



Central FANS Reporting Agency





Table of contents

- Introduction.
- Example of a report on SACCAN FANS 1/A functionality:
 - Evolution of the FANS 1/A connections.
 - Datalink performance analysis.
 - ADS-C Contracts.
 - Controller-pilot datalink communications
- Conclusions and recommendations.





Introduction





Introduction

- SATMA was committed to develop the CFRA functions in 2010.
- The collaboration and coordination of all the involved States is mandatory, despite not enough information has been sent to date.
- An attempt to start the development of CFRA functions can be made by using the monthly reports sent by SITA.
- Therefore, to achieve this, it is necessary that SITA reports are sent periodically.





Introduction

- The information available is limited to that provided by SITA, this fact entails the consecution of a restricted analysis.
- More complete and detailed analyses are expected to be done in the future.
- These capabilities, which can be develop by the CFRA in the future, have been already done by AENA in its Canary oceanic airspace.
- An instance of this kind of study is presented next.





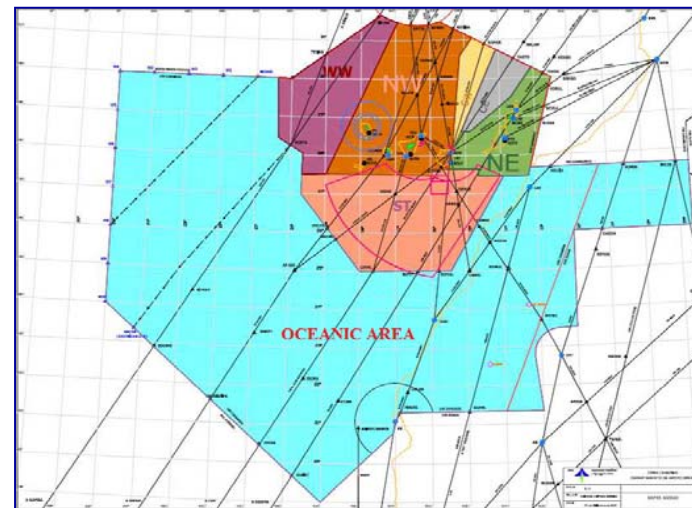
Example of a report on SACCAN FANS 1/A functionality





Example of a report on SACCAN FANS 1/A functionality

- Following sections summarize the results of the monthly report made by AENA to monitor the use of the FANS services in the Canary oceanic airspace. This report is based on:
 - Traffic information from the Oceanic area of the Canaries UIR and,
 - FANS connections recorded in the SACCAN system.
- With the objectives to show tendencies, information has been used from September 2009 to January 2010.





Example of a report on SACCAN FANS 1/A functionality

- Evolution of the FANS 1/A connections.
 - Evolution of FANS connections in relation to the number of flight in the oceanic area and those that reported ADS and datalink capabilities

General information	Jan. 2010	Dec. 2009	Nov. 2009	Oct. 2009	Sep. 2009
N° connected flights	1233	1210	1165	1049	947
% with respect to total flights (Oceanic area)	32.67%	33.16%	32.70%	28.40%	27.59%
% with respect to FANS 1/A equipped flights (Oceanic area)	73.39%	81.59%	77.31%	66.60%	65.36%
N° of flights with CPDLC exchange	1127	1065	1001	901	839

- Principal airlines connected to SACCAN using FANS 1/A technology.

Airline information (Percentage of total connected flights)						
Airline	Jan. 2010	Dec. 2009	Nov. 2009	Oct. 2009	Sep. 2009	Type of airplane
TAM Brazil	22.71%	24.05%	26.35%	24.79%	26.40%	59.83% A330 26.59% B777 13.58% A340
Iberia	19.63%	20.41%	20.17%	20.21%	16.90%	100% A340
TAP Portugal	17.68%	14.96%	14.08%	9.34%	7.18%	100% A330
Air France	17.60%	17.11%	18.03%	21.26%	24.29%	48.90% B777 27.15% A330 21.56% B747 2.39% A340
Lufthansa	6.57%	6.36%	6.35%	7.34%	7.92%	71.44% B747 28.56% A340
Air Europa	5.19%	5.87%	5.24%	4.96%	5.70%	100% A340

