INTERNATIONAL CIVIL AVIATION ORGANIZATION
WESTERN AND CENTRAL AFRICAN OFFICE

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Agenda Item 4: System performance monitoring and maintenance

Analysis of FANS services in the EUR/SAM Corridor for the Year 2011 (Canarias FIR/UIR)

(Presented by Aena/Spain)

SUMMARY

The aim of this working paper is to present a summary of monitoring activities carried out by Aena related to FANS 1/A services in Canarias FIR/UIR of the EUR/SAM Corridor.

1. INTRODUCTION

1.1 The present report contains data relative to the performance and use of Future Air Navigation System (FANS) services for the year 2011, concerning aircraft flying in the Canarias FIR/UIR of the EUR/SAM Corridor.

1.2 As the provider responsible for Air Traffic Services in Canarias, AENA oversees FANS 1/A services in Canarias FIR/UIR. This report is the data summary of such monitoring activities for 2011 focusing on traffic overflying the EUR/SAM Corridor part lying in Canarias. Consequently, it only takes into account records from the ADS/CPDLC System of the Canarias FIR/UIR (SACCAN). This report describes the FANS services performance and use in terms of traffic data, data link utilization by aircraft, CPDLC exchange, etc., and includes a brief description of issues found during the research period.

2. BACKGROUND

2.1 During 2010, CFRA functions were committed to SATMA, the South Atlantic Monitoring Agency. These duties included the production of an annual report on FANS-1/A activity within the area of interest for review by the SAT FANS-1/A Interoperability Team (FIT).

2.2 AENA, on behalf of SATMA, conducted the corresponding activities and the resulting report was presented by SATMA in SAT/FIT/6.

3. SCOPE

3.1 The EUR/SAM Corridor covers the routes between Europe and South America crossing the Information Regions (FIR/UIR) of Atlantico, Dakar Oceanic, Sal Oceanic and Canarias. For Canarias data analysis, "EUR/SAM Corridor flights" are considered as those flights either overflying EDUMO, TENPA, IPERA or GUNET, or flying those RANDOM routes with NELSO and/or ROSTA as route waypoints and with exit points at the south of Canarias FIR/UIR defined by coordinates (see Figure 1).

