



**TWENTIETH MEETING ON THE IMPROVEMENT OF AIR TRAFFIC SERVICES
OVER THE SOUTH ATLANTIC (SAT20)**

(Abidjan, Cote d'Ivoire, 3 to 5 June 2015)

Agenda Item 2: Air Traffic Management (ATM)

**Air traffic statistics of the EUR-SAM Corridor
January – June 2014**

(Presented by SATMA)

SUMMARY

This information paper presents to SAT States global and detailed information about the air traffic statistics of the EUR-SAM Corridor during first half of 2014.

1. INTRODUCTION

The importance of SATMA collection and treatment of statistical data of air traffic movements along the EUR-SAM Corridor during last years, has been strongly highlighted in previous SAT meetings as a relevant data to take preventive actions, in line with the evolution of these figures. Nevertheless, several issues were detected during last SAT (SAT19) related to the statistical data presented:

- Provided figures do not represent whole EUR/SAM Corridor since data is based exclusively on traffic that fly over Canarias FIR;
- There are not data related to Fleet FANS 1A/RNP4 Capabilities;

The objective of this working paper is to cover both, the mentioned detected issues and SATMA monitoring performed in the EUR-SAM Corridor.

Once presented in SAT/20 Meeting, this statistical assessment of the EUR-SAM Corridor will be available on SATMA web page: www.satmasat.com.

2. BACKGROUND

In accordance with the SAT19/01 conclusion, SATMA was assigned to gather the necessary 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 should collect Air Traffic Movement data from their ATM Systems in a period of six months (Jan-Jun 2014) in accordance with the pre-established format agreed with each member.

During SAT19 it was mentioned that all SAT members had already provided this information to perform the present analysis.

3. HYPOTHESIS, ASSUMPTIONS AND CONSIDERATIONS

Even though global figures and conclusions should be obtained directly from the data provided by each ANSP with an easy and simple process, the data provided are not coherent among ANSP. For instance, there are flight plans that are not registered by all involved ANSPs, the operational information shows differences in terms of time, flight levels or coordination points, and even flight plans of the same day reported by the same ANSP with the same times but different trajectories..

Therefore, and in order to increase the consistency of this operational data, several hypothesis and assumptions have been considered:

- The information supplied has been treated globally, so that lacking or erroneous information provided by an ANSP has been corrected according with the rest of existing information for that flight. Therefore, time, flight level and coordination points have been revised.
- A total of 130.000 position reports have been provided. Additional information has been extrapolated from this original data. Likewise, coordinates reports have been associated with the closer waypoint possible.
- Whereas flight plan information had only an initial and final point, the flight plan has been extrapolated to the closer route. For instance, if the initial flight plan was TENPA SAMAR, the final flight plan would be TENPA USOTI APASO VIDRI GDV SAMAR.
- Although the provided data of traffic outside of the EUR-SAM corridor were not relevant for the safety and statistical assessments, all data has been processed similarly.

During the elaboration of this study, it was detected that fleet equipment and capabilities were lacking in the information provided. Although this information is registered in the initial flight plan (item 10 and 18 of IFPL), SATMA does not have access to this data. The only data collected by SATMA are those reported by Enaire that show data relative to the performance and use of FANS services of aircrafts across Canarias FIR from/to the EUR-SAM Corridor. To complete those data, Enaire, on behalf of SATMA, requested to Eurocontrol the information of those flight plan of traffic with origin/destination S*** or GV** and origin/destination the ECAC area regarding item 10 and 18 of flight plan.

Although this source of information does not take into account the transversal traffic of EUR-SAM Corridor, it is the only source available for this purpose.

Note that capabilities shown in the flight plan mean that:

- a. Relevant serviceable equipment is on board the aircraft; and
- b. Equipment and capabilities are commensurate with flight crew qualifications;
and
- c. where applicable, the authorization from the appropriate authority exists.

Furthermore, where there is no capability data available, it is considered that there is no equipment/capabilities available.

Finally, it is necessary to explain some terms in order to understand the figures presented in this working paper:

- It is considered “EUR/SAM traffic” the traffic which has flown at least a leg of the following AWYs in SBAO/GOOO/GVSC FIRs: UN741, UN866, UN873 and UN857.
- It is considered “EUR/SAM Area” the area where the information has been reported to SATMA. Next figure depicts what it is considered the EUR/SAM Area.

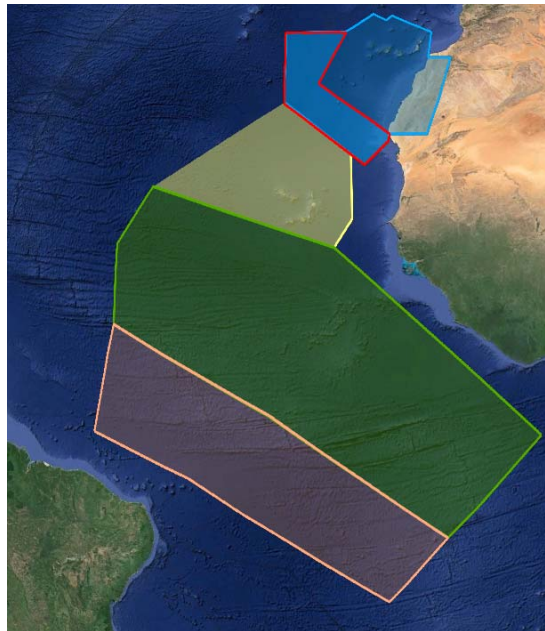


Figure 1. EUR/SAM Area

- The information related to dates, months, and times is obtained from the first waypoint where the flight is referred. The criteria and information used to perform this study, both global and per FIR, are the same.

4. DISCUSSION

Next table shows the number of flights per month belonging to EUR/SAM or random/transversal traffic. The total number of flights registered in the EUR/SAM area in the analysed period of 2014 has been **30.169** flights. Only 16.019 of them are considered traffics belonging to EUR/SAM Corridor (53% of total).

NUMBER OF FLIGHTS							
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
EUR/SAM	2788	2475	2910	2594	2639	2613	16019
Random / Transversal	2316	2106	2210	2378	2437	2703	14150
TOTAL	5104	4581	5120	4972	5076	5316	30169

Table 1. Global Figures of Flights – EUR/SAM Area

Next figures show that globally, the traffic in the EUR/SAM Corridor has a similar performance in each analysed month.

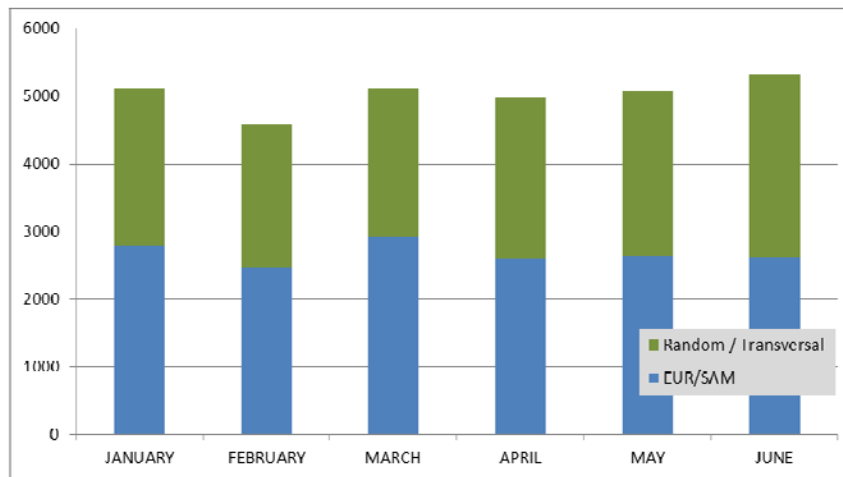


Figure 2. EUR/SAM Corridor vs Transversal/Random -Traffic

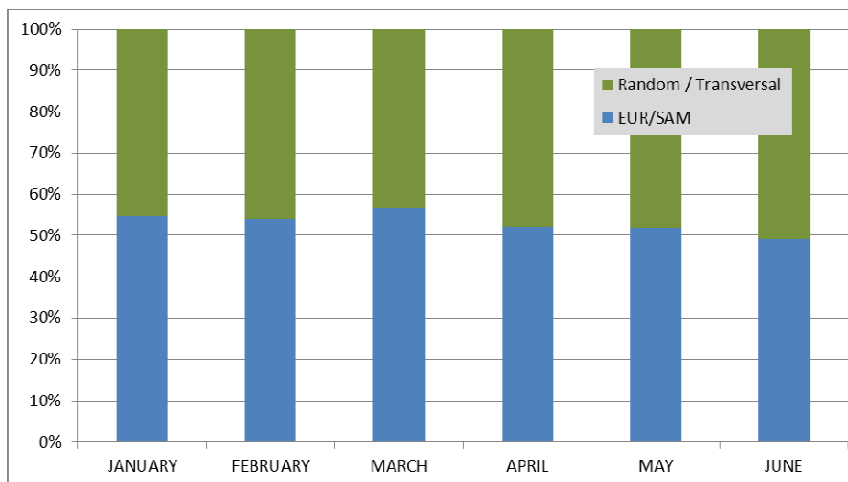


Figure 3. Percentage of EUR/SAM Corridor vs Transversal/Random -Traffic

Regarding FANS 1A and RNP4 capabilities, the global figure shows that **64%** of traffic has FANS 1A capability, figure that decreases to **57%** regarding RNP4 capability. Both percentages are even lower when all the traffic of the EUR-SAM area are considered: 51.3% FANS1A and 38.5 RNP4.

	FLEET CAPABILITIES					
	FANS 1A	%	RNP4	%	RNP4 + FANS	%
EUR/SAM	10257	64.0%	9127	57.0%	7690	48.0%
Random / Transversal	5216	36.9%	2477	17.5%	2349	16.6%
TOTAL	15473	51.3%	11604	38.5%	10039	33.3%

Table 2. Global figures of fleet capabilities in the EUR/SAM AREA

Table 3 shows, for the most significant airlines in terms of registered figures, the number of flights and percentage referred to the total number of registered flights in the EUR/SAM Area. Likewise, the percentages of traffic in the EUR/SAM area, with FANS 1A and RNP4 capabilities referred to the number of registered flights are shown.

AIRLINE	FLIGHTS	%	% EUR/SAM	% FANS	% RNP4
TAP	4211	14.0%	96%	72%	98%
AFR	2177	7.2%	71%	98%	97%
IBE	2085	6.9%	60%	80%	0%
TAM	1922	6.4%	84%	94%	98%
DLH	1401	4.6%	43%	96%	95%
SAA	1261	4.2%	0%	0%	0%
DAL	1117	3.7%	3%	0%	0%
AEA	1097	3.6%	44%	90%	0%
BAW	1049	3.5%	53%	97%	0%
AZA	1025	3.4%	1%	94%	0%
UAE	868	2.9%	0%	0%	0%
ARG	868	2.9%	51%	0%	0%
KLM	759	2.5%	55%	79%	79%
TCV	736	2.4%	83%	0%	0%
DTA	561	1.9%	0%	0%	0%
-	9032	29.9%	49%	21%	17%

Table 3. Global Figures per airline

Only 18 airlines comprise the 70.1 % of total traffic. Note that 10 of them do not have RNP4 / FAN1A capabilities.