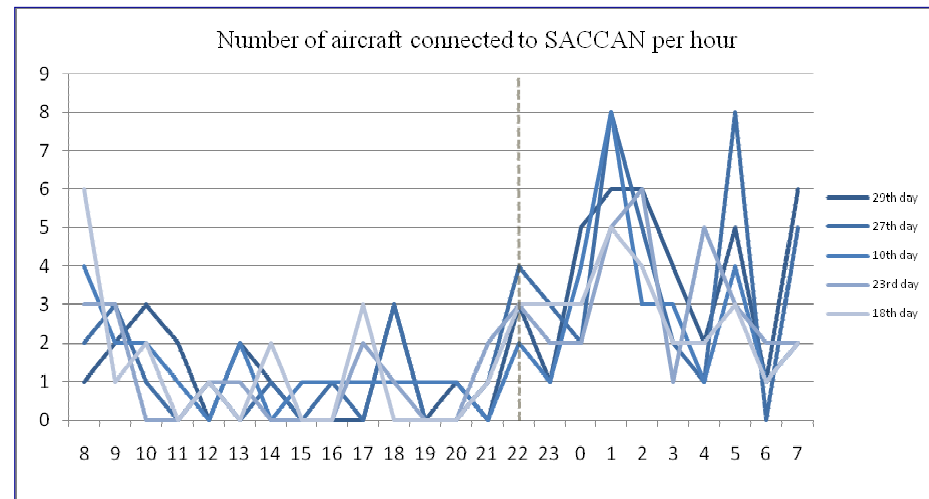




Example of a report on SACCAN FANS 1/A functionality

- Evolution of the FANS 1/A connections.
 - Periods of time in which flights are connected to SACCAN in January 2010 and the distribution of connections per hour (five days with the highest figures)

Day	From 08:00 a.m. to 22:00 p.m.		From 22:00 p.m. to 08:00 a.m.	
	Total	Percentage	Total	Percentage
1	9	25,71%	26	74,29%
2	7	20,59%	27	79,41%
3	8	21,05%	30	78,95%
4	12	28,57%	30	71,43%
5	9	32,14%	19	67,86%
6	14	32,56%	29	67,44%
7	17	43,59%	22	56,41%
8	13	31,71%	28	68,29%
9	15	34,88%	28	65,12%
10	17	36,96%	29	63,04%
11	10	33,33%	20	66,67%
12	14	36,84%	24	63,16%
13	10	32,26%	21	67,74%
14	14	38,89%	22	61,11%
15	12	27,91%	31	72,09%
16	12	30,77%	27	69,23%
17	11	27,50%	29	72,50%
18	16	36,36%	28	63,64%
19	12	30,77%	27	69,23%
20	19	48,72%	20	51,28%
21	11	26,83%	30	73,17%
22	10	23,26%	33	76,74%
23	13	29,55%	31	70,45%
24	11	29,73%	26	70,27%
25	10	29,41%	24	70,59%
26	12	30,00%	28	70,00%
27	13	25,49%	38	74,51%
28	12	30,77%	27	69,23%
29	15	27,78%	39	72,22%
30	12	29,27%	29	70,73%
31	12	29,27%	29	70,73%

