



**EIGHTEENTH MEETING ON THE IMPROVEMENT OF AIR TRAFFIC SERVICES
OVER THE SOUTH ATLANTIC (SAT18)
(Dakar, Senegal, 17 to 19 July, 2013)**

**Agenda Item 4: Communications, navigation and surveillance / Air traffic management
(CNS/ATM) Systems**

4.2 RNP-4 IN THE EUR/SAM CORRIDOR

(Presented by SATMA)

SUMMARY

The main aim of this working paper is to present a tentative roadmap to implement **RNP 4 in the EUR/SAM corridor**.

1. INTRODUCTION

The main aim of this working paper is to present a tentative roadmap to implement **RNP 4 in the EUR/SAM corridor**, in close coordination with NAT region.

Currently, RNP 10 supports 50NM lateral and 80NM (or 10 minutes) longitudinal separation and RNP 4 implementation would allow 30NM lateral and 30NM longitudinal separation.

2. BACKGROUND

It is well known that RNP 4 implementation is a target of the working programme of IAS/SG. In this line, during last SAT meetings there have been several working papers, references and decisions related to the implementation of RNP 4 in the EUR/SAM Corridor:

- SAT14/TF1/Decision 11 (2009-Cape Verde): That EUR/SAM Corridor States and ANSPs agree on the need of RNP 4(30/30NM) implementation strategy;
- SAT15/FIT5/Decision 3 (2010-Lisbon):That IATA and ACC units encourage Airlines to increase their level of participation in ADS-C/CPDLC operations in order to enhance safety and efficiency of operations within the SAT and specially within the EUR/SAM corridor;
- Based on previous discussion, it was decided by SAT States to develop a task in accordance with the following terms (Decision SAT 16/06 -Brazil):
 - *It is agreed by all EUR SAM States that consolidation of FANSI/A aircraft facilities, prior to RNP 4 fleet certifications, should be a prerequisite for the implementation of RNP 4 in the area.*
 - *SATMA will contact States and IATA to compile data and information required to achieve a cost/benefit study based on the following hypothesis:*

- a) Results in terms of time and average of FANSI/A equipped & RNP 4 certified aircraft on traffic growth expected;
- b) Impact of “FL, Route or Airspace” restrictions for low average of FANSI/A equipped & RNP 4 certified aircraft;
- c) Increase average of optimal levels per period /peak time set;
- d) ATC/Pilots Work load impact;

The cost/benefit analysis will be submitted to SAT Group for further actions”.

- SAT17/Conclusion 11, in order to achieve the implementation of RNP 4, SAT States concluded that:
 - SATMA and SAT States initiate study for a mandatory target date for aircraft FANS equipage on the routes in the corridor in close coordination with NAT region;
 - IATA will assist with the data.

3. NAT REGION PLAN RELATED TO RNP 4

The objective of NAT plan is to enhance communications and surveillance capabilities in NAT operations and thereby, enhance operational safety in the NAT by increasing the number and percentage of NAT flights conducted by aircraft using FANS 1/A (or equivalent) CPDLC and ADS-C.

All aircraft operating in the NAT PBN airspace shall have an operational approval based on the RNAV 10 (RNP 10) or RNP 4 navigation specification requirements. Therefore, there is not a target to implement an RNP 4 Area in NAT Region.

The ongoing main plans already defined in NAT Region are the following:

➤ MNPS to PBN Transition Plan

No.	Timeline	Milestone
1	2013	An aircraft that is approved (certified) for RNAV10 (RNP10) and/or RNP4 can be issued an MNPS operational authorization without further examination of the navigation specification component. The indicator X will still be required in item 10 of the ICAO FPL.
2	2015	For new MNPS operational approvals, discontinue the use of MNPS navigation specification (6.3 NM standard deviation). New MNPS operational approvals will be based on RNAV10 (RNP10) or RNP4 navigation specifications. Existing aircraft having MNPS approvals based on the 6.3 NM standard deviation will be allowed to continue operating in the NAT MNPS airspace.
3	2015	Modify the definition of the NAT airspace such that the NAT MNPS airspace will be replaced with the NAT PBN airspace. The NAT PBN airspace will be defined in such a way that MNPS, RNAV10 and RNP4 aircraft are deemed to satisfy the prescribed NAT PBN airspace operation requirements.
4	2020	All aircraft operating in the NAT PBN airspace shall have an operational approval based on the RNAV10 (RNP10) or RNP4 navigation specification requirements Aircraft having MNPS approvals based on the 6.3 NM standard deviation will not be allowed anymore.
5	TBD	Allow applying 50NM lateral separation between a mix of MNPS, RNAV10 and RNP4 approved aircraft on intersecting and non-intersecting tracks in the NAT MNPS airspace.

➤ **NAT Region Data Link Mandate**

The NAT data link mandate will be implemented incrementally, via two phases.

- The first phase will start on **7th February 2013**, with all aircrafts operating on or at any point along two specified tracks within the NAT organized track system (OTS) between FL360 to FL390 inclusive, being required to be fitted with and using CPDLC and ADS-C equipment.
- From **5th February 2015**, the specified tracks will be those for which the predicted load is in the higher percentage of overall predicted NAT OTS loading on that day, and shall be identified in the Remarks section of the NAT Organized Track message. Non compliant aircraft will not be permitted to join or cross the specified tracks during the OTS validity period. However, continuous climb or descent through the specified levels may be available, subject to traffic.

