First Meeting of the Steering Group of the Improvement of Air traffic Services over the South Atlantic (SAT-SG/01)

(*Virtual, 4 December 2023)*

Agenda Item 3 : Update on developments in the SAT area

State Report Dakar FIR
(*Presented by ASECNA)*

SUMMARY
This paper presents traffic figures, the latest updates and developments in Dakar Oceanic FIR.

REFERENCES
SAT Procedural Handbook
ACM-S meeting SoD
SAT IMG/01 SoD

1. Introduction

1.1 This report is being provided to assist in the planning of the SAT/IMG region and to gain a comprehensive understanding of the various requirements within the region.

1.2 The report encompasses not only statistical data on traffic movements and performance projections for the Dakar Oceanic FIR, but also provides updates on planned changes to the ATM/CNS infrastructure, including the percentage of aircraft equipage within Dakar Oceanic FIR.

2 Discussion

2.1 The tables and diagrams below provide an overview of traffic performance during the reporting period, illustrating the recovery of demand following the Covid-19 pandemic:

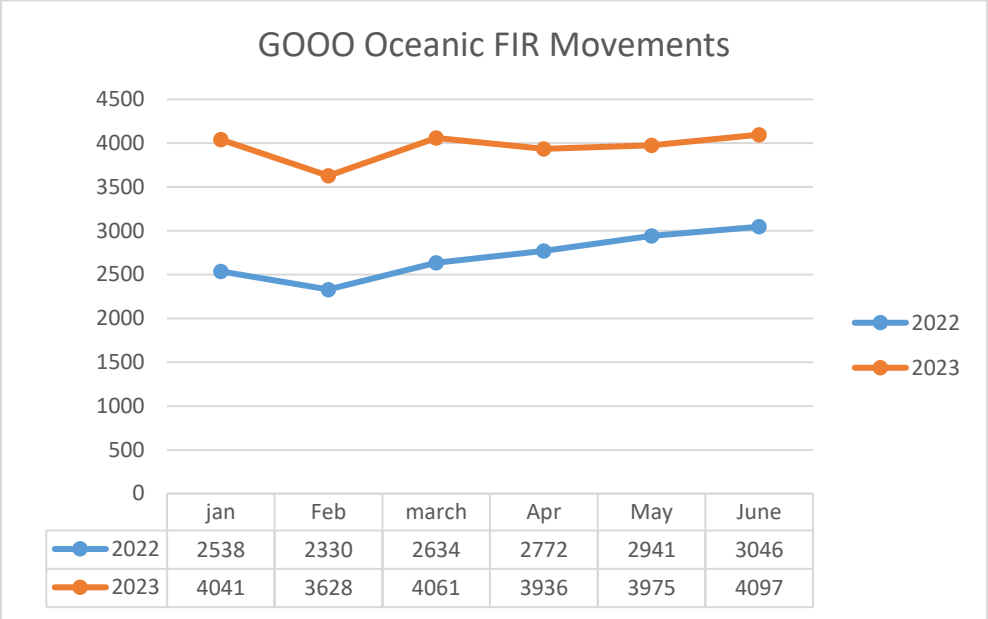

Fig A: *Traffic performance*

ATS Routes	Months						Number of Flights	Percentage
	jan-23	Feb-23	Mar-23	Apr-23	May-23	June-23		
UN873	1391	1117	1518	1518	1304	1475	8323	**35, 1%**
UN857	550	398	472	400	384	460	2664	**11,2%**
UN866	526	535	487	462	602	571	3183	**13,4%**
UN741	400	516	273	429	460	309	2387	**10,1%**
Random	1174	1062	1311	1127	1225	1282	7181	**30,2%**
Total Flights	**4041**	**3628**	**4061**	**3936**	**3975**	**4097**	**23738**	100%

Fig B: *Traffic Distribution*

Airspace Organization and Management

2.2 Dakar Oceanic FIR is a mixed airspace composed of:

- Unidirectional RNAV routes (UN741 and UN866) and bidirectional route (UN873 and UN857) in the EUR/SAM Corridor.
- Atlantic Ocean Random Routing Area (AORRA)

A longitudinal separation of ten (10) minutes, using the Mach Number Technique, is applied within the airspace.

