

*INTERNATIONAL CIVIL AVIATION ORGANIZATION***TWENTY FIFTH MEETING OF THE  
ASIA/PACIFIC AIR NAVIGATION PLANNING AND  
IMPLEMENTATION REGIONAL GROUP (APANPIRG/25)***Kuala Lumpur, Malaysia, 8 – 11 September 2014***Agenda Item 1B: Flight Safety and RASG-APAC Activities****IMPROVING AIR TRAFFIC SAFETY PERFORMANCE***(Presented by IATA)***SUMMARY**

*As noted in the Global Aviation Safety Plan (2014-2016), with air traffic projected to double in the next 15 years, current and emerging safety risks must be addressed proactively. This is particularly urgent for the Asia Pacific Region where the majority of this growth is staged to occur.*

*This paper identifies the need for a wider focus on improving Air Traffic Safety Performance in the Asia Pacific Region in order to address current safety risks as well as to prepare for future ATM capabilities and demands.*

*Strategic Objectives:*

*A: Safety – Enhance global civil aviation safety*

**1. INTRODUCTION**

1.1 As noted in the Global Aviation Safety Plan (2014-2016), with air traffic projected to double in the next 15 years, current and emerging safety risks must be addressed proactively. This is particularly urgent for the Asia Pacific Region where the majority of this growth is staged to occur.

1.2 Airline safety data provided to IATA shows ATS related safety occurrences is the second highest reported event type after bird strike at many major hub airports in APAC, which further supports this concern. Further, a review of IATA global safety data trends reveals Air Traffic Management as a factor in 18% of all go-around events, within two key sub-categories - Inadequate Separation and ATC Service Standard. 31% of all reports ATC instructions affected approach stability.

1.3 Additionally, during the Nineteenth Meeting of the Regional Airspace Safety Monitoring Advisory Group (RASMAG/19) held in May 2014, an assessment of Large Height Deviations (LHDs) was present and noted a significant deterioration in the Region meeting the Target Level of Safety (TLS) for LHDs. Both RASMAG/18 and RASMAG/19 reports indicate a significant number of LHD ‘hotspots’ persisting along FIR boundaries, mostly due to ATC to ATC transfer errors as a result of human factors issues.

1.4 The above information strongly suggests the need for a wider focus on monitoring and support to improve Air Traffic Safety Performance in the Asia Pacific Region in order to address current safety risks as well as to prepare for future ATM capabilities and demands.

## **2. DISCUSSION**

2.1 The establishment of State safety management functions and coordination of safety management activities are prerequisite for the implementation of the Aviation System Block Upgrades.

2.2 These functions include the monitoring of human factors to include Air Traffic Control and Flight crew performance in en-route, terminal approach and runway, the availability of communication, navigation and surveillance systems and flight plan accuracy to name a few.

2.3 While planning for the future, IATA safety data and the current RASMAG reports indicate that urgent action and solutions are also needed to address the known safety risks, but mitigation will not occur through monitoring alone. States will also need support to develop effective and regionally harmonized solutions to address these risks.

2.4 In Africa Region (AFI), ATS incidents are being actively monitored and regional stakeholders are working together to determine the best solutions to address the common and significant issues. The ATS Incident Analysis Group (AIAG) meets annually and has developed mechanisms for the collection and analysis of ATS incidents related to:

- 2.4.1. Human error
- 2.4.2. Data and display
- 2.4.3. Coordination
- 2.4.4. Equipment
- 2.4.5. Non-compliance due to
  - 2.4.5.1. ATC error / Training requirement
  - 2.4.5.2. ATC overload
  - 2.4.5.3. Airspace organization / ATM procedure.

2.5 AIAG data and information is collected from ATS incident reports as well as airline Aviation Safety Reports (ASRs). Representatives from State Air Navigation Service Providers (ANSPs) and airline stakeholders work in collaboration to develop recommendations and suggested initiatives to mitigate the key ATS related safety risks. The report of the 11<sup>th</sup> AIAG Meeting is attached for reference.

2.6 Asia Pacific Region lacks a function similar to AIAG that is focused on the wider aspects of improving air traffic safety performance; and while most of the knowledge and expertise in ATM falls under APANPIRG, the expertise for safety data collection, analysis and the development of Safety Enhancement Initiatives (SEIs) to address safety risks falls under the Asia Pacific Regional Aviation Safety Group (AP-RASG).

2.7 To adequately address both the current Air Traffic safety risks and to prepare for future ATM capabilities and demands, effective coordination between APANPIRG and AP-RASG is required.

## **3. ACTION BY THE MEETING**

3.1 The Meeting is invited to:

- 3.1.1. Support the establishment of processes that collect and exchange air traffic safety related information, similar to that in AFI under AIAG;

- 3.1.2. Support the development of mechanisms that address known air traffic safety concerns and to help ensure the coordination of air traffic safety management functions required to sustain future ATM capabilities;
- 3.1.3. Establish means to enable more coordination with AP-RASG in order to utilize the safety analysis and SEI development expertise of RASG while leveraging APANPIRG mechanisms for the collection of air traffic safety information and the implementation of solutions to improve air traffic safety performance.