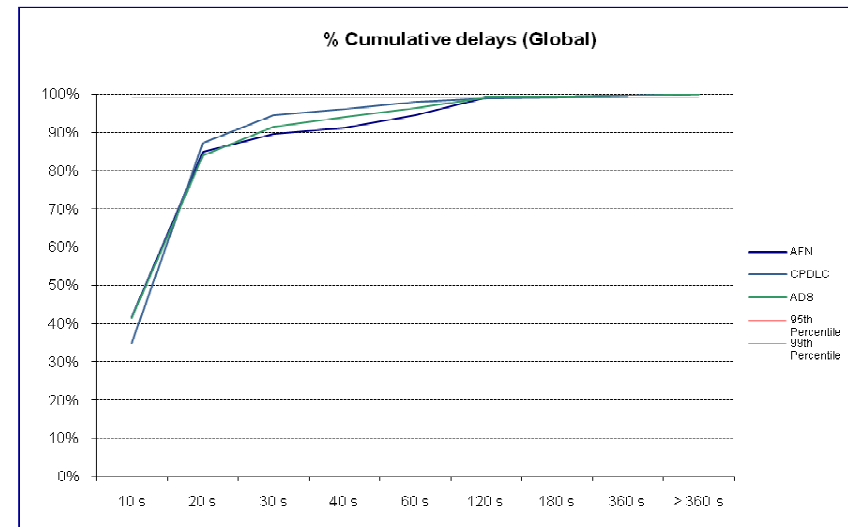




Example of a report on SACCAN FANS 1/A functionality

- Datalink performance analysis.
 - Delay in the reception of the message sent by the ADS and CPDLC communications in the last month analyzed, January 2010.
 - It is presented the downlink message delivery delay at 95% and 99% and its graphical representation.

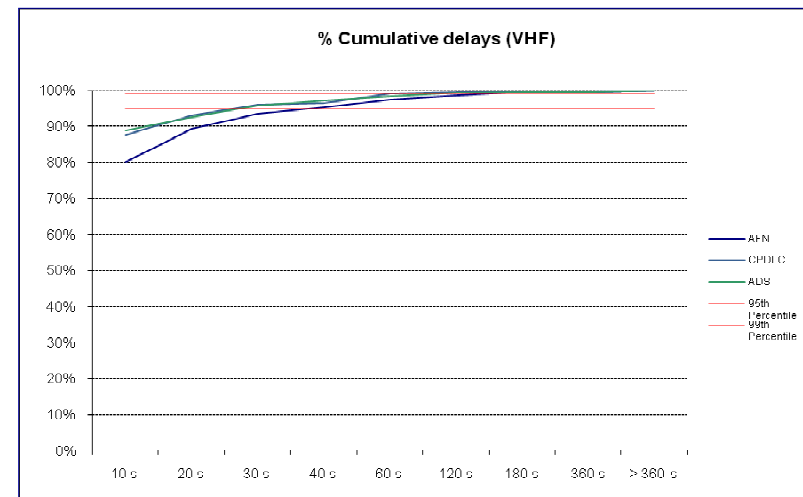
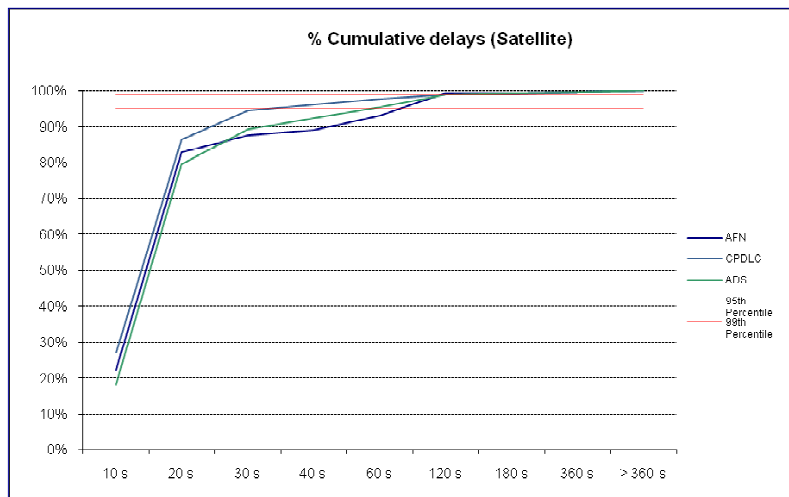
	Figure of delays $\geq 95\%$ (seconds)	Figure of delays $\geq 99\%$ (seconds)
AFN Log On		
VHF	38,503 s.	138,864 s.
Satellite	71,280 s.	112,644 s.
Global	65,447 s.	117,968 s.
ADS Reports		
VHF	27,144 s.	86,944 s.
Satellite	56,555 s.	127,138 s.
Global	45,993 s.	116,326 s.
CPDLC AT		
VHF	21,782 s.	53,201 s.
Satellite	33,682 s.	130,105 s.
Global	32,906 s.	125,740 s.
AFN Log On, ADS Reports and CPDLC AT		
VHF	27,556 s.	89,378 s.
Satellite	55,736 s.	126,132 s.
Global	46,105 s.	116,492 s.