Next table shows that main city pairs that fly over the EUR/SAM Corridor are from South America to Europe. Nevertheless, if traffic flying out the EUR/SAM Corridor is considered, main traffic flows are from/to Africa.

AREA PAIR	TOTAL	%	AREA PAIR	TOTAL	%
SB <=> LP	3309	20.7%	SB <=> OM	1072	7.7%
SB <=> LF	1601	10.0%	LI <=> SB	1063	7.6%
SB <=> LE	1517	9.5%	LE <=> SA	743	5.3%
LP <=> GV	1216	7.6%	SB <=> ED	700	5.0%
SA <=> LE	953	5.9%	LE <=> SB	627	4.5%
ED <=> SB	928	5.8%	SC <=> LE	620	4.4%
EG <=> SB	853	5.3%	SA <=> LI	580	4.2%
GC <=> GV	554	3.5%	FA <=> SB	575	4.1%
GV <=> EG	454	2.8%	SB <=> FN	407	2.9%

Table 4. Area pair in EUR/SAM Corridor vs Area pair out EUR/SAM Corridor

In order to analyse the evolution of traffic with respect to previous years, as well as to foresee the impact of unconsidered traffic (see issues described in the introduction), the following figure depicts the global figures obtained from statistical study performed heretofore by SATMA:

MONTH	SOUTHBOUND		NORTHBOUND		TOTAL TRAFFIC IN THE CORRIDOR						% VARIATION	
	2013	2014	2013	2014	2012	DAILY	2013	DAILY	2014	DAILY	2012 - 2013	2013 - 2014
JANUARY	1347	1159	1447	1288	2714	88	2794	90	2447	79	3%	-12%
FEBRUARY	1107	1092	1289	1087	2446	84	2396	86	2179	78	-2%	-9%
MARCH	1290	1108	1393	1329	2869	93	2683	87	2437	79	-6%	-9%
APRIL	1248	914	1264	1286	2524	84	2512	84	2200	73	0%	-12%
MAY	1110	936	1365	1163	2167	83	2475	80	2099	68	14%	-15%
JUNE	1225	1041	1314	1195	2796	93	2539	85	2236	75	-9%	-12%
JULY	1283	1296	1417	1257	2955	95	2700	87	2553	82	-9%	-5%
AUGUST	1319	1136	1304	1284	2986	96	2623	85	2420	78	-12%	-8%
SEPTEMBER	1178	1017	1303	1256	2904	97	2481	83	2273	76	-15%	-8%
OCTOBER	1252	1209	1232	1246	2937	95	2484	80	2455	79	-15%	-1%
NOVEMBER	1167	1090	1255	1031	2704	90	2422	81	2121	71	-10%	-12%
DECEMBER	1252	986	1284	1268	2867	92	2536	82	2254	73	-12%	-11%
AVERAGE	1232	1082	1322	1224	2739	91	2554	84	2306	76	-6%	-10%

The figures registered in 2014 consolidate and emphasize, regarding Canarias FIR, the decreasing trend of 2013. In the first six-months period, the total flights were 13.598. This figure shows that there is a decrease of 17% of the traffic counts. In this line, but from a global point of view, the number of traffic with origin/destination S*** or GV** and origin/destination the ECAC area at the beginning of 2014 respect to the same period in 2013 are practically the same.

5. CONCLUSION

Main operational conclusions obtained from this working paper are the following:

- **A total of 30.169** flights, out of which only 16.019 are considered traffic that fly over the EUR/SAM Corridor.
- There is a loss of 17% of traffic if the new data is compared with the traditional reports where the figures registered in 2014 consolidate and emphasize the decreasing trend of 2013.
- Regarding FANS 1A and RNP4 capabilities, figures show that **51.3%** of traffic has FANS 1A capability, figure that decreases to **38.5%** regarding RNP4 capability.
- Only 12 airlines comprise the 73% of total traffic in the EUR/SAM Corridor, where 7 of them do not have RNP4 capabilities.
- During 2014 the trend of traffic counts in EUR/SAM corridor has been kept respect to 2013. There is no increase of traffic in 2014.

On the other hand, during the preparation of this working paper, several issues were detected regarding data provided:

- The treatment of the information has been very complex since the lacking or erroneous information has required many estimations and corrections.
- There is a lack of a reliable fleet capabilities source. This means that more hypothesis and assumptions had to be done..
- Although all the information has been analysed, the group must be aware that most of the traffic cannot be considered as belonging to EUR/SAM Corridor. This extra information to be analysed meant more efforts to achieve the same results.

6. ACTION BY THE MEETING

The SAT/20 Meeting is invited:

- To analyse and discuss the conclusions of this WP.
- To determine if other air traffic statistics studies are needed to assess the evolution of the EUR-SAM corridor.
- To determine if it is needed to reduce the scope of this study and not to include traffic out of EUR/SAM Corridor.
- If air traffic statistics studies are considered adequate, it is necessary to improve the quality and reliability of the data provided by including additional data per flight such as fleet capabilities, ADS-C/CPDLC connection and registration number.

ANNEX I: AIR TRAFFIC STATISTICS IN THE EUR/SAM AREA FROM JANUARY TO JUNE OF 2014

1. INTRODUCTION

In order to complete the main body of this working paper, a similar study of each involved FIR that monitors and manages traffic in the EUR/SAM Corridor. As it has been mentioned before, the criteria and information used to perform this study, both global and per FIR, are the same. Likewise, additional analyses have been included to complete the local vision.

2. AIR TRAFFIC STATISTICS IN THE EUR/SAM AREA – CANARIAS FIR

Next table shows the number of flights per month belonging to EUR/SAM or random/transversal traffic (Canarias FIR). The total number of flights registered in the EUR/SAM area of Canarias FIR has been **13.939** flights. Only 13.500 of them are considered traffics belonging to EUR/SAM Corridor (96.8 % of total).

NUMBER OF FLIGHTS - CANARIAS FIR							
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
EUR/SAM	2422	2152	2424	2179	2099	2224	13500
Random / Transversal	69	49	63	56	103	99	439
TOTAL	2491	2201	2487	2235	2202	2323	13939

Table 5. Global Figures of Flights – EUR/SAM Area – Canarias FIR

The following bar shows that the traffic in the EUR/SAM Corridor – Canarias FIR has a similar behaviour in each analysed month. Besides, random/transversal traffic is not significant and number of traffics per day is very alike monthly.

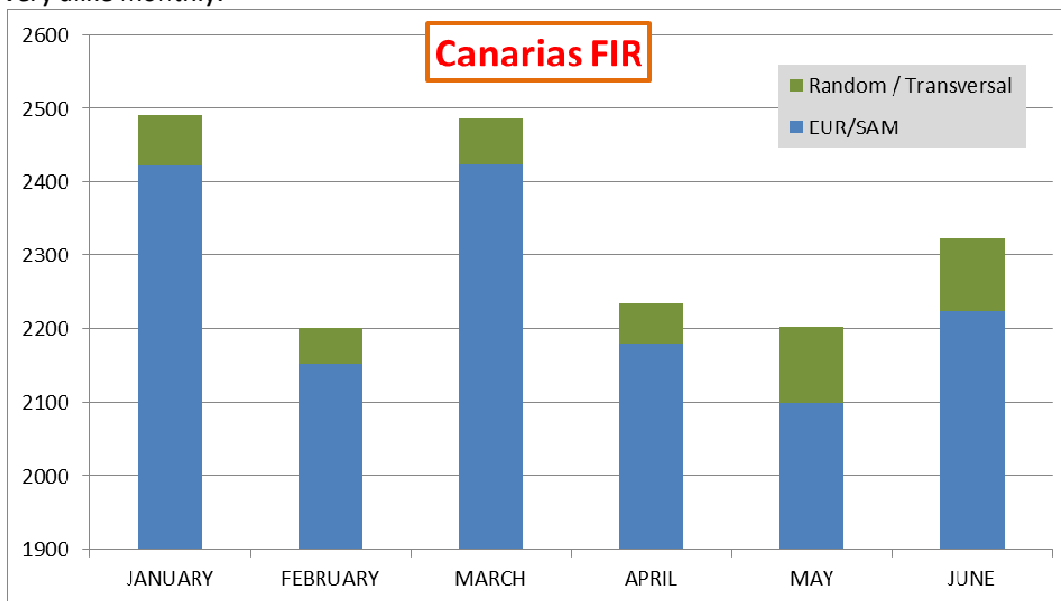


Figure 4. EUR/SAM Corridor Vs Transversal/Random –Traffic (Canarias FIR)

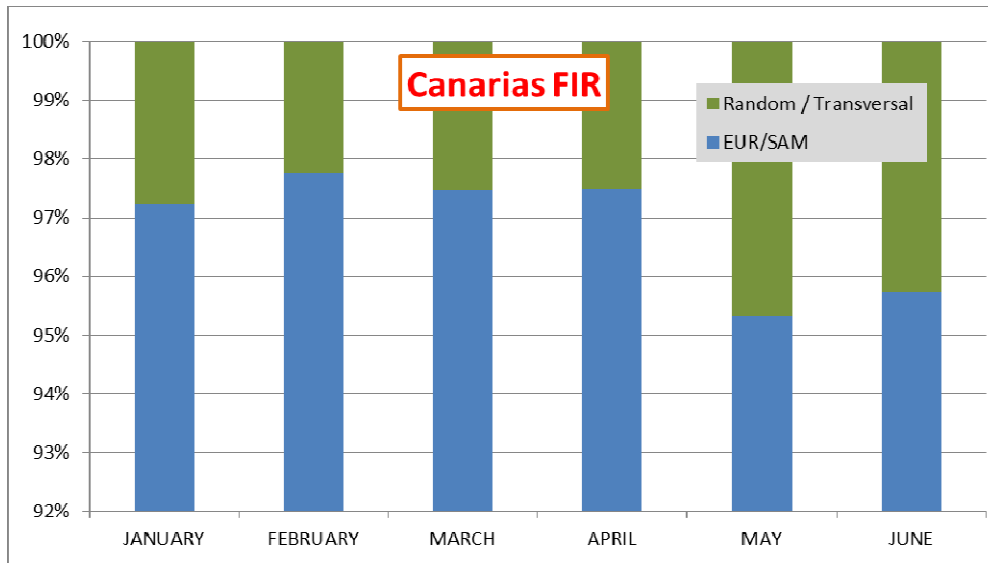


Figure 5. Percentage EUR/SAM Corridor Vs Transversal/Random –Traffic (Canarias FIR)

Regarding FANS 1A and RNP4 capabilities, the global figure in Canarias FIR shows that **63%** of traffic has FANS 1A capability, figure that decreases to **55.2%** regarding RNP4 capability.

