / Global</p> <p><input checked="" type="checkbox"/> Inter-regional</p> <p><input type="checkbox"/> Economic</p> <p><input type="checkbox"/> Environmental</p> <p><input checked="" type="checkbox"/> Technical/Operational</p>
Why: Restructuration and formalization of SAT	
When: SAT/23	Status: Valid
Who: <input type="checkbox"/> Coordinators <input type="checkbox"/> States <input checked="" type="checkbox"/> ICAO Secretariat <input type="checkbox"/> ICAO HQ <input type="checkbox"/> Others: ANSPs	

Agenda Item 7:

Any other business

7.1 Under this agenda item the meeting was informed of the commitment of Trinidad and Tobago CAA to host the SAT/25 meeting in 2020, pending a good pace of attendance by members.

7.2 The meeting applauded this offer from Trinidad and Tobago and tasked the Secretariat to coordinate with the State in order to provide relevant details including venue, dates, etc. for the next SAT meeting.

Agenda Item 8:**Adoption of the Conclusions/Decisions of the SAT/24 meeting (Plenary)**

8.1 Under this Agenda item the meeting adopted the conclusions and decisions emanating from the debates on its Agenda item.

8.2 The meeting reminded the Sub Groups Chairpersons and Leaders of specialized groups to enhance the coordination and follow up implementation of SAT conclusions and Decisions.

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