Example of a report on SACCAN FANS 1/A functionality

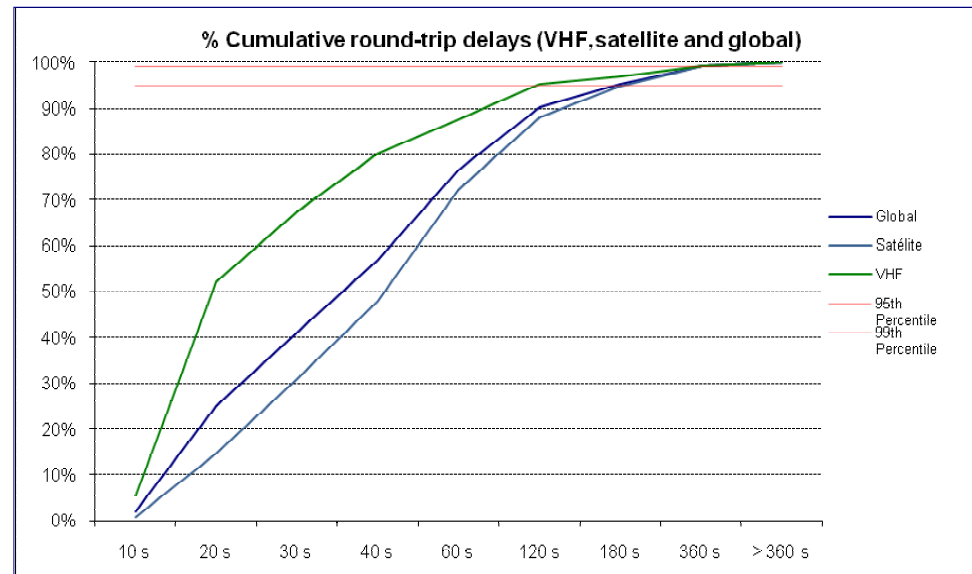
- Datalink performance analysis.
 - Specifically, it is possible to make a comparison between the ways in which the information is transmitted, namely VHF or satellite.





Example of a report on SACCAN FANS 1/A functionality

- Datalink performance analysis.
 - It is also possible to present the round trip time. This time is measured by using ADS-C contracts, from time these contracts are sent until an answer is provided, it also includes time spent by the avionic.





Example of a report on SACCAN FANS 1/A functionality

- ADS-C Contracts.
 - Following tables summarize ADS-C contracts established and the cumulative percentages of FOM values sent in ADS-C messages.
 - It is remarkable that SACCAN is configured to automatically establish one periodic and one event contracts. These are considered a part from the rest of contracts.

ADS-C Contracts	Jan. 2010	Dec. 2009	Nov. 2009	Oct. 2009	Sep. 2009
Initials contracts	1332	1311	1347	1193	998
Periodic contracts (No initials)	123	92	114	95	116
Event contracts (No initials)	105	104	113	106	104
Demand contracts	97	77	81	76	82

FOM	Jan. 2010	Dec. 2009	Nov. 2009	Oct. 2009	Sep. 2009
FOM = 7 (Error < 0.05 NM)	2.31%	1.91%	0.79%	0.75%	1.28%
FOM ≥ 6 (Error < 0.25 NM)	99.13%	99.88%	99.93%	99.95%	99.90%
FOM ≥ 5 (Error < 1 NM)	99.15%	99.88%	99.94%	99.98%	99.91%
FOM ≥ 4 (Error < 4 NM)	99.20%	99.88%	99.94%	99.98%	99.91%
FOM ≥ 3 (Error < 8 NM)	99.34%	99.88%	99.94%	99.98%	99.91%
FOM ≥ 2 (Error < 15 NM)	99.34%	99.88%	99.94%	99.98%	99.91%
FOM ≥ 1 (Error < 30 NM)	99.38%	100%	99.99%	99.98%	99.91%
FOM ≥ 0	100%	100%	100%	100%	100%





Example of a report on SACCAN FANS 1/A functionality

- Controller-pilot datalink communications.
 - Following tables introduce CPDLC functionality, summarizing number and type of uplink message elements (January 2010).