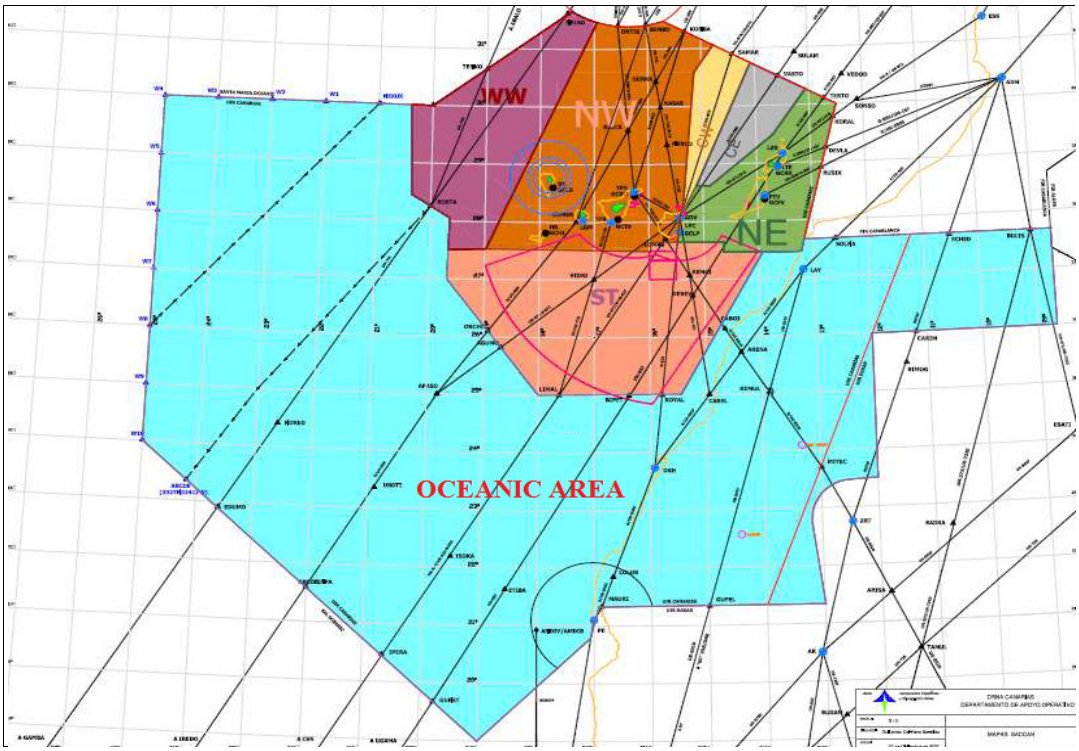

FIGURE 1. Canarias FIR/UIR

Consequently, this report exclusively takes into account records from the ADS/CPDLC System of the Canarias FIR/UIR (SACCAN).

4. TRAFFIC ANALYSIS

4.1 First of all, the following tables introduce the evolution of the FANS 1/A connections during 2011 on SACCAN in relation to the number of aircraft flying in the oceanic area and those ones that, in its flight plan, reported ADS and data link capabilities (See Table 1 "FANS 1/A Equipped flights").

	2011 Mean Value	Max. Value	Min. Value
Number of connected flights (Monthly average)	1658	1843	1482
Percentage referred to total number of flights in the EUR/SAM Corridor	59,07%	62,70%	54,69%
Percentage referred to flights in the EUR/SAM Corridor indicating data link and ADS capacity in the Flight Plan	94,89%	96,66%	93,55%
Number of flights with CPDLC connection (Monthly average)	1546	1712	1410
Number of different aircraft (aircraft registration) connecting to SACCAN (Monthly average)	232	246	208

Table 1 : FANS 1/A equipped flights

4.2 As it can be inferred from the table above, approximately **60%** out of the total flights within the EUR/SAM Corridor connect to SACCAN (though percentage dropped down the last two months), having connected nearly all of FANS equipped aircraft (around 95%). Also, the vast majority of logged-on flights connect to CPDLC application (all months except June and August, between 93% and 96% of the logged-on flights). Finally, the number of aircraft (i.e. number of different aircraft registrations) flying over the EUR/SAM Corridor and making use of FANS services is between 208 and 246 per month.

4.3 In Table 2 shown below, a comparison between the principal airlines connected to SACCAN and using FANS 1/A technology has been depicted.

Airline	% referred to connected flights			
	Annual Percentage	Max. value	Min. value	Average
TAM Brazil	28,05%	30,69%	25,34%	66,02% A330 23,96% B777 10,02% A340
TAP Portugal	22,22%	23,65%	18,99%	100% A330
Air France	15,68%	17,42%	14,49%	64,80% B777 28,70% A330 6,12% B747 0,38% A340
Iberia	14,25%	15,58%	13,19%	100% A340
Lufthansa	5,28%	6,36%	3,97%	65,84% B747 34,16% A340
Air Europa	2,74%	3,84%	1,09%	100% A330

Table 2 : Traffic data summary

4.4 As it is shown, airlines with the highest number of connections in the EUR/SAM Corridor

are TAM Brazil (around 30% in the first half of the year, falling to a 26-27% in the second half) and TAP Portugal (over 20%), comprising both of them about 50% of the total number of connected flights. The next ones, Air France and Iberia, are about 15% each. These four airlines (TAM Brazil, TAP Portugal, Air France and Iberia) comprise about 80% of the total number of connected flights. Adding Lufthansa and Air Europa to the previous four ones, percentage increases up to about 85-90%.