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**Report of the Eleventh (11<sup>th</sup>) AIAG Meeting  
Johannesburg, 12 and 13 March 2014**

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## Introduction

1. The 11<sup>th</sup> ATS Incident Analysis Group (AIAG) meeting was held on 12 and 13 March 2014, at Balalaika Hotel in Johannesburg under the chairmanship of Mr. Gerrit Plaisier of KLM.
2. This meeting was attended by eighty-seven (87) participants from forty-one (41) organisations:
  - Aeroportos de Mocambique (ADM);
  - AFI Regional Monitoring Agency (ARMA);
  - Agence pour La Sécurité de la Navigation Aérienne en Afrique et a Madagascar (ASECNA);
  - Air Traffic and Navigation Services - South Africa (ATNS);
  - Botswana CAA;
  - British Airways (BA);
  - Cape Verde (ASA);
  - CANSO;
  - Comair (MN);
  - Delta Air Lines(DL);
  - Emirates airlines (EK);
  - Empresa Nacional de Exploracao de Aeroportos e Navegacao Area - Angola (ENANA);
  - Ethiopia CAA;
  - Federal Aviation Administration (FAA)
  - Ghana CAA;
  - Mozambique Civil Aviation Authority (IACM) ;
  - International Air Transport Association (IATA);
  - International Civil Aviation Organisation –Eastern and Southern African Office & Western Africa and Central Africa Office ESAF and ICAOWACAF);
  - International Federation of Airline Pilots Association (IFALPA);
  - IFATCA;
  - Kenya CAA;
  - Kenya Airways (KQ);
  - KLM Royal Dutch Airlines (KL);
  - Lufthansa (LH);
  - Namibia DCA;
  - Nigerian Airspace Management Agency (NAMA);
  - Régie des Voies Aériennes (RVA) ;
  - SAFAIR;
  - SA Express;
  - Seychelles CAA;
  - Somalia ICAO project;
  - South African Airways (SA);
  - South African CAA;
  - Sudan CAA;
  - Swaziland CAA;
  - TAAG Angola Airlines (DT);
  - Tanzania CAA;
  - Uganda CAA;
  - Zambia DCA and
  - Zimbabwe CAA.



3. In opening remarks, Mr. Gerrit Plaisier, the AIAG Chairman, Mrs Tanja Grobotek, the Regional Director IATA Africa - Safety & Flight Operations (SFO), Mr Gaoussou Konate ICAO WACAF Deputy Regional Director; and Mr. Seboeso Machobane ICAO ESAF Regional officer ATM/SAR, welcomed the participants and wished them success in their deliberations.
4. The 11th AIAG had been divided in three sub-groups with the following roles and responsibilities:
  - Sub-group Chair nominated from airline operator and was responsible for leading the group discussions with the emphasis on cockpit perspective, ensuring that the Methodology (Attachment C) had been followed and together with the group leader from ANSP side, was responsible for preparing the summary report for day 2 of the meeting when a presentation on conclusions was given.
  - Sub-group leader nominated from Air Navigation Service Provider and was responsible for encouraging the discussion with the emphasis on ATM perspective, and together with the group leader from the operators side was responsible for preparing the summary report for day 2 of the meeting when a presentation on conclusions was given.
  - Sub-group moderator nominated from aviation organisations such as ICAO, IATA, and ARMA and was responsible for taking notes on the discussions in the classification table (Attachment D) in accordance with the discussion and Methodology (Attachment C). Moderator was also responsible for reaching consensus on ASRs requiring discussion with another group, and assisting Chair and Group leader in preparation of summary report for day 2.
  - Remaining Sub-group members were representative of airline operators, ANSPs and various organisations who participated in the discussions and analysis.
  - Chairman was responsible for overall proceedings of the meeting.

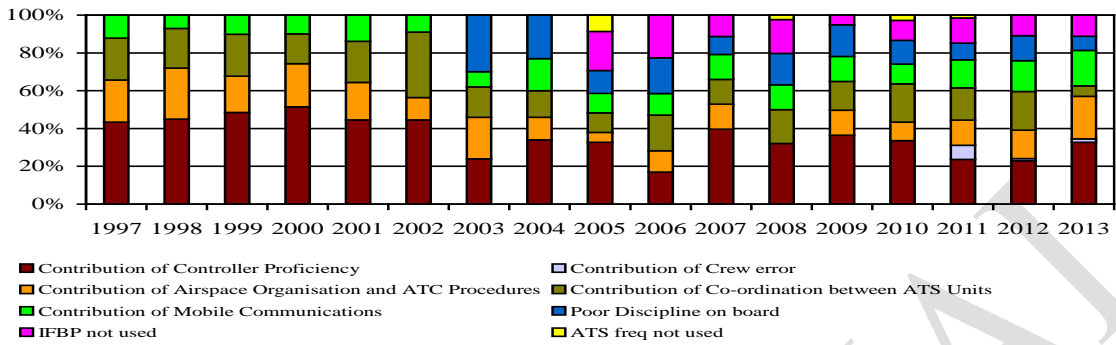
## Reference Papers

5. The Chairman reminded the meeting of the Terms of Reference of the Group. Thereafter, reviewed the Version 2 of methodology introduced to the meeting to ensure that new participants adhere to how AIAG determines an AIRPROX and how the Group draws lessons to be learned from the reports during the analysis.

The following documents are included as attachments;

- List of participants *Attachment A*
- Terms of Reference *Attachment B*
- Methodology *Attachment C*
- Classification table *Attachment D*
- Summary of reported ASRs *Attachment E*

6. In total, AIAG analysed eighty-five (85) reports that were submitted either by operators or Air Navigation Service providers.