Fleet Capability Assessment

2.3 Traffic statistics are crucial for studying, monitoring, and evaluating air navigation. operations. They provide essential information for the orderly, continuous, safe, and efficient development of air navigation services within the airspace. In line with the SAT (South Atlantic) terms of reference, the SAT IMG (Implementation Management Group) needs to assess the current capabilities of the Communications, Navigation, and Surveillance (CNS) fleet. This assessment will serve as a basis for deployment planning.

and monitoring.

2.4 This assessment is carried out by collecting Flight Plan (FPL) information through the Air Traffic Management (ATM) system.

2.5 Data collected from 23,738 flights in Dakar Oceanic FIR from January to June 2023 was analyzed:

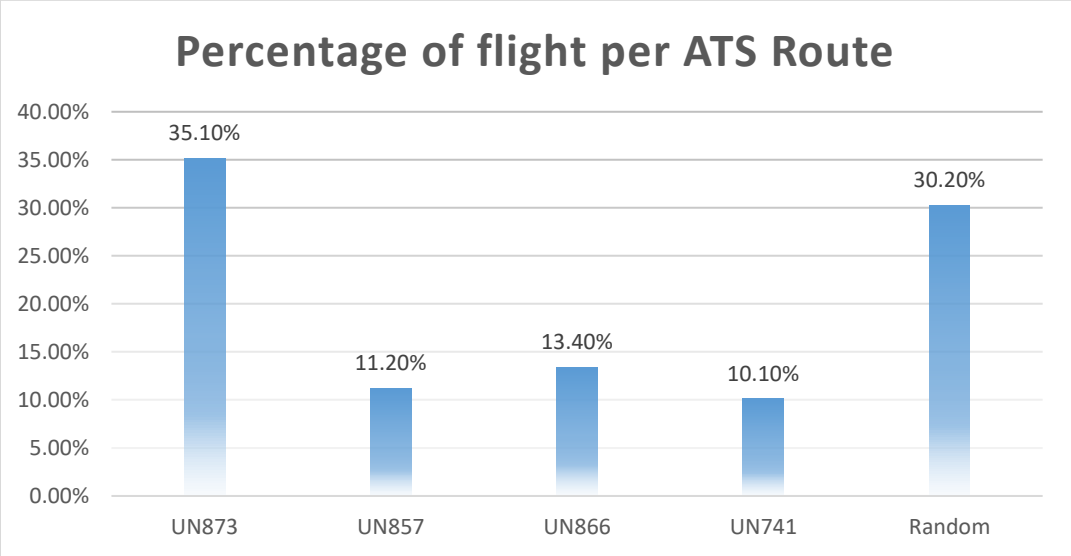

Fig C: *Percentage of flight per ATS Route*

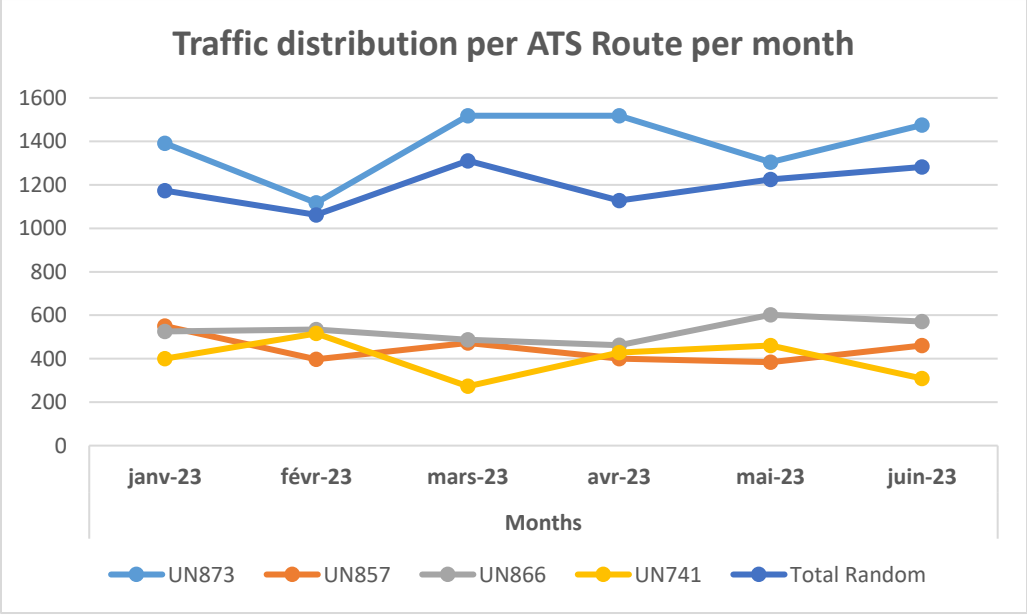

Fig D: *Number of flights per ATS Route*

Flight Level Occupancy

2.6 According to the ICAO SAT 23 Summary of Discussion, ***the most requested flight levels***

in Dakar Oceanic was FL 370. However, 25% of flights were cleared to or below FL340.