4.5 Almost all connected aircraft are either Airbus A330, Airbus A340, Boeing B747 or Boeing B777. Next figure illustrates the percentage of main type of connected aircraft flying in the EUR/SAM Corridor.

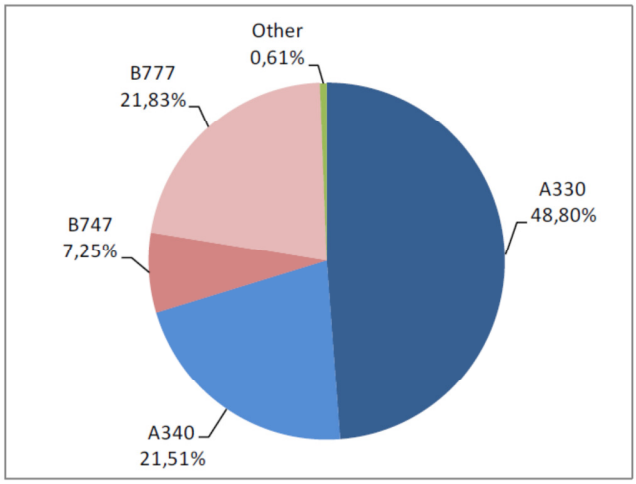

FIGURE 2. Total percentage of main type of connected aircraft

5. COMMUNICATIONS NETWORK PERFORMANCE

5.1 DATA LINK MEDIA

The percentage utilization value per data link media used for air-to-ground (i.e. downlink) communications is depicted below. It shows that the satellite link is primarily used (around 70% of the times), maintaining similar values along the year of study.

Data link type	Percentage of Utilization												
	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Annual cumulative percentage
Satellite Link	72,04%	67,84%	69,82%	70,60%	71,07%	69,22%	67,70%	67,33%	66,54%	65,80%	70,17%	69,01%	68,87%
VHF Link	27,96%	32,16%	30,18%	29,40%	28,93%	30,78%	32,30%	32,67%	33,46%	34,20%	29,83%	30,99%	31,13%

Table 3 : Percentage of data link utilization in 2011

5.2 AIR-TO-GROUND MESSAGES DELAYS

Percentage data for annual downlink messages delay, and annual maximum and minimum values are shown in Table 4, providing indication of surveillance elapsed time (ADS) and communications (CPDLC) downlink messages delivery.

Parameter	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Annual cumulative percentage
95% VHF delay	29,238 s.	25,800 s.	27,245 s.	27,080 s.	27,623 s.	25,360 s.	25,236 s.	20,722 s.	22,140 s.	23,823 s.	27,087 s.	20,568 s.	25,538 s.
95% SAT delay	53,611 s.	50,000 s.	49,932 s.	52,357 s.	55,026 s.	51,668 s.	49,476 s.	49,141 s.	53,926 s.	56,623 s.	53,379 s.	45,008 s.	51,484 s.
95% ALL delay	45,430 s.	43,116 s.	42,856 s.	44,116 s.	44,372 s.	41,988 s.	41,245 s.	39,420 s.	41,068 s.	41,941 s.	44,758 s.	37,238 s.	42,322 s.
99% VHF delay	67,912 s.	72,096 s.	65,513 s.	66,118 s.	60,648 s.	73,671 s.	69,192 s.	58,918 s.	57,303 s.	56,012 s.	65,416 s.	49,816 s.	63,072 s.
99% SAT delay	101,616 s.	102,418 s.	103,586 s.	103,632 s.	103,814 s.	100,545 s.	100,884 s.	96,407 s.	101,906 s.	102,030 s.	102,256 s.	99,084 s.	101,412 s.
99% ALL delay	98,544 s.	98,680 s.	98,704 s.	99,028 s.	98,896 s.	97,524 s.	97,541 s.	90,936 s.	95,540 s.	95,148 s.	98,272 s.	93,154 s.	97,044 s.