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#### Organisations reporting ATS Incidents

7. Eighteen (18) airlines operating in AFI contributed in reporting the reports:

- Air France-AF (8);
- Air Mauritius-MK (2);
- Air Portugal-TP (2);
- Air Namibia-SW (1);
- Alitalia-AZ (1);
- British Airways-BA (8);
- Cargolux Airlines-CV(1);
- Emirates Airlines-EK (4);
- Ethiopian Airlines-ET (3);
- Etihad Airways-EY (1);
- Kenya Airways-KQ (7);
- KLM Royal Dutch Airlines-KL (5);
- Qatar Airways-QR (3);
- Linhas Aereas de Mozambique-TM (1)
- South African AirlinK-4Z (1);
- SN Brussels Airlines-SN (4);
- South African Airways-SA (30);
- Turkish Airlines-TK (1)
- Virgin Atlantic Airlines-VS (1).

8. One (1) Air Navigation Service Providers (ANSP) in reporting one (1) report:

- Democratic Republic of Congo (1);

#### **AIAG Outcome of 2013 Incident Analysis**

9. Of 85 Air Safety Reports (ASRs) analyzed during 11th AIAG meeting:

- 10 reports were determined to not constitute incidents (Events and Non-events);
- 2 reports were inconclusive; thereby resulting in a total of
- 10 ATS incidents; and
- 63 AIRPROX.

10. Among reports classified as AIRPROX:

- 43 were classified as AIRPROX with high risk;
- 15 were classified as AIRPROX with medium risk;
- 5 was classified as AIRPROX with low risk





11. Where ATC separation was compromised it was found that the required separation was restored as follows:

- 11.1 Risk: Separation below standards/Severity was medium:
- In 6 instances it was restored by ATC intervention only;
  - In 3 instances it was restored by pilots only;
  - In 3 instances it was restored by combination of ATC intervention, ATS frequency monitored by pilots, IFBP, TCAS TA and pilot visual awareness;
  - In 3 instances it was restored by combination of ATC intervention, pilot visual awareness and TCAS TA;
  - In 3 instances it was restored by combination of ATC intervention and TCAS TA or TCAS display;
  - In 4 instances it was restored combination of ATC intervention and pilot awareness.
- 11.2 Risk: Separation below standards/ Severity was high:
- TCAS RA in 19 instances;
  - No time for action or previous warning in 1 instance;
  - No previous warning in 1 instance;
  - Combination of last minute separation and no previous warning in 1 instance.

Air Navigation Service Provider Contribution in Investigating ATS Incident Reports

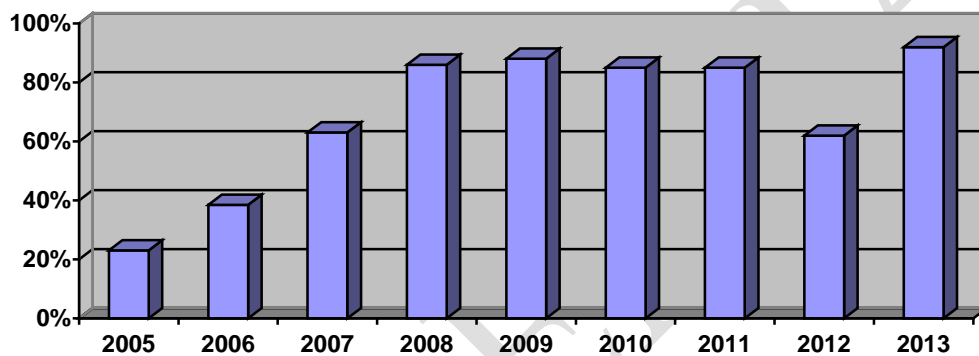
12. The 85 reported ATS incidents occurred in the airspace of FIRs, namely:

- Accra (1);
- Brazzaville (5);
- Bujumbura (1);
- Beira (2);
- Dar es Salaam (4);
- Dakar terrestrial (8);
- Entebbe (2);
- Gaborone (3);
- Harare (8);
- Johannesburg (2) and Cape Town (1);
- Kinshasa (7);
- Khartoum (5);
- Kano (3) ;
- Luanda (6) ;
- Lusaka (5);
- Mogadishu (5);



- Nairobi (7);
- Niamey (5);
- N'Djamena (2);

13. Out of the 85 incidents reported by operators, the concerned air navigation service providers have provided 78 feedbacks, for 7 incidents feedback were not received. Therefore feedback rate for 2013 is 92% for AFI region.