UL message elements	N° of times used	Percentage
[freetext] (normal)	660	54,55%
SQUAWK [beaconcode]	124	10,25%
REPORT LEVEL [altitude]	92	7,60%
CONTACT [icaounitname] [frequency]	87	7,19%
CLIMB TO AND MAINTAIN [altitude]	69	5,70%
PROCEED DIRECT TO [position]	63	5,21%
MAINTAIN [altitude]	26	2,15%
ERROR [errorInformation]	22	1,82%
MONITOR [icaounitname] [frequency]	19	1,57%
ROGER	13	1,07%
RADAR CONTACT [position]	11	0,91%
END SERVICE	5	0,41%
DESCEND TO AND MAINTAIN [altitude]	4	0,33%
[freetext] (distress)	4	0,33%
CONFIRM ALTITUDE	3	0,25%
REPORT PASSING [position]	2	0,17%
CONFIRM SPEED	2	0,17%
REQUEST POSITION REPORT	2	0,17%
AT [position] CONTACT [icaounitname] [frequency]	1	0,08%
RADAR SERVICE TERMINATED	1	0,08%

Type	N° of times used	Percentage
Responses / Acknowledgements	13	1,07%
Vertical clearances	99	8,18%
Crossing constraints	0	0,00%
Lateral offsets	0	0,00%
Route modifications	63	5,21%
Speed changes	0	0,00%
Contact / Monitor / Surveillance requests	231	19,09%
Report / Confirmation requests	101	8,35 %
Negotiation requests	0	0,00%
Air traffic advisories	12	0,99%
System management messages	27	2,23%
Additional messages	664	54,88%





Example of a report on SACCAN FANS 1/A functionality

- Controller-pilot datalink communications.
 - In this case, it is presented the used CPDLC downlink service in January 2010.

DL message elements	N° of times used	Percentage
ROGER	525	31,31%
WILCO	360	21,47%
POSITION REPORT [positionreport]	237	14,13%
[freetext]	213	12,70%
LEVEL [altitude]	81	4,83%
DEVIATING [distanceoffset] [direction] OF ROUTE	74	4,41%
REQUEST [altitude]	58	3,46%
REQUEST CLIMB TO [altitude]	36	2,15%
DUE TO AIRCRAFT PERFORMANCE	20	1,19%
STANDBY	16	0,95%
REQUEST CRUISE CLIMB TO [altitude]	10	0,60%
REQUEST DIRECT TO [position]	8	0,48%
ERROR [errorInformation]	6	0,36%
REQUEST VOICE CONTACT	5	0,30%
REQUEST DESCENT TO [altitude]	4	0,24%
PRESENT ALTITUDE [altitude]	4	0,24%
WHEN CAN WE EXPECT HIGHER ALTITUDE	3	0,18%
NOT CURRENT DATA AUTHORITY	3	0,18%
AT [position] REQUEST CLIMB TO [altitude]	2	0,12%
AT PILOTS DISCRETION	2	0,12%
UNABLE	1	0,06%
AT [position] REQUEST DESCENT TO [altitude]	1	0,06%
AT [time] REQUEST CLIMB TO [altitude]	1	0,06%
REQUEST [speed]	1	0,06%
CLIMBING TO [altitude]	1	0,06%
PASSING [position]	1	0,06%
PRESENT SPEED [speed]	1	0,06%
WHEN CAN WE EXPECT [speed]	1	0,06%
WHEN CAN WE EXPECT LOWER ALTITUDE	1	0,06%
DUE TO WEATHER	1	0,06%

Type	N° of times used	Percentage
Responses	902	53,79 %
Vertical requests	112	6,68%
Lateral offset requests / reports	74	4,41%
Speed requests	1	0,06%
Voice contact requests	5	0,30%
Route modification requests	8	0,48%
Reports	325	19,38 %
Negotiation requests	5	0,30%
Emergency messages	0	0,00%
System management messages	9	0,54%
Additional messages	236	14,07%





Conclusions and recommendations





Conclusions and recommendations

- Due to the lack of suitable information, the start-up of CFRA functions has not been possible to date.
- An attempt to start the development of CFRA functions can be made by using periodical reports sent by SITA. These analyses will be restricted to the information provided by SITA.
- More complete FANS analyses are expected to be done in the future, although it requires that more information is sent to SATMA. An instance of this kind of analysis has been introduced in this presentation.