FLEET CAPABILITIES - CANARIAS FIR						
	FANS 1A	%	RNP4	%	RNP4 + FANS	%
EUR/SAM	8456	62.6%	7605	56.3%	6237	46.2%
Random / Transversal	330	75.2%	89	20.3%	84	19.1%
TOTAL	8786	63.0%	7694	55.2%	6321	45.3%

Table 6. Global figures of fleet capabilities in EUR/SAM Corridor – Canarias FIR

The following table shows, for the most significant airlines in terms of registered figures, the number of flights and percentage referred to the total number of registered flights in the EUR/SAM Area – Canarias FIR during the studied period (six months). Likewise, the percentages of traffic in the EUR/SAM – Canarias FIR, with FANS 1A and RNP4 capabilities referred to the total number of registered flights are shown.

TRAFFIC PER AIRLINE IN CANARIAS FIR					
AIRLINE	FLIGHTS	%	% EUR/SAM	% FANS	% RNP4
TAP	3417	24.5%	99.6%	69.6%	99.1%
AFR	1451	10.4%	98.7%	99.9%	99.9%
IBE	1362	9.8%	87.0%	91.5%	0.0%
TAM	1153	8.3%	99.4%	95.9%	99.7%
TCV	549	3.9%	99.8%	0.0%	0.0%
DLH	497	3.6%	95.2%	99.8%	99.8%
AEA	441	3.2%	91.4%	99.8%	0.0%
ARG	437	3.1%	99.8%	0.0%	0.0%
TOM	418	3.0%	100.0%	33.7%	0.0%
BAW	345	2.5%	93.9%	98.8%	0.0%
TUI	338	2.4%	99.4%	0.0%	0.0%
BLX	260	1.9%	100.0%	0.0%	0.0%
KLM	241	1.7%	95.9%	97.9%	97.9%
TFL	214	1.5%	100.0%	8.4%	0.0%
NOS	165	1.2%	99.4%	0.0%	0.0%
-	2652	19.0%	95.2%	35.3%	36.8%

Table 7. Global Figures per airline – Canarias FIR

Note that 10 of 15 main airlines in Canarias FIR do not have RNP4 capability.

On the other hand, considering the foreseen evolution of EUR/SAM Corridor, several additional analyses have been accomplished for each FIR:

- **Flight level distribution:** Flight level FL380 was the most required one. Likewise, the 23% of traffic in Canarias FIR was cleared to FL340 or below.

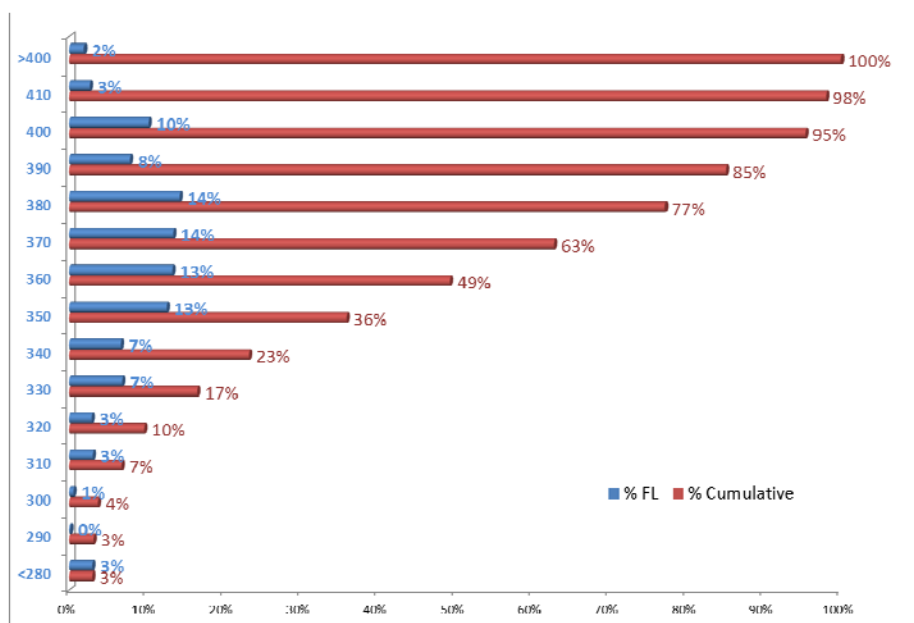


Figure 6. Distribution the Flight Levels in EUR/SAM Corridor – Canarias FIR

Note that to prepare this assessment only FL in the border of FIR was considered.

• **Traffic load:**

Next chart shows a summary of traffic load registered in Canarias FIR where orange bars represent the maximum number of aircraft that entered in the FIR per hour. The green curve represents the average number of aircrafts that entered in the FIR per hour. The hourly trend of average traffic is very steady during all day. The peak periods of traffic are 22-03 and 08-13 UTC.

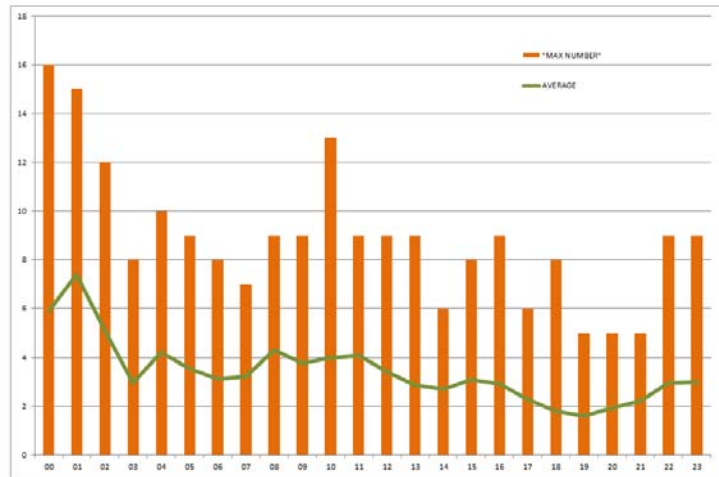


Figure 7. Traffic load (max / average) in EUR/SAM Corridor – Canarias FIR

• Traffic load (max / average) in EUR/SAM Corridor – Canarias FIR **Main Flows:**

The following figures and tables try to sum up the operational data provided to SATMA. In Canarias FIR the main flow is via IPERA, afterwards this traffic planned other ATS routes depending on their origin/destination. UN741 and UN866 have also relevant figures but less than the first one due to their unidirectional characteristic. Note that UN857 figures have already overcome UN741 figures and is very close to UN866, even though it is a bidirectional route. Finally, it is remarkable that Canarias FIR registered several “random routes” which are based on published DCT.

TRAFFIC	RR	UN741	UN866	UN873	UN857	UB600G/UG853	TOTAL
NORTHBOUND	272		2851	3076	1325	15	7539
SOUTHBOUND	137	1566		3355	1285	29	6372
TOTAL	409	1625	2851	6431	2610	44	13911

Table 8. Distribution per ATS Route – Canarias FIR

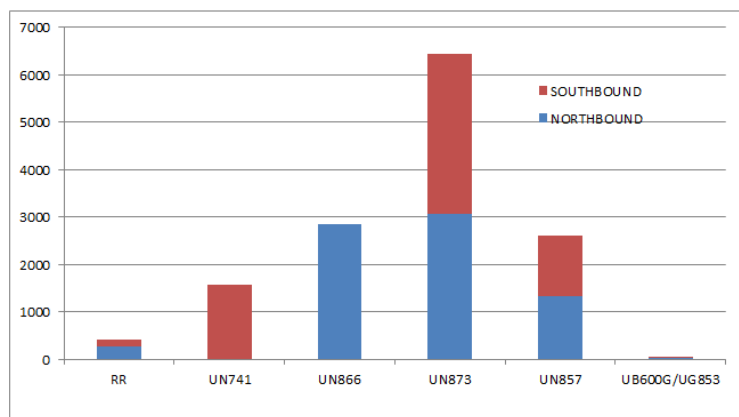


Figure 8. Distribution per ATS Route – Canarias FIR

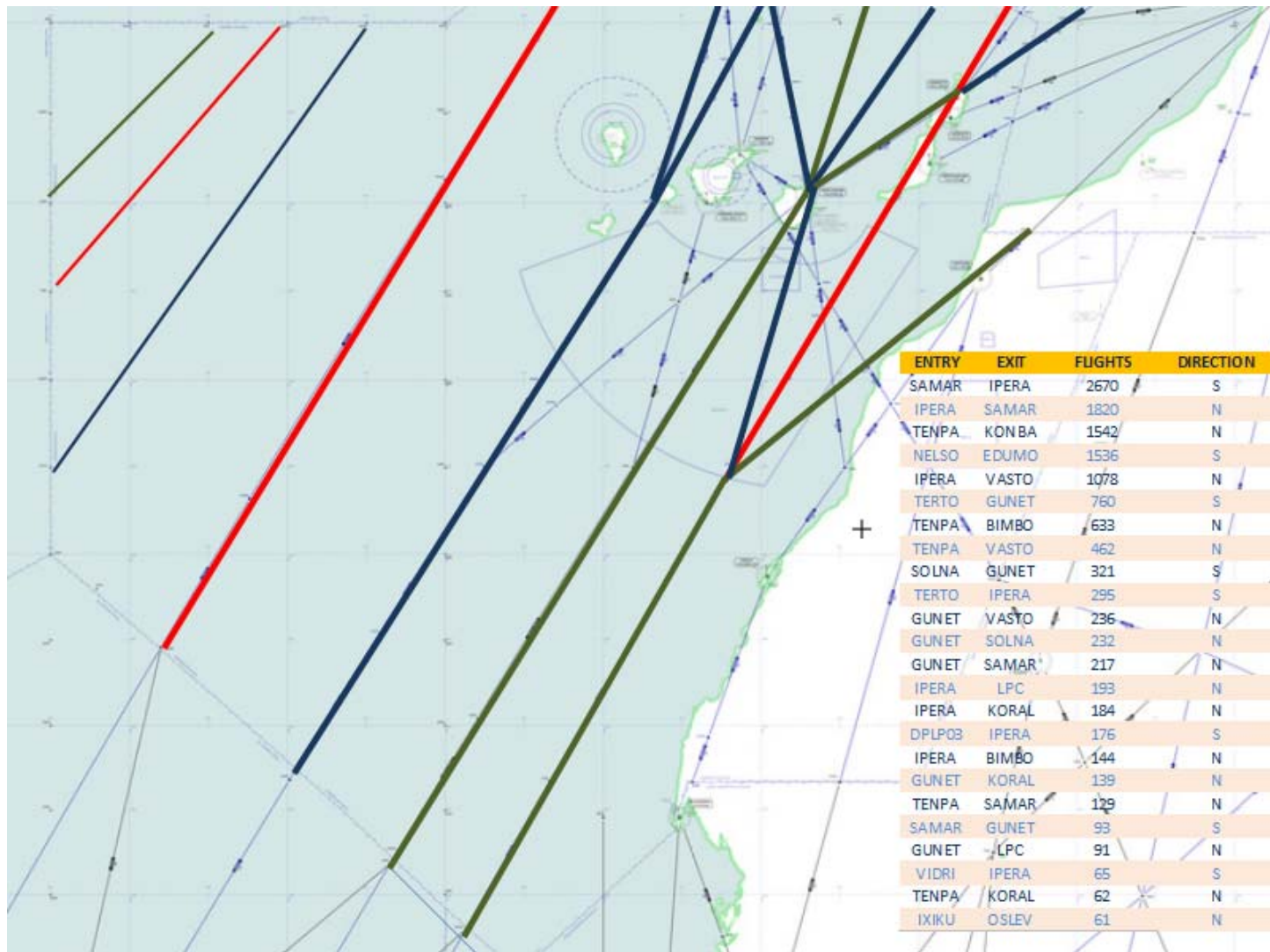


Figure 9. Main Flows of Traffic in the EUR/SAM Corridor – Canarias FIR

3. AIR TRAFFIC STATISTICS IN THE EUR/SAM AREA – SAL OCEANIC FIR

Next table shows the number of flights per month belonging to EUR/SAM or random/transversal traffic (Sal Oceanic FIR). The total number of flights registered in the EUR/SAM area of Sal Oceanic FIR has been **21.117** flights. Only 15.886 of them are considered traffics belonging to EUR/SAM Corridor (75.2 % of total).