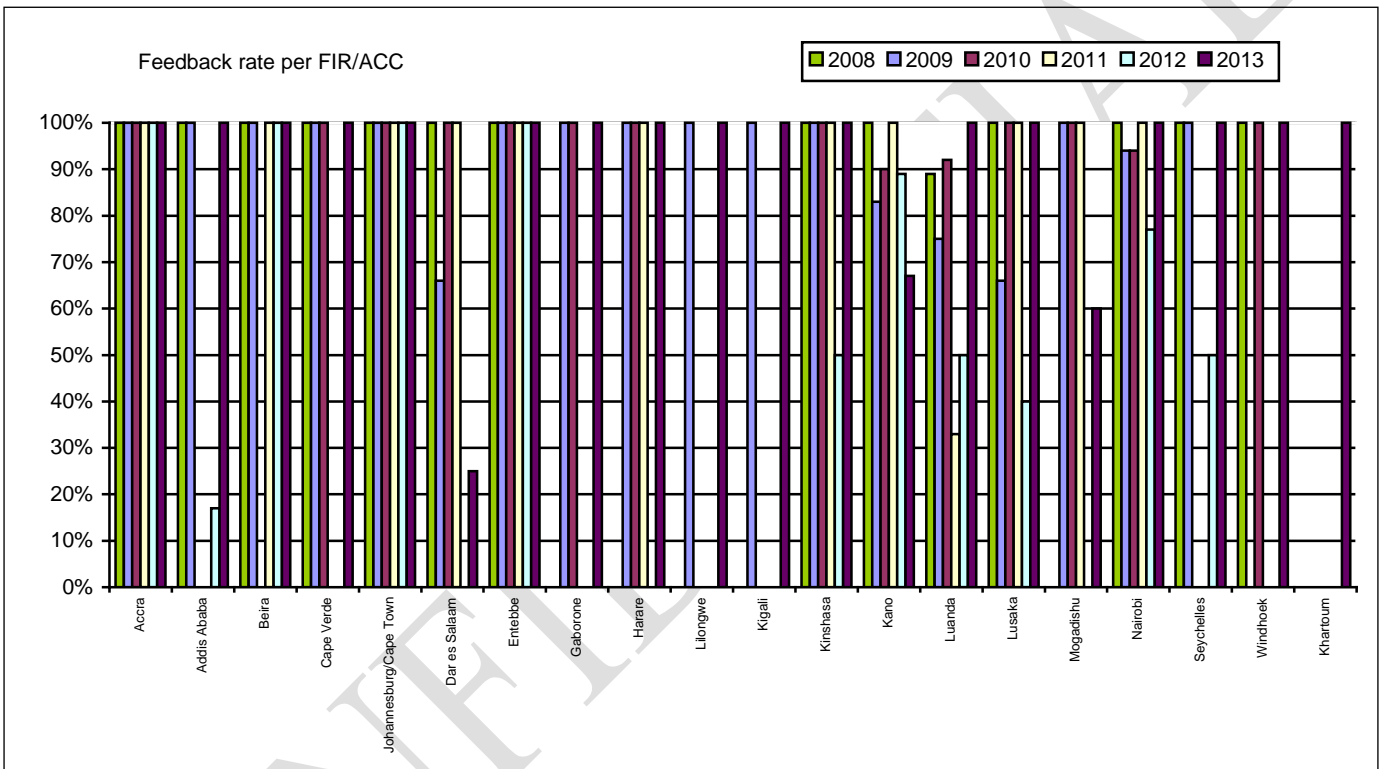


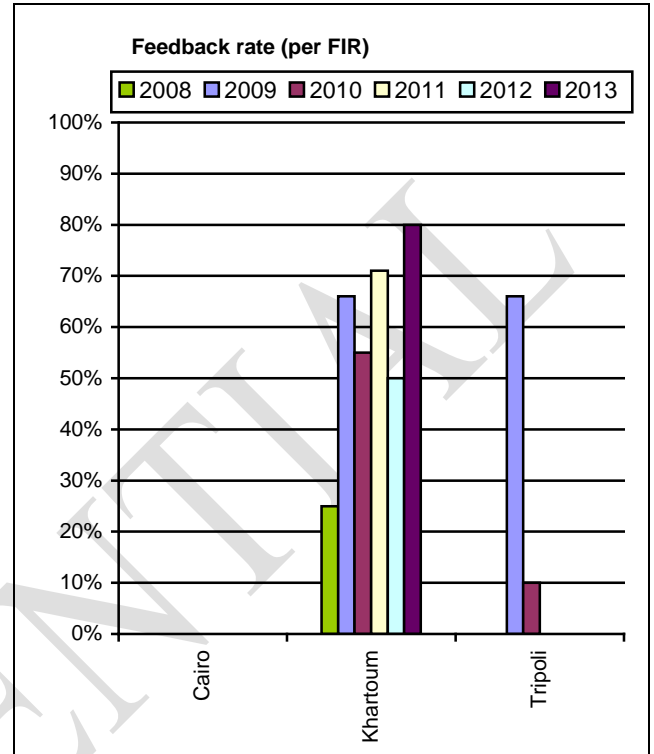
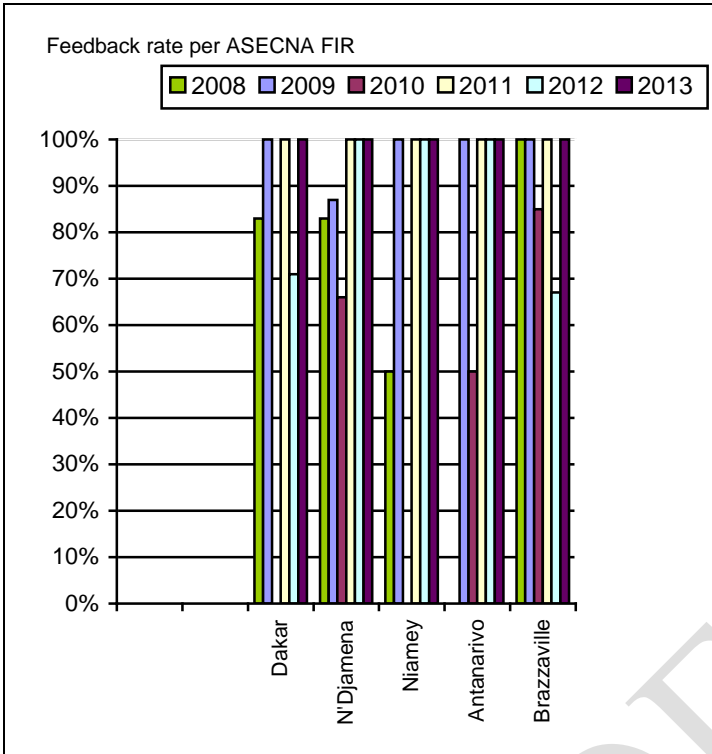
14. However, the responsiveness varied significantly from ANSP to ANSP.