2.7 In order to verify these claims, a study conducted from **January to March 2023** indicates that the satisfaction rate for climb requests in the Dakar Oceanic FIR is **98.90%.** This study is based on the extraction of data from the CPDLC message database.

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2023-01-01  03:04:27 : New uplink for AZU8750 message : CLIMB TO 390
2023-01-01  03:06:10 : Downlink received for AZU8750 message : WILCO

2023-01-01  03:10:27 : New uplink for DAL55 message : CLIMB TO 360. REPORT LEVEL 360
2023-01-01  03:10:54 : Downlink received for DAL55 message : WILCO

2023-01-01  03:42:32 : New uplink for ITY674 message : CLIMB TO 400. REPORT LEVEL 400
2023-01-01  03:43:05 : Downlink received for ITY674 message : WILCO
```

Fig F: *CPDLC message database extraction*

2.8 Data collected from 23,738 flights operating in the Dakar airspace from January to June 2023 was analyzed. The analysis focused on the aircraft's ADS-B, CPDLC, RSP180, RCP240, and RNP4 capabilities.

The study results are displayed in the table below:

Period	**January - March 2023**
Total Aircraft	**586**
Total flight	**5492**
Capabilities	**% Flight**
ADS-B	**91 %**
CPDLC	**97 %**
RNP4	**83 %**
RCP240	**61 %**
RSP180	**60 %**

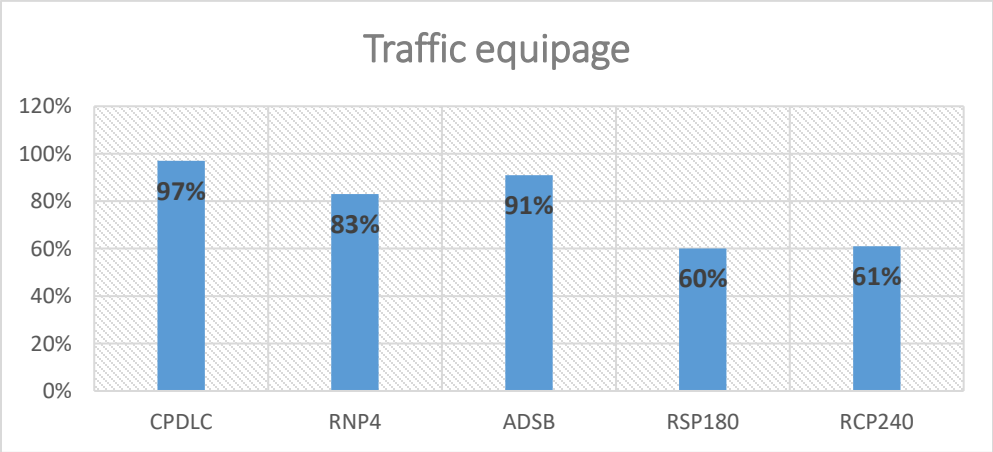

Fig H: *Fleet Capability*

latest updates and developments in Dakar oceanic FIR

2.9 The table below presents the status of implementation of CNS/ATM concepts in the Dakar Oceanic airspace:

❖

CNS/ATM Concepts	latest updates
AIDC	**Abidjan/Accra** ❖ Abidjan ACC successfully implemented AIDC with Accra ACC in July 2019. **Abidjan/Dakar** ❖ Dakar ACC successfully implemented AIDC with Abidjan ACC in November 2021. **Atlántico/Dakar** ❖ Dakar ACC and Atlántico ACC transition to AIDC coordination on **November 1st, 2023**. However, due to a certain issue, vocal coordination remains in effect until the problem is resolved. **SAL/Dakar** ❖ A mission from Dakar center is scheduled from November 27 to December 1, 2023, in SAL, to define a common roadmap for the implementation of AIDC. Implementation is expected in the first half of 2024. **CAYENNE/Dakar:** ❖ A mission from the Dakar center is scheduled in 2024 in Cayenne to define a common roadmap for the implementation of AIDC.
PBCS	Following the ***SAT IMG Decision 01/03N***, a survey on PBCS implementation in the Dakar FIR was conducted in 2023 to assess readiness for PBCS implementation. The results are presented in Table C. **RCP240** and **RSP180** monitoring tests carried out in the Dakar FIR from January to March 2023. See the table below. A local monitoring strategy is currently under development. In the meantime, a regional strategy is expected from the SAT Group.
Space-based ADS-B	The space-based ADS-B is operationally implemented in Dakar Oceanic FIR since 19 May 2022 after the experimental phase launched in 2020. ADS-B monitoring is underway at the Dakar ATS Center for a future implementation of Advanced Surveillance-Enhanced Procedural Separation (ASEPS) using Space-based ADS-B.