Table 4 : Delay parameter

This table presents delay values for which 95% and 99% of air-to-ground transit times (calculated from message time stamp and message reception time in SACCAN) remain below, grouped messages altogether) and data link media (VHF, Satellite and Satellite plus VHF together).

As it is seen in Table 4, 95% of calculated times are never greater than 60 seconds whilst 99% of calculated delays are well below 180 seconds. Figures are not constant throughout the analyzed year but, generally speaking, there are not major differences from mean values in each case. As expected, data largely depend on data link media, being satellite delays greater than VHF delays.

6. AUTOMATIC DEPENDENT SURVEILLANCE

6.1 ADS CONTRACT REQUESTS

In the Canarias FIR/UIR, initial ADS contracts are automatically set with every logged-on aircraft. These initial contracts consist of a 15 minute periodic contract, requesting the transmission of earth reference and predicted route groups with every periodic report, and an event contract including waypoint change and lateral deviation events, the latter with a 5 nautical miles threshold. Though a new periodic contract can be subsequently requested, it is seldom done. Event contracts including vertical rate change or altitude range events are occasionally established. At times, demand contracts are also requested.

Initial Contracts (monthly average)	Non initial contracts (monthly average)		
	Periodic	Event	Demand
1776	118	123	95

Table 5 : ADS Contract Request

Also, in 2011, 5 emergency periodic contracts and 1 emergency demand contract have been requested. The CPDLC link was always active and, when a dialogue existed, it did not show any unusual or emergency situation.

6.2 FIGURE OF MERIT (FOM) ANALYSIS

This subsection presents the Figure of Merit parameter (FOM) analysis from ADS messages transmitted by A/Cs and received by SACCAN. FOM is a parameter included in every ADS report that provides information about how precise the notified A/C position is and, therefore, the quality of the ADS surveillance data.

FOM	Jan 2011	Feb 2011	Mar 2011	Apr 2011	May 2011	Jun 2011	Jul 2011	Aug 2011	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Annual cumulative percentage
FOM = 7 (Error < 0,05 NM)	2,05%	1,32%	2,88%	1,78%	1,43%	0,61%	0,85%	0,75%	1,04%	1,19%	1,78%	2,05%	1,46%
FOM ≥ 6 (Error < 0,25 NM)	99,95%	99,92%	99,97%	100,00%	99,90%	99,88%	99,88%	99,99%	99,96%	99,99%	99,95%	100,00%	99,95%
FOM ≥ 5 (Error < 1 NM)	99,95%	99,96%	99,98%	100,00%	99,95%	99,88%	99,88%	99,99%	99,96%	99,99%	99,95%	100,00%	99,96%
FOM ≥ 4 (Error < 4 NM)	99,95%	99,97%	99,98%	100,00%	99,96%	99,88%	99,89%	99,99%	99,96%	99,99%	99,97%	100,00%	99,96%
FOM ≥ 3 (Error < 8 NM)	99,95%	100,00%	99,98%	100,00%	99,96%	99,88%	99,89%	99,99%	99,96%	99,99%	100,00%	100,00%	99,97%
FOM ≥ 2 (Error < 15 NM)	99,95%	100,00%	99,98%	100,00%	99,96%	99,88%	99,89%	99,99%	99,96%	99,99%	100,00%	100,00%	99,97%
FOM ≥ 1 (Error < 30 NM)	99,95%	100,00%	99,98%	100,00%	99,96%	99,88%	99,89%	99,99%	99,96%	99,99%	100,00%	100,00%	99,97%
FOM ≥ 0	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Table 6 : FOM percentage

As it is shown in the table above, 99.95 % of ADS reports received on ground, reported a FOM value equal to 6 or 7, meaning that the position error is always estimated as being either lower than 0.25NM (FOM = 6) or lower than 0.05 NM (FOM = 7), with a probability of 95%.