- Mozambique (ADM) – 100%;
- ASECNA provided feedback to 88% of reported incidents:
  - Brazzaville – 100%
  - Dakar – 100%
  - N'Djamena – 100%
  - Niamey – 100%;
- Burundi CAA – 100%;
- Botswana CAAB – 100%;
- South Africa (ATNS) – 100%;
- Ghana CAA – 100%;
- Angola (ENANA) –100%;
- Kenya CAA – 100%);
- Zambia CAA – 100%;
- NAMA (Nigeria) – 67% (one ASR pending investigation report);;



- DR Congo (RVA) – 100% (four ASRs pending investigation report);
- Somalia ICAO – 60% (two ASR pending investigation report);
- Sudan CAA – 80% (one ASR pending investigation report);
- Tanzania CAA – 25% (three ASRs pending investigation report);
- Uganda CAA – 100%;
- Zimbabwe CAA – 100% (one ASR pending investigation report).



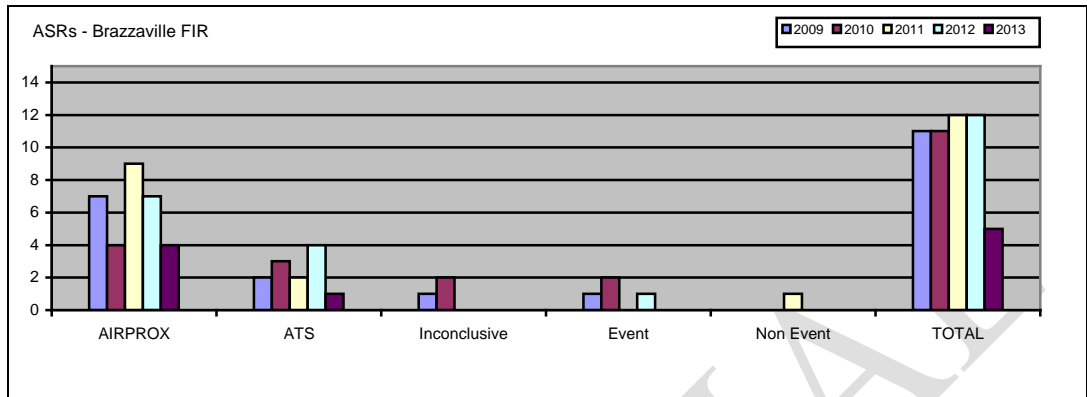


Analysis per FIRs/ACCs

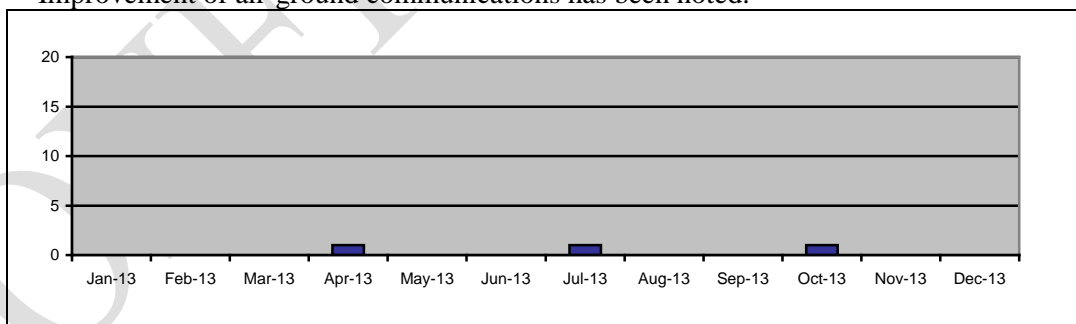
15. ASECNA (ANSP for Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Gabon, Guinea Bissau, Equatorial Guinea, Madagascar, Mali, Mauritania, Niger, Senegal, and Togo). Data from Cairo and Tripoli FIRs were not available.

**15a) Brazzaville FIR**

- Five (5) ASRs were recorded in Brazzaville FIR, of those five ASRs, one occurred on FIR boundary with Kano FIR. Feedback had been received for 100% of these ASRs.
  - Four (4) AIRPROX occurred with one (1) in Douala ACC, two (2) in Libreville ACC and one (1) in Brazzaville ACC,
  - One (1) ATS incident occurred in Douala ACC.