Table A summarizes CPDLC Actual Communications Performance for messages sent within Dakar FIR

Dakar FIR CPDLC ACP per Month				
Month (2023)	**CPDLC transactions Count**	**95% RCP 240 benchmarking % < 180 sec**	**99,9% RCP 240 benchmarking %< 210 sec**	**Remarks**
Fleet Performance				
January	2527	99,85	99,88	
February	3402	99,66	99,77	
March	3439	99,72	99,87	

Table A: ***CPDLC MESSAGES LATENCY***

Table B summarizes ADS-C Downlink Latency measurements per month for messages sent within Dakar FIR

Dakar FIR ADS-C Downlink Latency				
Month (2023)	**Messages Count**	**95% RSP180 benchmarking % <90 sec**	**95% RSP180 benchmarking %< 180 sec**	**Remarks**
Fleet Performance				
January	4446	98,94	99,54	
February	6596	98,91	99,92	
March	6750	99,19	99,74	

Table B: ***DOWNLINK ADS MESSAGES LATENCY***

Table C summarizes the results of PBCS survey in the Dakar FIR :

				Y/N	If NO, Planned Date	Comments
1. Has your State completed any of the following preparations for PBCS implementation?						
	Task Group	**Task ID**	**TASK descriptor**			
	Group A	A-1	AIP (Prescription of an RCP/RSP specification. Also see B-3 below)	N	2024	
		A-2	PBCS policies, objectives supporting safety oversight of ANSP PBCS operations	N	2025	
		A-3	PBCS policies, objectives supporting safety oversight of Aircraft Operator and Aircraft System PBCS operations	N	2025	
		A-4	Proposal for Amendment to ICAO Doc 7030 - *Regional Supplementary Procedures* for PBCS operations, if applicable	N		
	Group B	B-1	PBCS Implementation Plan	N		To be developed by SAT IMG
		B-2	Target dates for PBCS and relevant ATM operations	N		To be developed by SAT IMG
		B-3	RCP/RSP specifications	N	2024	APIRG22 Conclusion 22/13: Adoption of RCP 240 and RSP 180 for PBCS operations in AFI Region Not yet included in our Regulations
		B-4	PBCS awareness	N	2024	A workshop was conducted in Senegal by FAA & ICAO. But, a planning team to work with ICAO and subject matter experts to develop relevant material has not been established.

	Group C	C-1	Operational concepts and procedures for PBCS operations	N		To be developed by SAT IMG
		C-2	ATM automation system changes to use flight plan RCP/RSP indicators	N		
		C-3	ATM automation changes for PBCS monitoring	N/Y		A semi-automatic monitoring tool has been developed
		C-4	Confirm initial ANSP compliance with RCP/RSP specifications	Y		RSP and RCP Trials performed in Dakar FIR from March 1 to 30, 2020
	Group D	D-1	Aircraft operator readiness	N		Liaison with Air Senegal and ASECNA's flight calibration unit required
		D-2	Confirm initial operator and/or aircraft type/system compliance with RCP/RSP	N		ASECNA's flight calibration aircraft and Air Senegal's A330 are compliant
	Group E	E-1	PBCS monitoring, analysis and reporting - post implementation	N		PBCS not yet implemented

Table C: PBCS implementation survey results in the Dakar FIR.

3. Action Required

3.1 The meeting is invited to:

a) note the information provided.

b) provide direction as deemed necessary; and

c) discuss any relevant matters as appropriate.

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