7. CONTROLLER - PILOT DATA LINK COMMUNICATIONS

This section provides a snapshot of CPDLC utilization by pilots and controllers, indicating the CPDLC message elements interchanged, as well as presenting the uplink and downlink percentage use per element types.

Next table shows the percentage of the most frequently transmitted uplink and downlink CPDLC message elements with respect to the total of transmitted elements (only those elements with an usage greater than 5% in at least one month have been presented in this table). Also, 14 Aircraft Communication Addressing and Reporting System (ACARS) free text message were sent by Controller.

UL message elements	Percentage referred to total		
	2011 value	Max value	Min value
[freetext] *(include UM169 and UM170 elements)	55,08%	58,70%	51,83%
SQUAWK [beaconcode]	11,29%	13,88%	9,87%
CONTACT [icaounitname] [frequency]	10,27%	13,49%	7,77%
REPORT LEVEL [altitude]	6,57%	7,58%	5,51%
CLIMB TO AND MAINTAIN [altitude]	5,18%	6,12%	4,40%

DL message elements	Percentage referred to total		
	2011 value	Max value	Min value
ROGER	34,77%	39,21%	31,56%
WILCO	24,60%	26,83%	21,63%
POSITION REPORT [positionreport]	12,25%	13,39%	10,38%
[freetext] *(include DM67 and DM68 elements)	7,69%	8,93%	6,00%
LEVEL [altitude]	5,23%	5,76%	4,39%
DEVIATING [distanceoffset] [direction] OF ROUTE	4,62%	6,17%	3,65%

Table 7 : Uplink/Downlink Message Elements

The most frequent uplink message element is the “freetext”, by far the most used (more than fifty percent). For downlink elements, the most common ones are the responses “ROGER” and “WILCO”; the “Position Report” and “freetext” elements are also usually transmitted though not as often as the other ones. As far as “ROGER” message element use is concerned, it is to be noticed that ROGER is required as a response to an uplink freetext, except for those cases in which the freetext message is included in a CPDLC message also comprising a message element requiring a WILCO/UNABLE response.

Type	2011 value	Max value [Month]	Min value [Month]
Additional messages	55,09%	58,70% [May]	51,83% [February]
Contact / Monitor / Surveillance requests	21,95%	24,90% [October]	18,83% [April]
Report / Confirmation requests	8,62%	9,87% [April]	7,01% [October]
Vertical clearances	8,00%	9,24% [March]	6,84% [October]
System management messages	4,32%	6,26% [October]	3,43% [November]
Responses / Acknowledgements	1,29%	2,43% [August]	0,51% [April]
Air Traffic advisories	0,36%	1,01% [June]	0,00% [4 months]
Route modifications	0,35%	1,03% [February]	0,00% [September]
Crossing constraints	0,01%	0,05% [November]	0,00% [10 months]
Speed Changes	0,01%	0,10% [December]	0,00% [11 months]
Lateral offsets	0,00%	N/A	N/A
Negotiation requests	0,00%	N/A	N/A
TOTAL MESSAGE ELEMENTS	**2327**	**2729 [May]**	**2018 [December]**

Table 8 : Uplink message element type

As it is shown in Table 7, other frequent downlink message elements are “LEVEL [altitude]”and “DEVIATING [distanceoffset] [direction] OF ROUTE” (both around 5% each month, being the percentage of the “LEVEL” element superior almost every month to the “DEVIATING” element percentage).