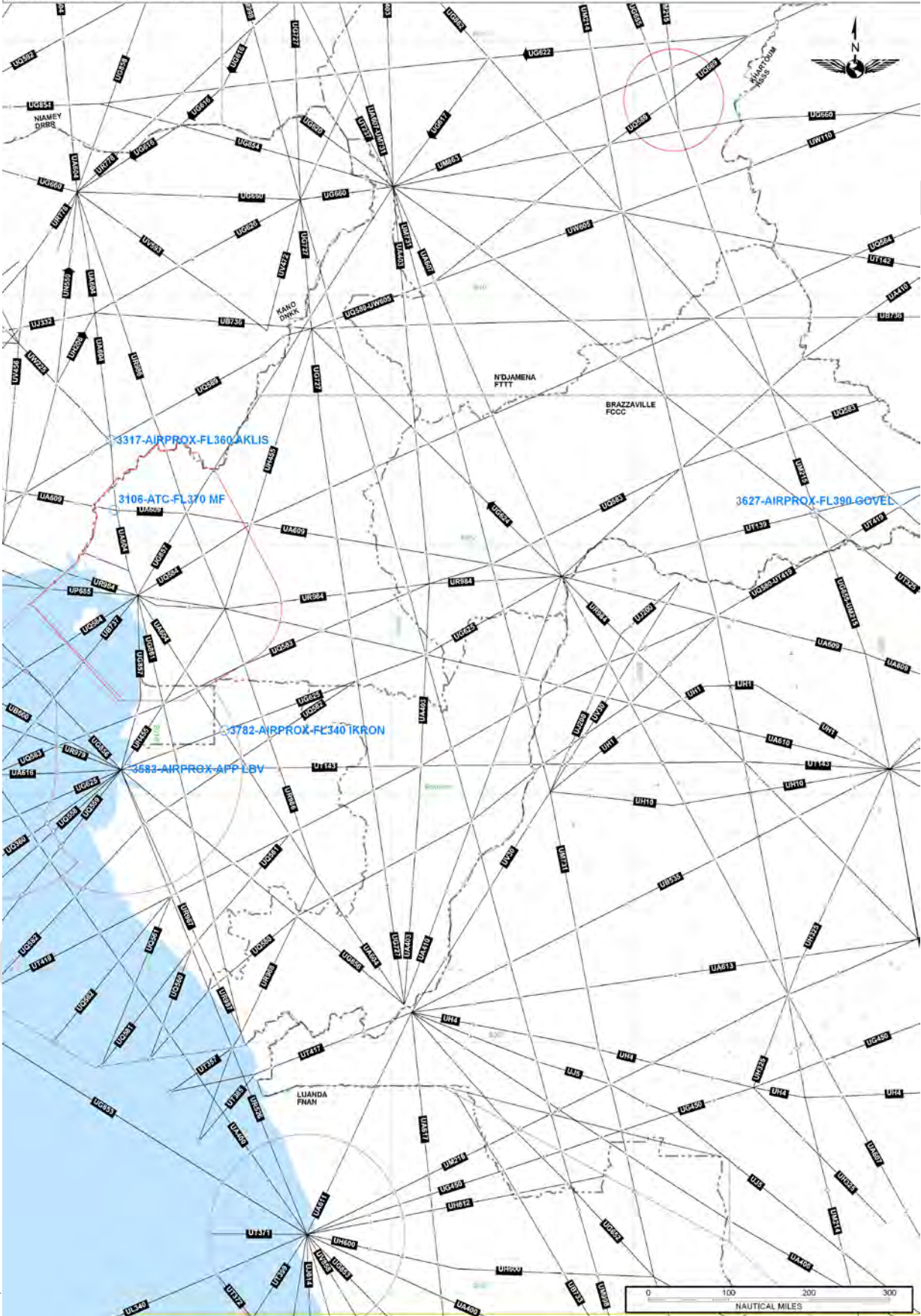
- Causes include (single cause or as combination of):
  - I. Human error (2);
  - II. Coordination (2);
  - III. Communication (2);
  - IV. Equipment (1);
  - V. Non-compliance (4);
  - VI. ATM operations (2);
  - VII. Procedures (1).
- Contributory factors include:
  - VIII. ATC Error / Training requirement (3);
  - IX. Cockpit discipline/Non-compliance (1).
- Communications:
  - Three (3) ASRs reported lack of mobile communications in Brazzaville FIR. Improvement of air-ground communications has been noted.



- **Recommendations:**
  - ATC proficiency factors and compliancy with procedures to be addressed.
  - Coordination with Kinshasa to be improved; AIAG Group was informed that direct link between Brazzaville and Kinshasa ACCs is now available.
- Map