NUMBER OF FLIGHTS - Sal Oceanic FIR							
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
EUR/SAM	2767	2457	2881	2564	2623	2594	15886
Random / Transversal	814	743	810	793	964	1107	5231
TOTAL	3581	3200	3691	3357	3587	3701	21117

Table 9. Global Figures of Flights – EUR/SAM Area – Sal Oceanic FIR

The following bar shows that the traffic in the EUR/SAM Corridor – Sal Oceanic FIR has a similar behaviour in each analysed month. Besides, random/transversal traffic is not significant and number of traffics per day is very alike monthly.

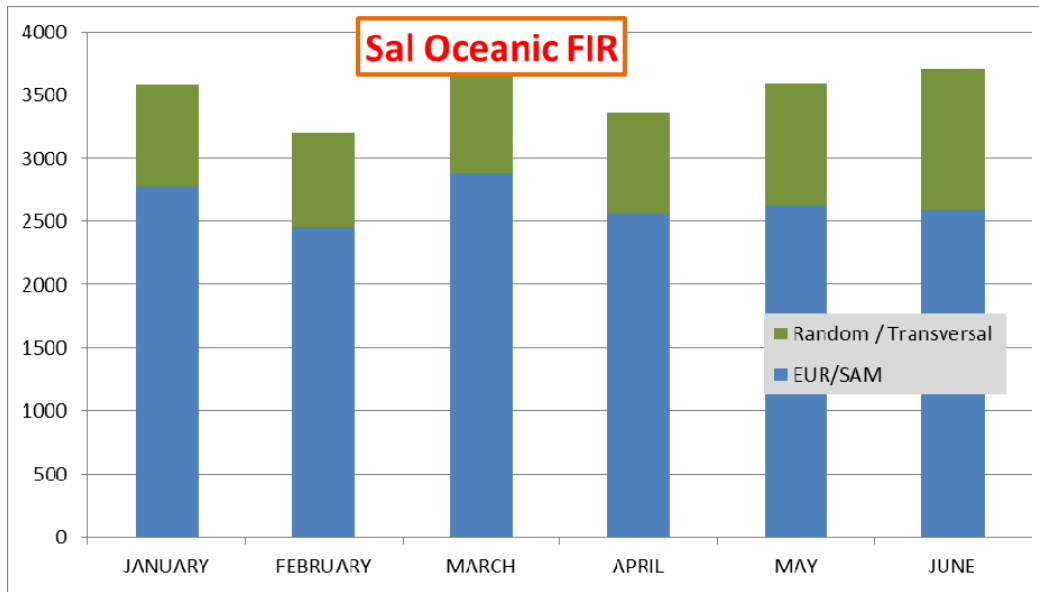


Figure 10. EUR/SAM Corridor Vs Transversal/Random –Traffic (Sal Oceanic FIR)

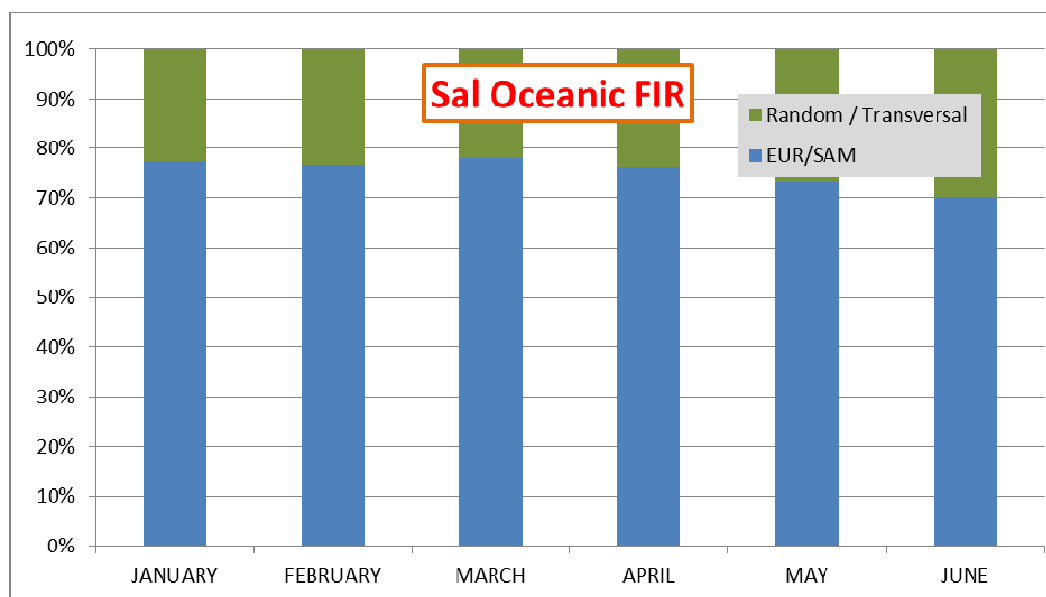


Figure 11. Percentage EUR/SAM Corridor Vs Transversal/Random –Traffic (Sal Oceanic FIR)

Regarding FANS 1A and RNP4 capabilities, the global figure in Sal Oceanic FIR shows that **57.1%** of traffic has FANS 1A capability, figure that decreases to **47.8%** regarding RNP4 capability.

	FLEET CAPABILITIES - Sal Oceanic FIR					
	FANS 1A	%	RNP4	%	RNP4 + FANS	%
EUR/SAM	10233	64.4%	9103	57.3%	7673	48.3%
Random / Transversal	1823	34.8%	987	18.9%	944	18.0%
TOTAL	12056	57.1%	10090	47.8%	8617	40.8%

Table 10. Global figures of fleet capabilities in EUR/SAM Corridor – Sal Oceanic FIR

The following table shows, for the most significant airlines in terms of registered figures, the number of Sal Oceanic FIR during the studied period (six months). Likewise, the percentages of traffic in the EUR/SAM – Sal Oceanic FIR, with FANS 1A and RNP4 capabilities referred to the total number of registered flights are shown.

TRAFFIC PER AIRLINE IN Sal Oceanic FIR					
AIRLINE	FLIGHTS	%	% EUR/SAM	% FANS	% RNP4
TAP	4038	19.1%	99.4%	72.1%	98.7%
AFR	1951	9.2%	78.6%	98.7%	98.5%
TAM	1883	8.9%	85.6%	93.8%	97.9%
IBE	1545	7.3%	80.9%	87.7%	0.0%
DLH	820	3.9%	73.3%	98.0%	97.9%
DAL	788	3.7%	3.6%	0.0%	0.0%
TCV	730	3.5%	82.7%	0.0%	0.0%
SAA	688	3.3%	0.0%	0.0%	0.0%
AEA	686	3.2%	70.7%	92.6%	0.0%
BAW	680	3.2%	82.1%	97.4%	0.0%
KLM	544	2.6%	75.2%	85.7%	85.5%
ARG	444	2.1%	100.0%	0.0%	0.0%
TOM	422	2.0%	99.5%	33.4%	0.0%
LAN	377	1.8%	1.1%	91.2%	0.5%
TUI	342	1.6%	98.5%	0.0%	0.0%
-	5179	24.5%	69.2%	20.2%	20.6%

Table 11. Global Figures per airline – Sal Oceanic FIR

Note that 7 of 15 main airlines in Sal Oceanic FIR do not have RNP4 capability.

On the other hand, considering the foreseen evolution of EUR/SAM Corridor, several additional analyses have been accomplished for each FIR:

- **Flight level distribution:** Flight level FL350 was the most required one. Likewise, the 36% of traffic in Canarias FIR was cleared to FL340 or below.

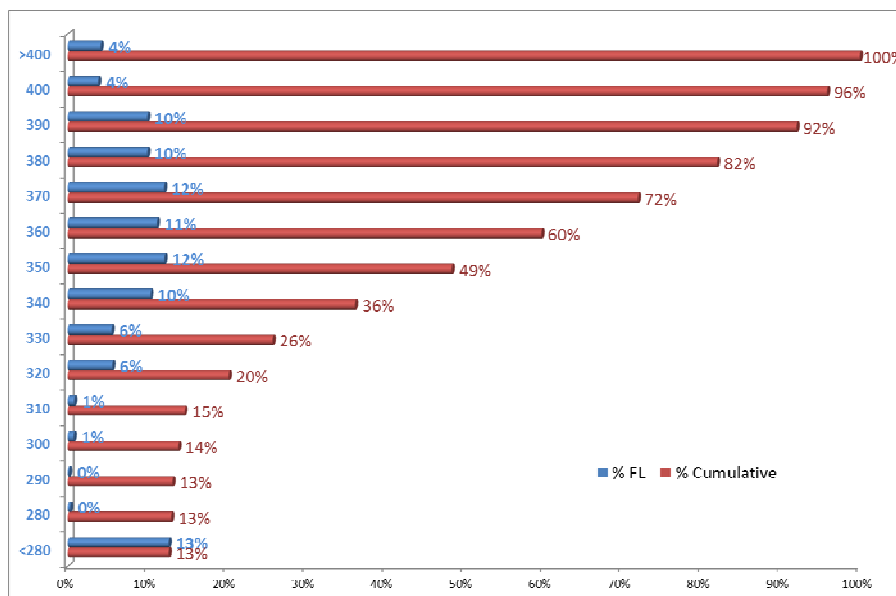


Figure 12. Distribution the Flight Levels in EUR/SAM Corridor – Sal Oceanic FIR

Note that to prepare this assessment only FL in the border of FIR was considered.