Type	2011 value	Max value [Month]	Min value [Month]
Responses	59,82%	63,11% [May]	56,17% [December]
Reports	18,49%	19,85% [March]	16,37% [May]
Additional messages	8,98%	10,15% [January]	6,77% [June]
Vertical requests	6,45%	7,18% [July]	5,56% [February]
Lateral offsets requests	4,63%	6,17% [December]	3,65% [September]
System management messages	0,71%	1,11% [August]	0,37% [December]
Route modification requests	0,62%	1,20% [October]	0,24% [September]
Voice contact requests	0,11%	0,23% [February]	0,00% [August]
Negotiation requests	0,10%	0,24% [November]	0,04% [September]
Speed requests	0,06%	0,16% [July]	0,00% [June]
Emergency messages	0,01%	0,04% [November]	0,00% [10 months]
TOTAL MESSAGE ELEMENTS	**2708**	**3113 [January]**	**2430 [December]**

Table 9 : Downlink message element type

8. POTENTIAL PROBLEMS IDENTIFIED

This section presents a brief summary of those issues and relevant aspects identified during data analysis of A/C connected to SACCAN (Canarias ACC) during 2011 and that should be further analyzed by the relevant stakeholders in the context of a CFRA.

8.1 OPERATIVE ISSUES/RELEVANT ASPECTS

The following subsections list identified aspects which, in principle, only deal with the operation of FANS services, subdivided in two categories: "Air side" (i.e those which probably deal with flight crew actions) and "Ground side" (i.e. those which probably deal with ATSPs).

8.1.1 "Air side"

- Log-On received from aircraft that are not flying towards Canarias FIR/UIR. Different situations have been observed:

    - A/C Log-On received from aircraft do not overflying Canarias FIR/UIR (i.e. during the flight Canarias FIR/UIR airspace is never overflown).

    - A/C Log-On received after A/Cs have left Canarias FIR/UIR. Some of them did not connect to SACCAN during Canarias FIR/UIR overflight.

  According to the current ground system (SACCAN) configuration, all these cases imply the appearance of flights in the HMI of the controller that are not under his responsibility.

- A/C Log-On received when A/Cs are flying far away from Canarias FIR/UIR (several hours before estimated time of entering Canarias FIR/UIR), prior to enter an airspace where ADS/CPDLC is operational. Afterwards, ADS and CPDLC applications are disconnected. Subsequently, aircraft log on again to SACCAN 30 minutes at most before entering Canarias FIR/UIR.

  Apart from the appearance of flights in the HMI that are not under the responsibility of the controller (due to current SACCAN configuration), taking into account that the first Log-On was sent prior to entering an airspace where ADS/CPDLC is operational, it might have happened that the connection with the corresponding control centre had not been established.

- A/C Log-On with incorrect flight identification: It is detected that some aircraft Log-On to SACCAN with incorrect flight identification. The following situations have been identified so far:

  - A/C that Log-On with a two-letter company code in the Flight Identification instead of the expected three-letter code, as contained in the flight plan (i.e. "AAnnnn" instead of "AAAnnnn").

  - A/C Log-On with an erroneous Flight Number.

    Among these situations, it is to be noticed two cases in which the erroneous Flight Number matched the Flight Number of another aircraft that, in turn, unsuccessfully tried to Log-On with its own correct Flight Number, because the first one was still connected to SACCAN.

  With a different SACCAN configuration, such situations would lead to a rejection of the corresponding Log-On. With the current one, it prevents involved flights from an appropriate flight plan correlation, leading to the appearance in the controller situation display of an ADS track with an incorrect flight identification along with a synthetic track (based on flight plan data) with the correct one.

- An A/C Log-On was received with an incorrect aircraft registration (with a different SACCAN configuration such a Log-On would have been rejected), which matched the aircraft registration of another aircraft, which tried to connect afterwards unsuccessfully, being its Log-On message rejected because the registration number was associated to the Flight Number of the first A/C. The disconnection of the first flight occurred when at the end of Canarias boundary.

- Reception of character-oriented applications messages (i.e. applications other than AFN, ADS, CPDLC or "ACARS Free Text" messages) from A/C, such as "Request Oceanic Clearance" (Oceanic Clearance application) or "Request ATIS Report" (ATIS application). This situation occurs in a monthly basis.