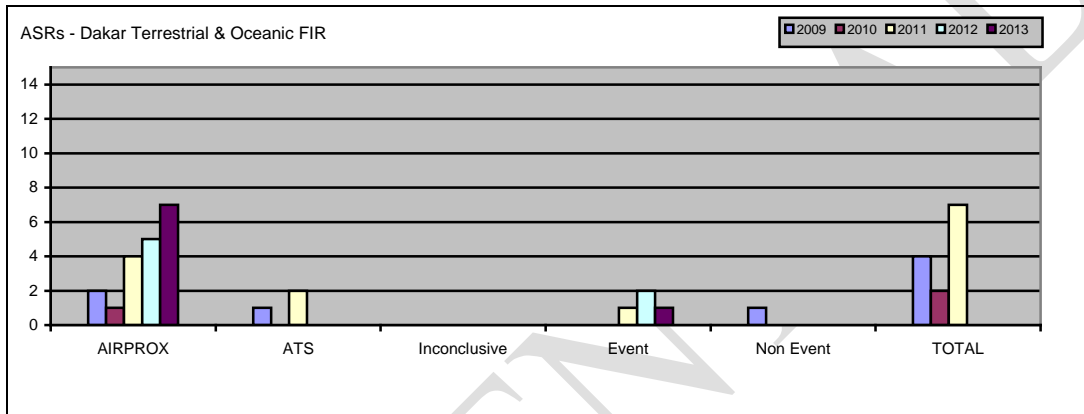
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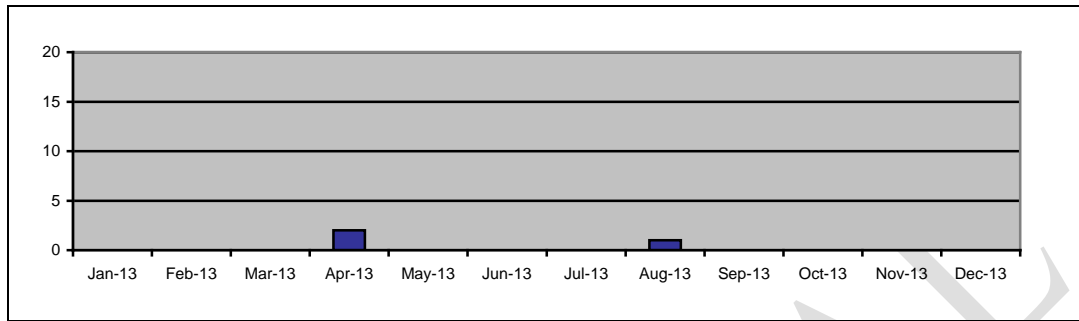


### 15b) Dakar Continental FIR

- Eight (8) ASRs were reported in Dakar Continental FIR. Feedback had been received for 100% ASRs.
  - Seven (7) AIRPROX occurred with four (4) in Nouakchott ACC, two (2) in Abidjan and one (1) in Dakar ACCs;
  - One (1) ASR in Abidjan ACC classified as event.



- Causes include (single cause or as combination of):
  - I. Human error (4);
  - II. Data and display (3);
  - III. Coordination (1);
  - IV. Communication (1);
  - V. Equipment (1);
  - VI. Non-compliance (3);
- Contributory factors include:
  - VII. ATC Error / Training requirement (6);
  - VIII. ATC Overload (2);
  - IX. Airspace organization/ATM procedure (2).
- Communications
  - Three (3) ASRs reported lack of mobile communications in Dakar Continental FIR.