• **Traffic load:**

Next chart shows a summary of traffic load registered in Sal Oceanic FIR where orange bars represent the maximum number of aircraft that entered in the FIR per hour. The green curve represents the average number of aircrafts that entered in the FIR per hour. The hourly trend of average traffic is very steady during all day. The peak periods of traffic are 23-04 and 12-15 UTC.

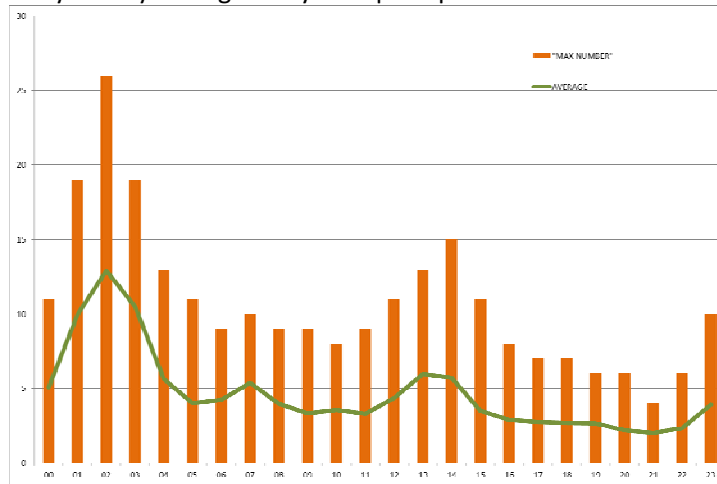


Figure 13. Traffic load (max / average) in EUR/SAM Corridor – Sal Oceanic FIR

• **Main Flows:**

The following figures and tables try to sum up the operational data provided to SATMA. Apart from the expected flows, described in Canarias FIR, there are two new ones: transversal traffic (ULTEM/ERNEK-LUMPO/MOGSA) and random route (ERNEK-GARPO and ULTEM->BIKOM-XUVIT).

TRAFFIC	RND	UN741	UN866	UN873/UB623	UN857	TRANSVERSAL	TOTAL
NORTHBOUND	1376		2765	3486	933		8560
SOUTHBOUND	2659	1591		3144	1066		8460
TOTAL	4035	1625	2765	6630	1999	4097	21117

Table 12. Distribution per ATS Route – Sal Oceanic FIR

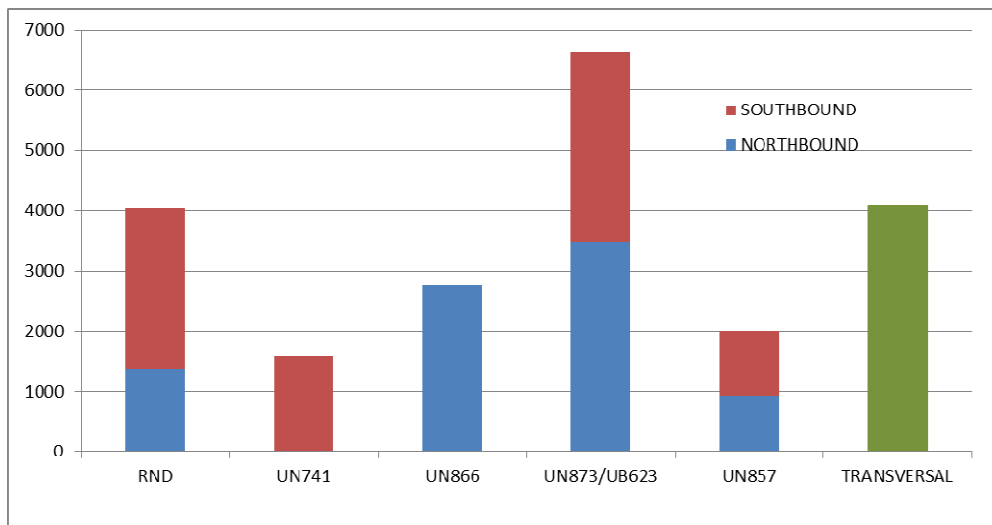


Figure 14. Distribution per ATS Route – Sal Oceanic FIR

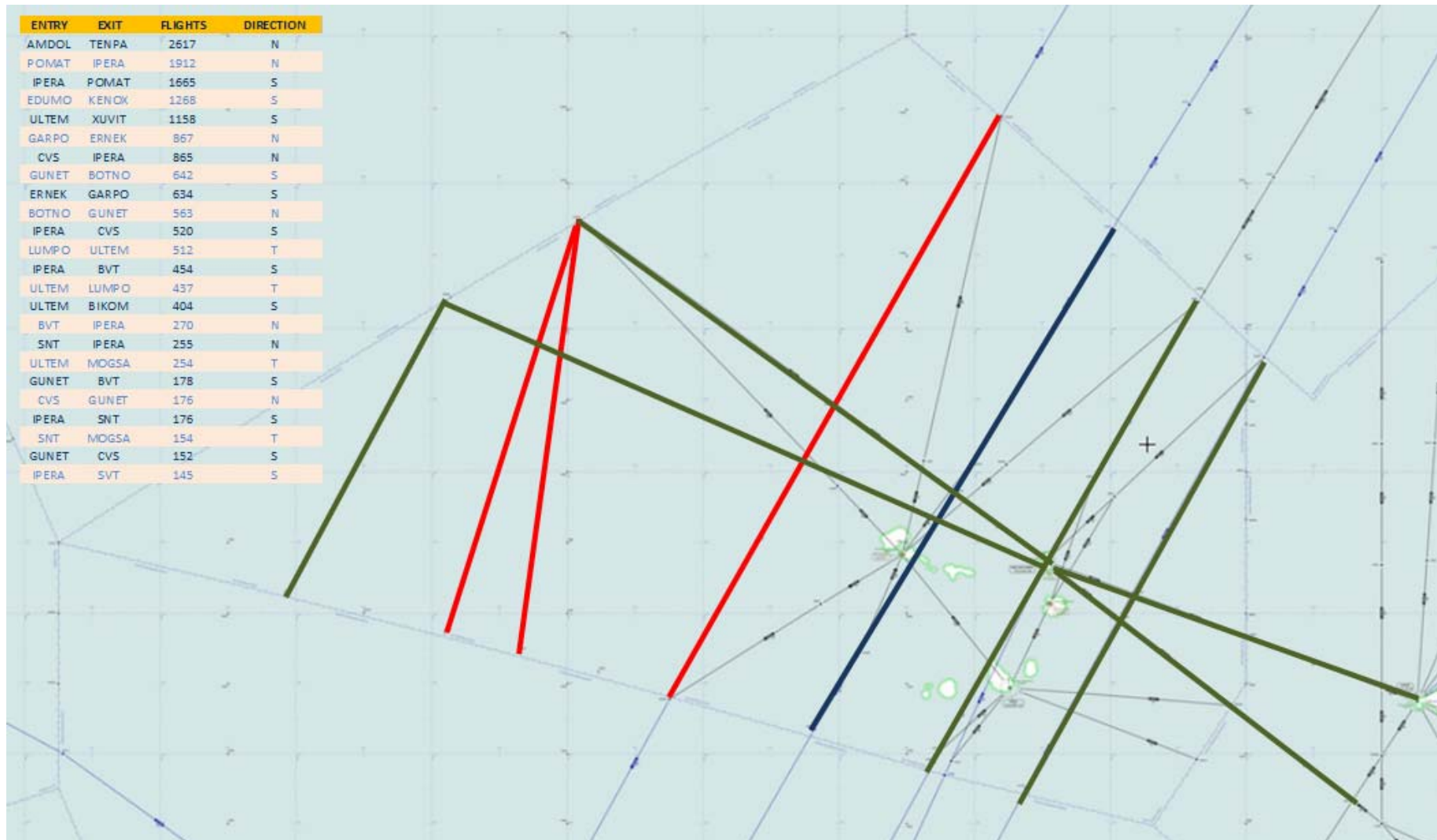


Figure 15. Main Flows of Traffic in the EUR/SAM Corridor – Sal Oceanic FIR

4. AIR TRAFFIC STATISTICS IN THE EUR/SAM AREA – DAKAR OCEANIC FIR

Next table shows the number of flights per month belonging to EUR/SAM or random/transversal traffic (Dakar Oceanic FIR). The total number of flights registered in the EUR/SAM area of Dakar Oceanic FIR has been **18.921** flights. Only 11.613 of them are considered traffics belonging to EUR/SAM Corridor (61.3 % of total).

NUMBER OF FLIGHTS - Dakar Oceanic FIR							
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
EUR/SAM	1944	1750	2111	1840	2012	1956	11613
Random / Transversal	1152	1066	1079	1274	1266	1471	7308
TOTAL	3096	2816	3190	3114	3278	3427	18921

Table 13. Global Figures of Flights – EUR/SAM Area – Dakar Oceanic FIR

The following bar shows that the traffic in the EUR/SAM Corridor – Dakar Oceanic FIR has a similar behaviour in each analysed month. Besides, random/transversal traffic is not significant and number of traffics per day is very alike monthly.

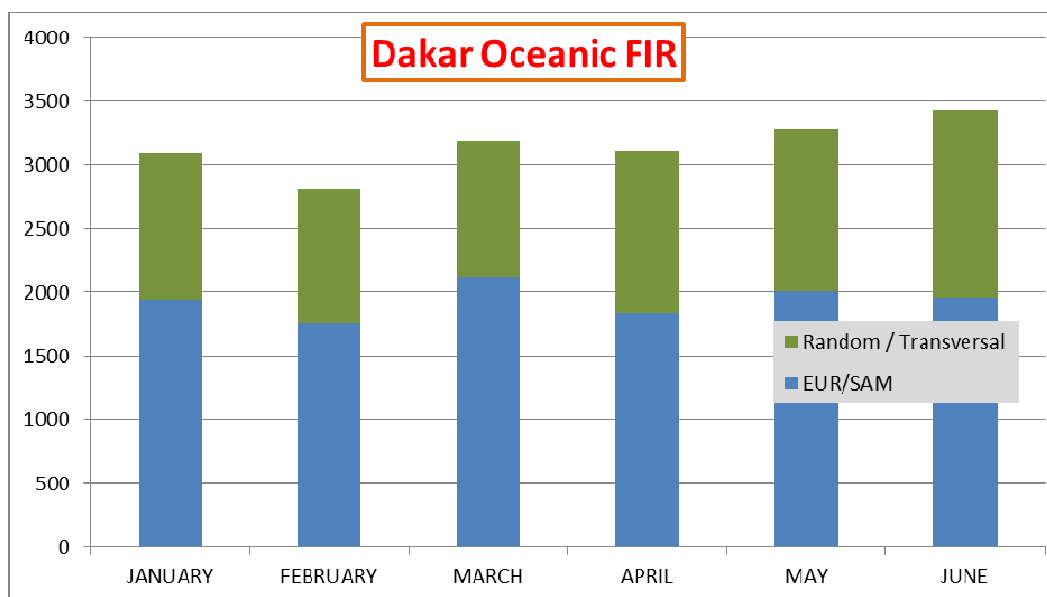


Figure 16. EUR/SAM Corridor vs Transversal/Random –Traffic (Dakar Oceanic FIR)