  SACCAN treats these messages as if they were "ACARS Free Text" messages. Consequently, if the message is the first one from the concerned aircraft, SACCAN records the aircraft with the flight ID associated to the message. This may lead to the rejection of any subsequent Log-On received while the aircraft is still registered in such a way, if the flight identification notified in the Log-On does not match the one associated to the character-oriented application message.

- Aircraft not declaring ADS capacity in their flight plan have been detected connecting to SACCAN; additionally, flights without CPDLC capability in the flight plan have established a CPDLC connection with SACCAN (Spanish AIC 8/09 requests the notification of ADS and CPDLC capabilities in the flight plan).

- Some A/Cs remain connected to ADS after exiting Canarias FIR/UIR and some of them even after landing (out of Canarias FIR/UIR), still sending reports when on ground. A part of the latter also remain connected after taking off.

  As this causes that A/Cs continue registered in the ground system, when A/Cs take off again (new flight), the system associates the aircraft ADS information with its previous FID. In the specific cases in which the new flight overflies Canarias FIR/UIR (A/Cs fly through Canarias FIR/UIR in both flights), this results in Log-On with the new FID being rejected (apart from the presentation of an ADS track with incorrect flight identification along with a synthetic track with the correct one (becoming a radar track when already under radar coverage), as it is still logged in the system with the previous FID.

8.1.2 "Ground side"

- Flight Plans with incorrect aircraft registration (i.e. it does not match the one notified in the A/C Log-On) or without any aircraft registration are found in ground flight plan database. Log-On for such aircraft are currently accepted but, with a different SACCAN configuration, such situations would lead to their rejection.

- In some situations a CPDLC downlink message "Not Current Data Authority" has been received as reply to an uplink CPDLC message. An analysis of received "Not Current Data Authority" messages showed that some of them were received while the aircraft was already flying over Canarias FIR/UIR or just before entering it. Therefore, in these cases CPDLC communication with aircraft overflying the Canarias area of responsibility is not possible. These situations may have occurred because either the previous data authority did not send the CPDLC message "END SERVICE" on time or concerned aircraft did not receive it.

- Sending of ACARS Free Text messages by controllers; in the considered year, almost always to FANS equipped aircraft with CPDLC link active and connected. Over half of them have been notified as undelivered within the aircraft (a Type B message with Standard Message Identifier "REJ" (Undelivered Uplink Report) is received from the DSP for the corresponding ACARS message).

8.2 TECHNICAL OR INTEROPERABILITY ISSUES

This subsection presents those issues that may entail some technical aspects or that concern the interaction of aircraft and ground systems. As former subsection, they are subdivided in categories: general (issues related to the global process or which are not specific to an application), ADS (those ones regarding the ADS functionality) and CPDLC (those ones concerning CPDLC). For issues in which avionics may be involved, no pattern (regarding e.g. aircraft model) has been identified for the time being.

8.2.1 General Issues

- Some AFN and CPDLC downlink messages are received including an issuing time stamp incoherent with ground clock: message time stamp is later than the time of reception. Due to the fact that some affected messages are CPDLC “Position Report” messages, in which “timeatpositioncurrent” field seems coherent with ground clock but not with its CPDLC message time stamp, some kind of synchronism error might have occurred in the onboard equipment.

- Uplink and downlink messages are being probably sent more than once by the Datalink Service Provider (DSP): nearly 1% of the downlink messages received on ground are duplicated downlink messages and, in the same way, some of the received downlink messages seem to be the consequence of uplink messages received on board more than once.

- In some cases, received Service Messages (SVCs) do not seem to have a justification:

    - SVCs of reason code 212, stating the aircraft number hasn't been identified to DSP, for uplink messages to A/Cs that are logged on to Ground System. Besides, some of these messages are accepted and processed by the A/C, which in turn, sends the concerned responses afterwards.

    - SVCs of reason code 234, indicating that some messages cannot be transmitted via SATCOM link because aircraft is not logged on, despite previous Log-On from aircraft having been received via SATCOM.