➤ **Implementation Plan for the Trial Application of RLongSM**

The proposed change is to reduce the minimum longitudinal separation within MNPS airspace to **5 minutes** where lateral and vertical separation does not exist between aircraft pairs equipped with Automatic Dependent Surveillance-Contract (ADS-C), Controller-Pilot Data Link Communications (CPDLC) and Global Navigation Satellite System (GNSS).

RLongSM was introduced via an operational trial. Bilateral operations between Gander and Shanwick began in March 2011.

➤ **Implementation Plan for the Trial Application of RLatSM**

The proposed change is to reduce lateral separation for aircraft operating at flight levels associated with NAT Region Data Link Mandate airspace, which can be practically achieved by establishing tracks which are spaced by $\frac{1}{2}$ **degree of latitude**.

It is envisaged to introduce RLatSM via an operational trial starting 2014/2015.

➤ **Required Navigation Performance (RNP) 4 equipage plans**

That the ICAO Regional Director, Europe and North Atlantic, encourage NAT Region operators to take the necessary steps to obtain RNP 4 approvals for suitably equipped aircraft in their fleets.

4. CURRENT STATUS IN EUR/SAM CORRIDOR

The plans related to RNP4 that are being developed in the EUR/SAM Corridor are the following:

➤ **Monitoring of FAN1/A aircraft capabilities**

Due to the lack of a global database with FANS 1/A capabilities in EUR/SAM Corridor, the unique data collected by SATMA has been the data reported by Aena that shows data relative to the performance and use of FANS services for year 2012, concerning aircraft flying in the UIR Canaries from/to the EUR/SAM Corridor.

An abstract of this report is shown in the following table:

Traffic Data	2012			2011	2010
	Maximum	Minimum	Mean	Mean	Mean
Number of connected flights	1813	1347	1651	1601	1601
Percentage referred to total number of flights in the EUR/SAM Corridor *	63,72%	55,82%	59,97%	61,37%	61,37%
Percentage referred to flights in the EUR/SAM Corridor * indicating data link and ADS capacity in the Flight Plan	100,00%	91,89%	95,44%	97,99%	97,99%
Number of flights with CPDLC connection (Monthly average)	1711	1266	1526	1525	1525

TABLE 1: Traffic data summary

The main conclusions obtained from this study are the following:

- Approximately **60%** out of the total flights within EUR/SAM Corridor * are FANS equipped flights.
- Almost every equipped flight connected to SACCAN (**95%**).
- The majority of logged-on flights exchanged CPDLC information (**95%**).
- **Trend of figures is kept since 2010.**

➤ **South-Atlantic Interoperability Initiative**

In accordance with Conclusion SAT16/09, SAT States have encouraged “**South-Atlantic Interoperability Initiative**” to support the SAIRE and any other initiative to improve energy efficiency and lower aircraft noise

The group is invited to analyze the Information Paper “**SATISFIED**” (**SAT** Improved uSe of Flight corrdor for Emissions reDuction).

➤ **GROUND SYSTEMS UPGRADING**

In this regard, the status of implementation of ADS-C/CPDLC ground systems in EUR/SAM corridor is fully operational.

5. PROPOSAL OF ROADMAP FOR EUR/SAM CORRIDOR

In order to accomplish with the SAT decisions mentioned above and taking into account the current status of EUR/SAM Corridor as well as the defined dates/targets in NAT Region, SATMA recommends SAT members to follow these next steps:

* Traffic over flying the UIR Canaries from/to the EUR/SAM Corridor

5.1. EUR/SAM Corridor Short Term Plan - Data Link Mandate

This data link mandate would be implemented during **2015**, with all aircraft operating in corridor between FL330 to FL390 inclusive, being required to be fitted with and using CPDLC and ADS-C equipment. This measure would have the following effects:

- Optimum flight level assignment to equipped and connected aircrafts.
- Reduced minimum longitudinal and lateral separation of 50NM based on RNP 10 and use of ADS-C and CPDLC from FL330 to FL390.

This plan would require a previous analysis, including its respective CRM, trials and consolidation of operation.

5.2. EUR/SAM Corridor Long Term PBN implementation plan

This PBN implementation plan should consist of:

- RNP 10 and RNP 4 differentiated airspace structure:
 - RNP 4 airspace from FL360 to FL390 based on ADS-C and CPDLC compliance, reduced lateral and longitudinal separation to 30NM and an extended set of new RNP 4 airways;
 - RNP 10 airspace from FL330 to FL350 based on ADS-C and CPDLC compliance, reduced lateral and longitudinal separation to 50NM and the existing set of airways;
 - RNP 10 airspace bellow FL330 with no ADS-C and CPDLC compliance, lateral and longitudinal separation of 80NM and the existing set of airways.
- A full implementation of this plan would be accomplished during 2020.

This plan allows to have reduced separation and optimum performance for better equipped aircrafts, and it is compatible with the operation in the EUR/SAM corridor for worse equipped aircraft. Thus, there would be three different degrees of performance according to the “best equipped best served” statement.

This plan would require a previous analysis, including its respective CRM, an agreed roadmap, trials and consolidation of operation.

5.3. Common tasks

The previous plans must be completed with:

- a. The promotion of real implementation of Central FANS 1/A Reporting Agency (CFRA). Note that nowadays there are many technical and operative issues related to FANS 1/A and a lack of global data: aircraft capabilities, incidents, etc.
- b. The definition of an agreed and consolidated roadmap of improvements for EUR/SAM Corridor.

To encourage operators to take the necessary steps to obtain RNP 4 approvals for suitably equipped aircrafts in their fleets.

6. ACTION BY THE MEETING

The SAT18 Meeting is invited to:

- a) Take note of the information provided in this working paper.
- b) To determine next steps.