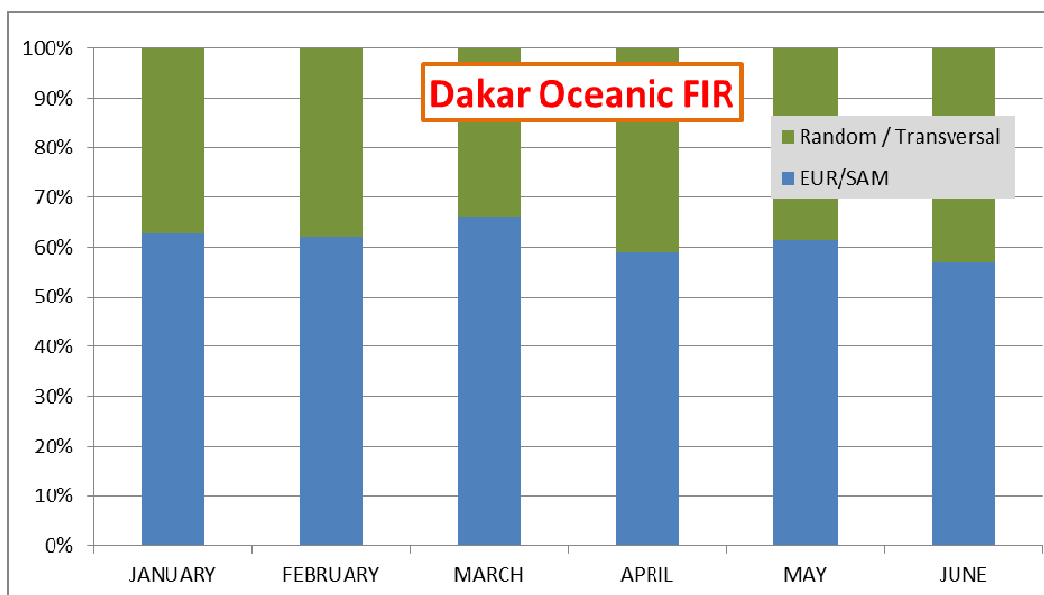


Figure 17. Percentage EUR/SAM Corridor Vs Transversal/Random –Traffic (Dakar Oceanic FIR)

Regarding FANS 1A and RNP4 capabilities, the global figure in Dakar Oceanic FIR shows that **74.7%** of traffic has FANS 1A capability, figure that decreases to **52.7%** regarding RNP4 capability.

FLEET CAPABILITIES - Dakar Oceanic FIR						
	FANS 1A	%	RNP4	%	RNP4 + FANS	%
EUR/SAM	9740	83.9%	7863	67.7%	7456	64.2%
Random / Transversal	4427	60.6%	2100	28.7%	1987	27.2%
TOTAL	14167	74.9%	9963	52.7%	9443	49.9%

Table 14. Global figures of fleet capabilities in EUR/SAM Corridor – Dakar Oceanic FIR

The following table shows, for the most significant airlines in terms of registered figures, the number of Dakar Oceanic FIR during the studied period (six months). Likewise, the percentages of traffic in the EUR/SAM – Dakar Oceanic FIR, with FANS 1A and RNP4 capabilities referred to the total number of registered flights are shown.

TRAFFIC PER AIRLINE IN Dakar Oceanic FIR					
AIRLINE	FLIGHTS	%	% EUR/SAM	% FANS	% RNP4
TAP	3368	17.8%	94.5%	89.3%	98.1%
AFR	2051	10.8%	74.2%	98.4%	98.2%
IBE	1995	10.5%	62.3%	81.2%	0.0%
TAM	1860	9.8%	85.6%	94.0%	97.8%
DLH	1281	6.8%	46.4%	95.9%	95.6%
AEA	1031	5.4%	46.6%	90.6%	0.0%
AZA	999	5.3%	1.2%	93.7%	0.0%
ARG	845	4.5%	52.3%	0.0%	0.0%
BAW	732	3.9%	75.5%	97.5%	0.0%
KLM	679	3.6%	60.5%	80.9%	80.7%
LAN	373	2.0%	1.1%	91.4%	0.5%
SWR	356	1.9%	43.3%	99.2%	98.6%
THY	337	1.8%	0.0%	0.6%	0.6%
DAL	310	1.6%	0.0%	0.0%	0.0%
GEC	186	1.0%	2.7%	4.3%	4.3%
-	2518	13.3%	56.3%	28.0%	27.4%

Table 15. Global Figures per airline – Dakar Oceanic FIR

Note that 6 of 15 main airlines in Dakar Oceanic FIR do not have RNP4 capability.

On the other hand, considering the foreseen evolution of EUR/SAM Corridor, several additional analyses have been accomplished for each FIR:

- **Flight level distribution:** Flight level FL360 was the most required one. Likewise, the 27% of traffic in Canarias FIR was cleared to FL340 or below.

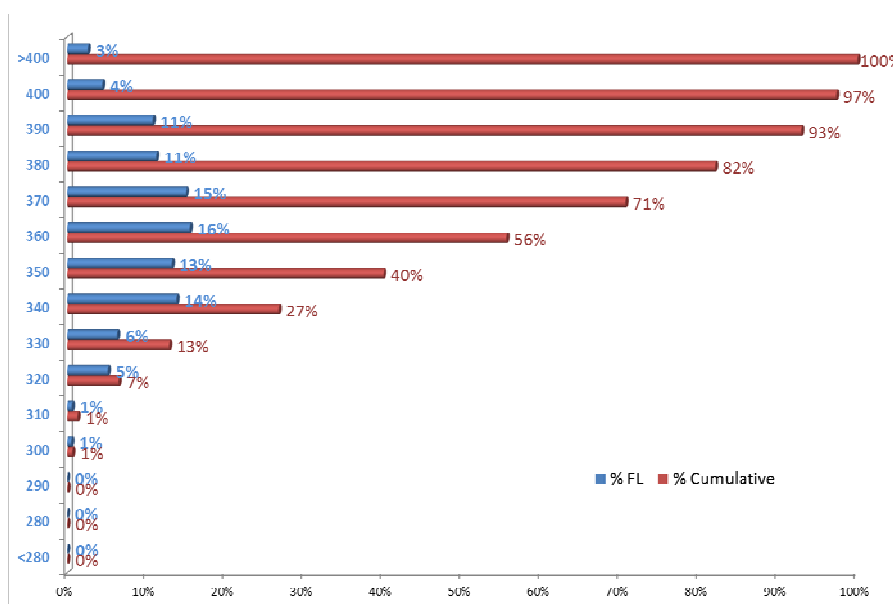


Figure 18. Distribution the Flight Levels in EUR/SAM Corridor – Dakar Oceanic FIR

Note that to prepare this assessment only FL in the border of FIR was considered.

• **Traffic load:**

Next chart shows a summary of traffic load registered in Dakar Oceanic FIR where orange bars represent the maximum number of aircraft that entered in the FIR per hour. The green curve represents the average number of aircrafts that entered in the FIR per hour. The hourly trend of average traffic is very steady during all day. The peak periods of traffic are 01-04, 13-15 and 22-23 UTC.

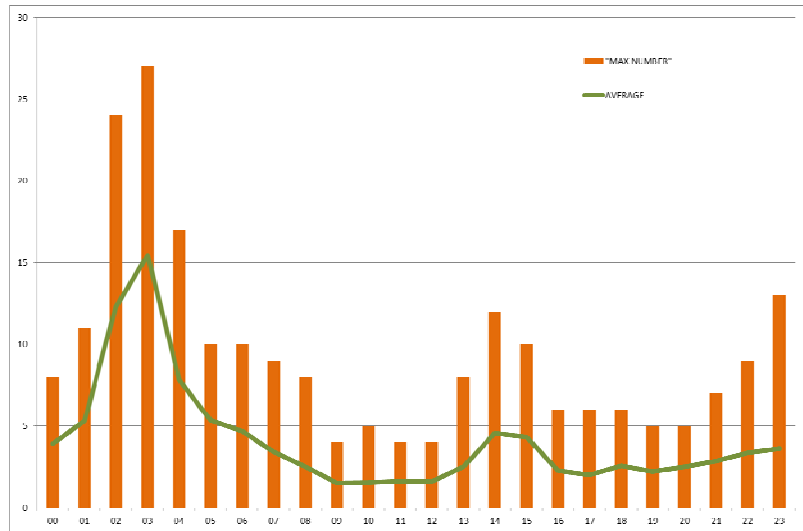


Figure 19. Traffic load (max / average) in EUR/SAM Corridor – Dakar Oceanic FIR

• **Main Flows:**

The following figures and tables try to sum up the operational data provided to SATMA. Most relevant figures are related to the flows in AHORRA airspace and random area (western area of the EUR/SAM Corridor). It is remarked that several random flows connect to The Corridor in NANIK.

TRAFFIC	RND	UN741	UN866	UN873/UB623	UN857	TRANSVERSAL/AHORRA	TOTAL
NORTHBOUND	942		2213	1796	665		5616
SOUTHBOUND	2601	1236		1766	558		6161
TOTAL	3543	1625	2213	3562	1223	4097	15874