    - SVCs of reason code 248, stating the message assurance timer has expired, though message assurance is not requested from ground system.

8.2.2 ADS issues

- Disconnection messages with no reason included are received from an aircraft: bits that define the reason are not present in the message.

- Different reports not generated at the same time, even sometimes with a difference of more than 5 minutes, are sent together in the same ADS message, instead of being sent in different messages.

- Identical reports of Waypoint Change event are received within an ADS message (i.e. the same Waypoint Change event report appears more than once within the ADS message).

- ADS Acknowledgement messages (ACK messages) with a contract number not corresponding to any contract request demanded by the concerned ground system are received.

- Altitude Range event messages are received from some aircraft though no Altitude Range event contract have been requested to them from ground system.
- ADS messages containing unasked optional groups, such as ARF and MET, are received without being included by the ground system in the requested contract.

- ADS reports notifying FOM equal to zero (0) are received. All of them from aircraft already on ground.

8.2.3 CPDLC issues

- Incorrect CPDLC messages received:

    - A CPDLC message is received, containing an initial CPDLC message element (DM48) with illogical data and erroneous characters.

    - Three CPDLC messages are received, which lacked essential information: specifically, the messages received did not have enough bits to constitute even the message element number. As expected, for each one of these messages, an uplink CPDLC error message is sent.

- After sending a CPDLC Disconnect Request to some aircraft (after that, SACCAN considers the aircraft is CPDLC disconnected), it is detected that they continue sending downlink messages which correspond to the CPDLC application. The analysis of these situations has concluded that all of them correspond to B747-400 aircraft, which ignore uplink CPDLC Disconnect Request messages. It is an already known and documented behaviour.

- A/Cs that do not accept CPDLC connection request messages after receiving an uplink CPDLC disconnect request message. The A/C rejects the CPDLC connection by sending a downlink disconnect request message (without any CPDLC message element) instead of a connection confirm message.

- "Insufficient Message Storage Capacity" error messages are received from B747-400 A/C due to the reception on board of uplink CPDLC Free text messages containing a text string superior to 80 characters. B747-400 A/Cs do not accept text length over 80 characters, so they answer with a CPDLC Error message. It is an already known and documented behaviour.

9. ACRONYMS

ACARS Aircraft Communication Addressing and Reporting System
ACC Area Control Centre
ACK Acknowledgement Message
ADS Automatic Dependent Surveillance
ADS-C Automatic Dependent Surveillance – Contract
AENA Aeropuertos Españoles y Navegación Aérea
AFN ATS Facilities Notification
ASECNA Agence pour la Sécurité de la Navigation Aérienne en Afrique et Madagascar
ARF Air Reference Group
ATCo Air Traffic Controller
ATSP Air Traffic Service Provider
ATS Air Traffic Services
CFRA Central FANS Reporting Agency
CPDLC Controller to Pilot Data Link Communications
DL Downlink
DM CPDLC Downlink Message Element
DSP Datalink Service Provider
ETA Estimated Time of Arrival
EUR Europe
FANS Future Air Navigation System
FID Flight Identification
FIR Flight Information Region
FIT FANS-1/A Interoperability Team
FOM Figure of Merit
HMI Human Machine Interface
MET Meteorological Group
NM Nautical Mile
NW Next Waypoint
SACCAN *Sistema* ADS/CPDLC *en el FIR Canarias* (ADS/CPDLC System in the Canarias FIR)
SAM South America
SAT Satellite/South Atlantic
SATMA South Atlantic Monitoring Agency
UL Uplink
UIR Upper Information Region
UM CPDLC Uplink Message Element
VHF Very High Frequency

10. ACTIONS BY THE MEETING

The SAT/FIT/7 Meeting is invited to:

a) Analyze the problems detected in Canarias Airspace regarding FANS services.

b) Take note of the information provided in this working paper.