Table 16. Distribution per ATS Route – Dakar Oceanic FIR

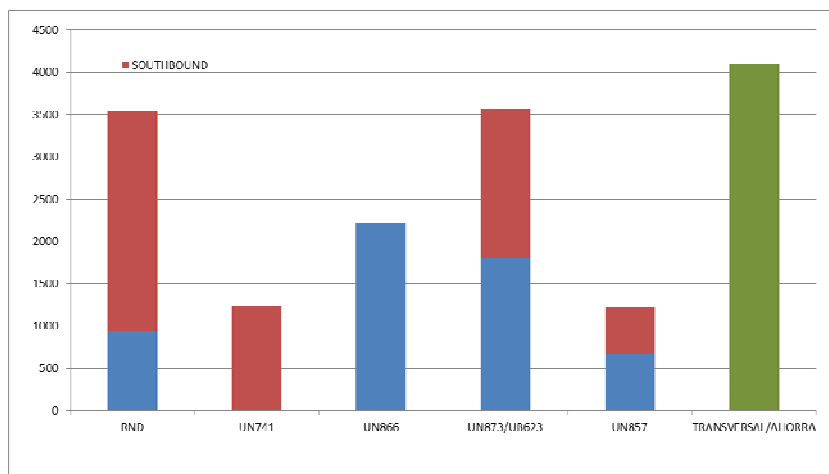


Figure 20. Distribution per ATS Route – Dakar Oceanic FIR

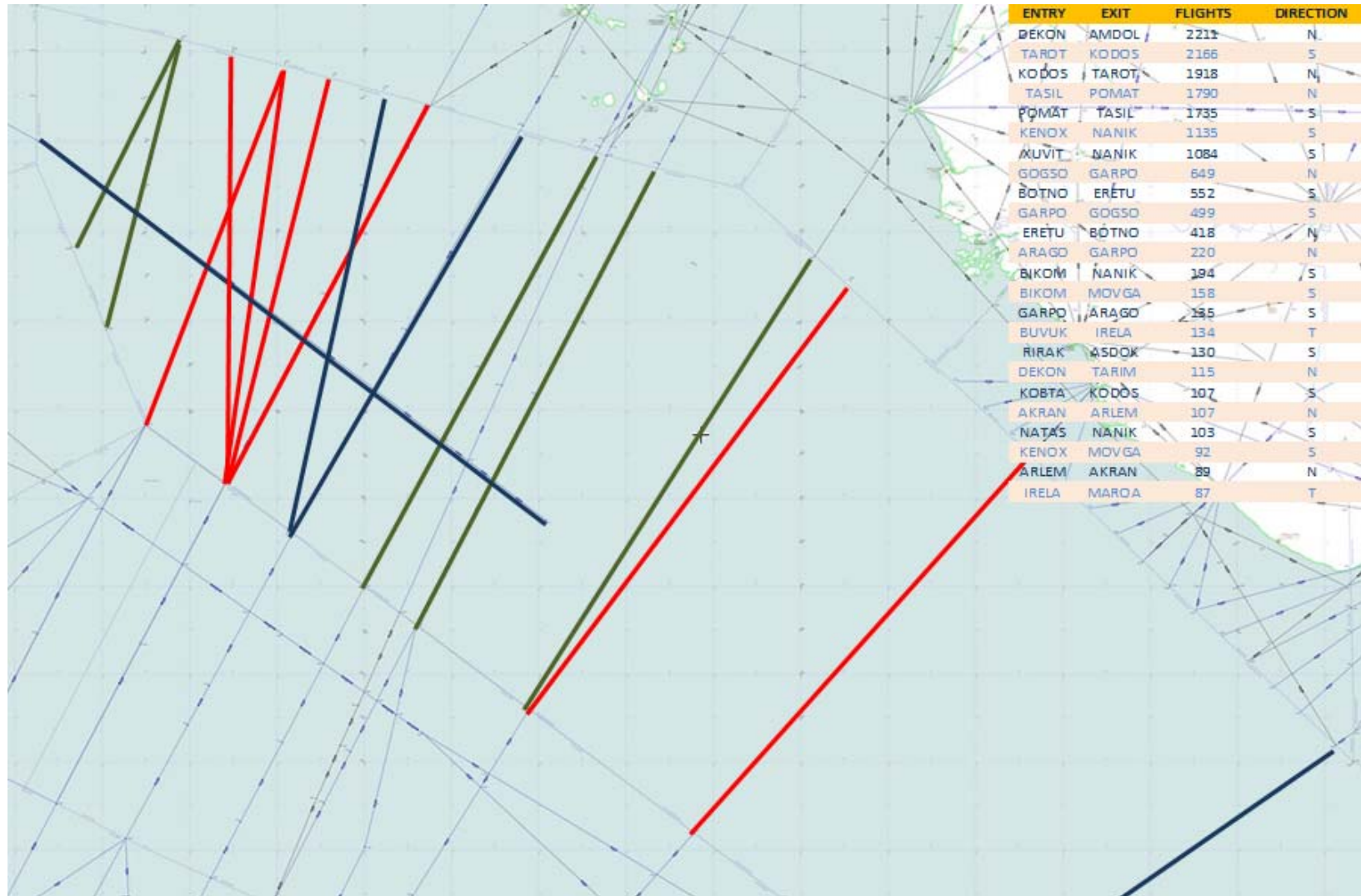


Figure 21. Main Flows of Traffic in the EUR/SAM Corridor – Dakar Oceanic FIR

5. AIR TRAFFIC STATISTICS IN THE EUR/SAM AREA – ATLANTICO FIR

Next table shows the number of flights per month belonging to EUR/SAM or random/transversal traffic (Atlantico FIR). The total number of flights registered in the EUR/SAM area of Atlantico Oceanic FIR has been **21.851** flights. Only 11.892 of them are considered traffics belonging to EUR/SAM Corridor (54.4 % of total).

NUMBER OF FLIGHTS - ATLANTICO FIR							
	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	TOTAL
EUR/SAM	1987	1772	2154	1889	2065	2025	11892
Random / Transversal	1671	1501	1509	1651	1663	1964	9959
TOTAL	3658	3273	3663	3540	3728	3989	21851

Table 17. Global Figures of Flights – EUR/SAM Area – Atlántico FIR

The following bar shows that the traffic in the EUR/SAM Corridor – Atlantico FIR has a similar behaviour in each analysed month. Besides, random/transversal traffic is not significant and number of traffics per day is very alike monthly.

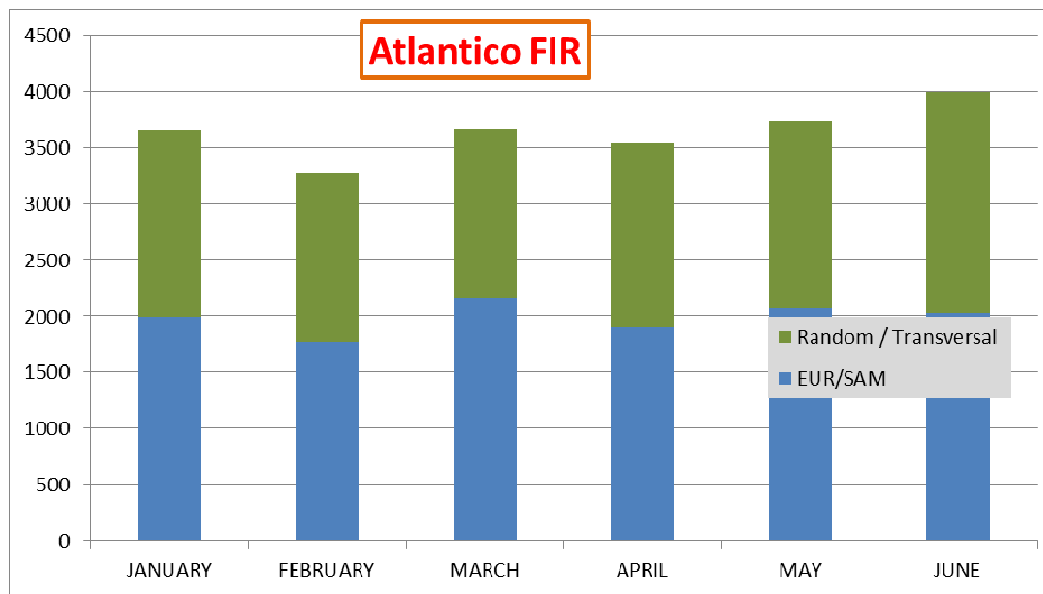


Figure 22. EUR/SAM Corridor vs Transversal/Random –Traffic (Atlántico FIR)

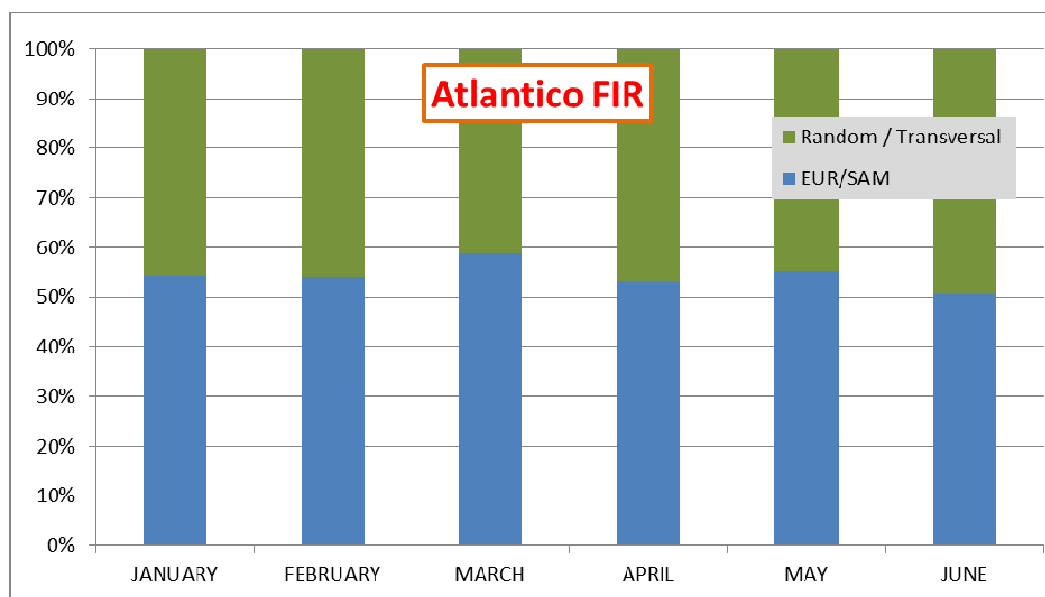


Figure 23. Percentage EUR/SAM Corridor vs Transversal/Random –Traffic (Atlántico FIR)

Regarding FANS 1A and RNP4 capabilities, the global figure in Atlantico FIR shows that **67.4%** of traffic has FANS 1A capability, figure that decreases to **47.1%** regarding RNP4 capability.

	FLEET CAPABILITIES - ATLANTICO FIR					
	FANS 1A	%	RNP4	%	RNP4 + FANS	%
EUR/SAM	9864	82.9%	7951	66.9%	7521	63.2%
Random / Transversal	4865	48.9%	2331	23.4%	2230	22.4%
TOTAL	14729	67.4%	10282	47.1%	9751	44.6%

Table 18. Global figures of fleet capabilities in EUR/SAM Corridor – Atlántico FIR

The following table shows, for the most significant airlines in terms of registered figures, the number of Atlantico FIR during the studied period (six months). Likewise, the percentages of traffic in the EUR/SAM – Atlantico FIR, with FANS 1A and RNP4 capabilities referred to the total number of registered flights are shown.

TRAFFIC PER AIRLINE IN ATLANTICO FIR								
AIRLINE	FLIGHTS	%	% EUR/SAM		% FANS		% RNP4	
TAP	3345	15.3%	3164	94.6%	2986	89.3%	3282	98.1%
AFR	2128	9.7%	1523	71.6%	2079	97.7%	2070	97.3%
IBE	1952	8.9%	1230	63.0%	1585	81.2%	0	0.0%
TAM	1896	8.7%	1605	84.7%	1782	94.0%	1855	97.8%
DLH	1337	6.1%	590	44.1%	1279	95.7%	1275	95.4%
BAW	1033	4.7%	556	53.8%	1008	97.6%	0	0.0%
AZA	1020	4.7%	12	1.2%	960	94.1%	0	0.0%
AEA	927	4.2%	483	52.1%	839	90.5%	0	0.0%
UAE	856	3.9%	0	0.0%	0	0.0%	0	0.0%
ARG	842	3.9%	446	53.0%	0	0.0%	0	0.0%
KLM	754	3.5%	416	55.2%	597	79.2%	597	79.2%
SAA	558	2.6%	0	0.0%	0	0.0%	0	0.0%
DTA	402	1.8%	0	0.0%	0	0.0%	0	0.0%
LAN	371	1.7%	4	1.1%	335	90.3%	2	0.5%
THY	364	1.7%	0	0.0%	78	21.4%	82	22.5%
-	4066	18.6%	1863	45.8%	1201	29.5%	1119	27.5%

Table 19. Global Figures per airline – Atlántico FIR

Note that 8 of 15 main airlines in Atlantico FIR do not have RNP4 capability.

On the other hand, considering the foreseen evolution of EUR/SAM Corridor, several additional analyses have been accomplished for each FIR:

- **Flight level distribution:** Flight level FL360 was the most required one. Likewise, the 23% of traffic in Canarias FIR was cleared to FL340 or below.

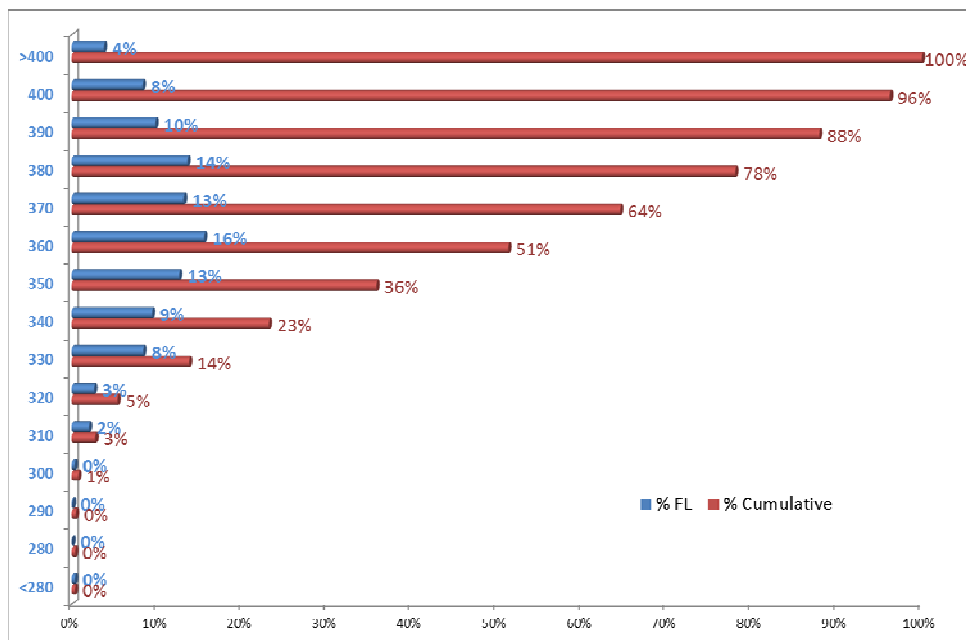


Figure 24. Distribution the Flight Levels in EUR/SAM Corridor – Atlantico FIR

Note that to prepare this assessment only FL in the border of FIR was considered.

• **Traffic load:**

Next chart shows a summary of traffic load registered in Atlantico FIR where orange bars represent the maximum number of aircraft that entered in the FIR per hour. The green curve represents the average number of aircrafts that entered in the FIR per hour. The hourly trend of average traffic is very steady during all day. The peak periods of is 03-06 UTC..

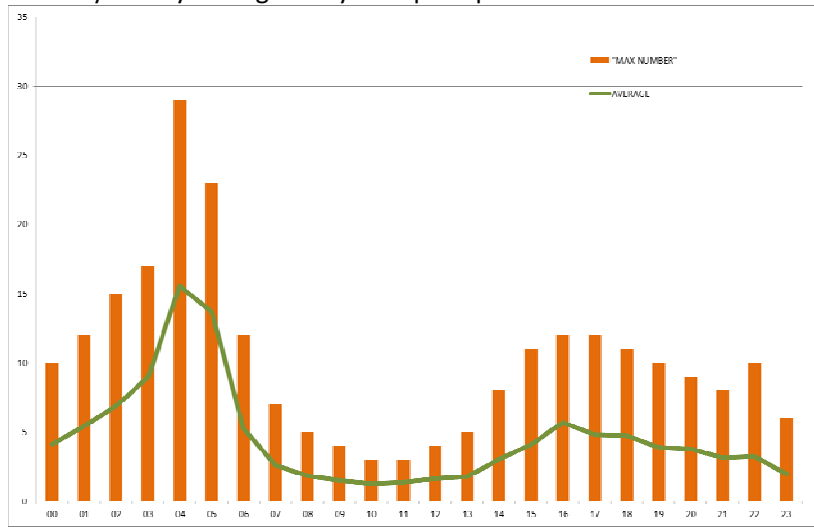


Figure 25. Traffic load (max / average) in EUR/SAM Corridor – Atlantico FIR

• **Main Flows:**

The following figures and tables try to sum up the operational data provided to SATMA.

TRAFFIC	UN741	UN866	UN873/UB623	UN857	TRANSVERSAL/AHORRA/RND	TOTAL
NORTHBOUND		2178	1693	563		4434
SOUTHBOUND	2523		1708	357		4588
TOTAL	1625	2178	3401	920	12829	21851

Table 20. Distribution per ATS Route – Atlantico FIR

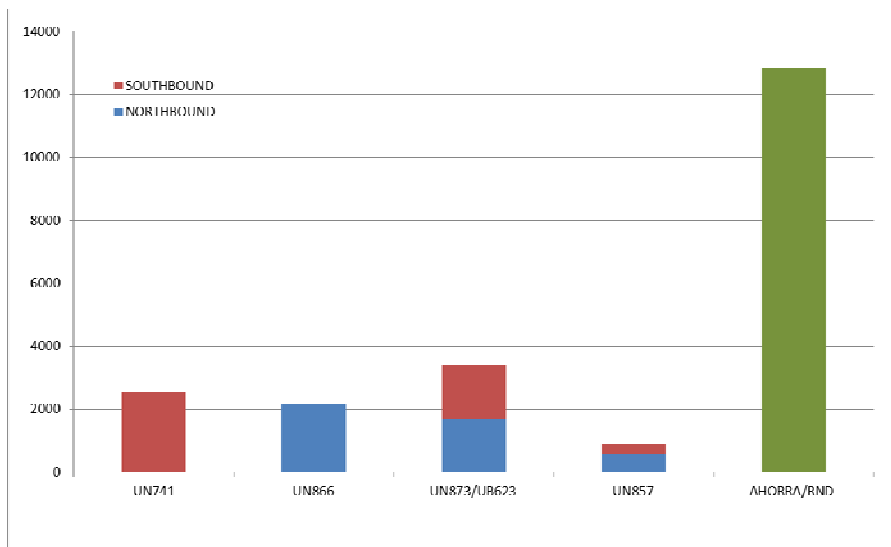


Figure 26. Distribution per ATS Route – Atlantico FIR

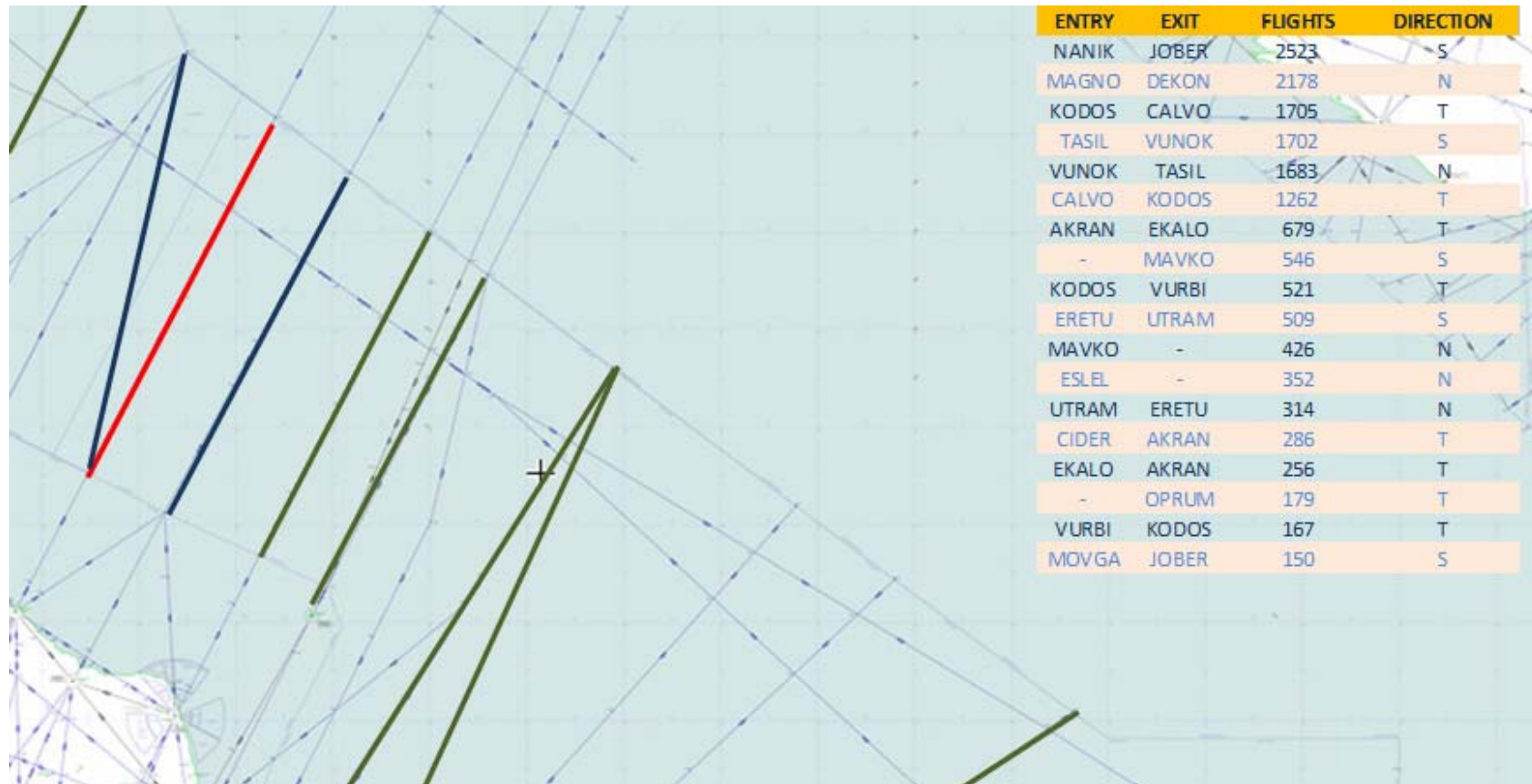


Figure 27. Main Flows of Traffic in the EUR/SAM Corridor – Atlantico FIR