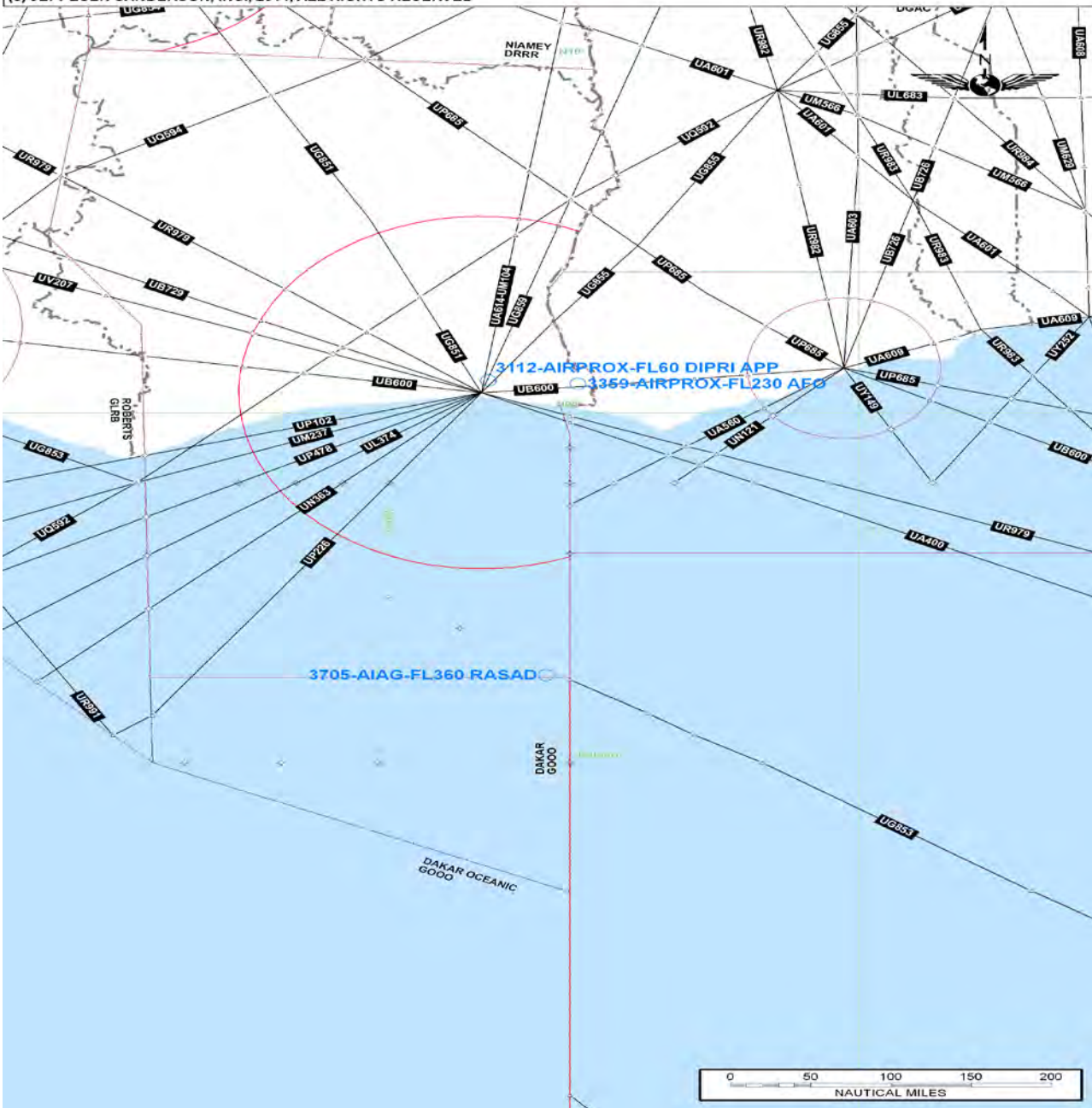


- **Recommendations:**
  - Management of human factors such as but not limited to fatigue, ATC work load, working conditions, and equipment resulting in inadequate ATC proficiency factors need to be addressed
  - Enhance ATC capacity in handling ATM system
  - Re-organization/sectorization of Nouakchott UTA
  
- Map Abidjan UTA

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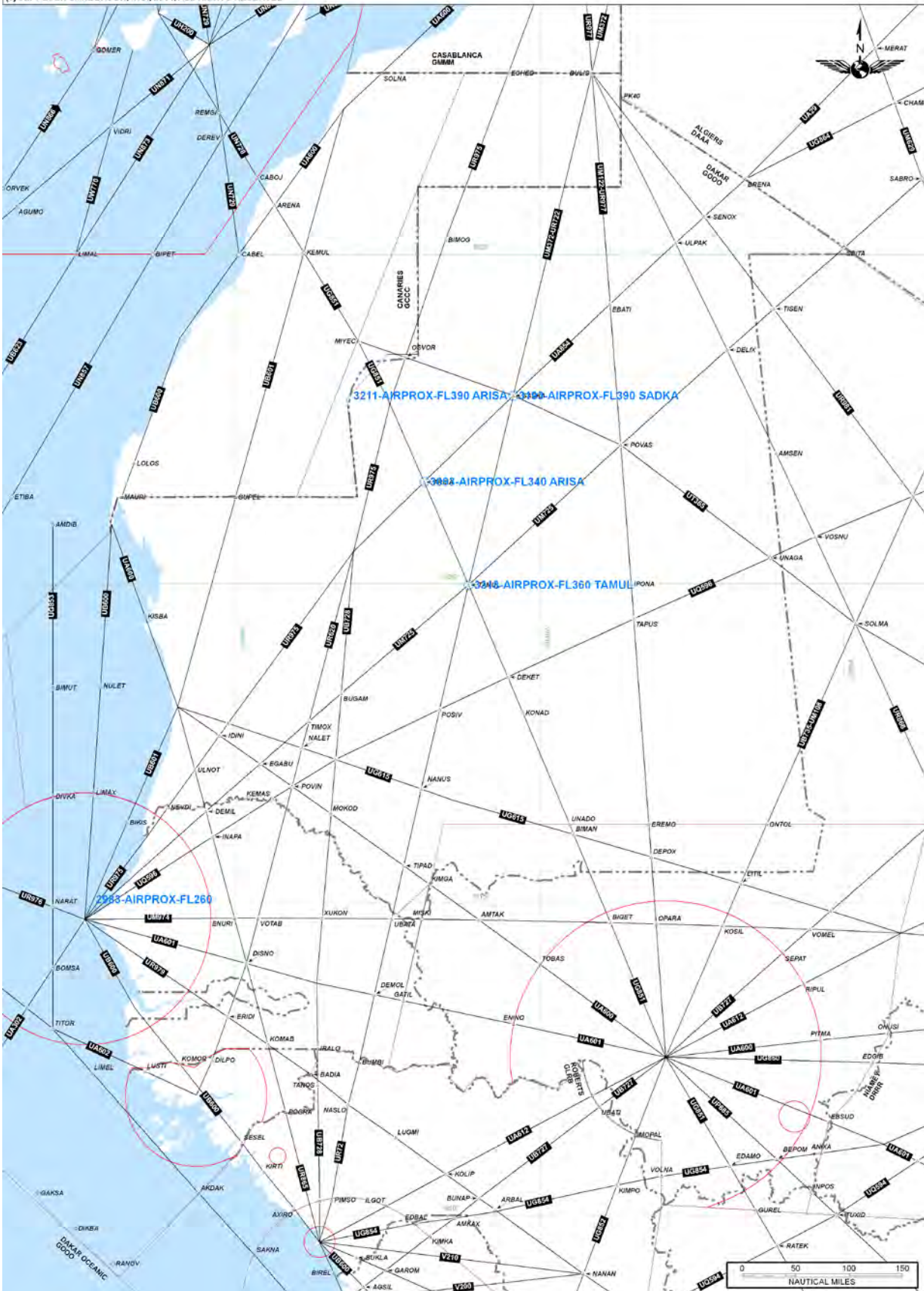
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- Maps Dakar and Nouakchott UTA



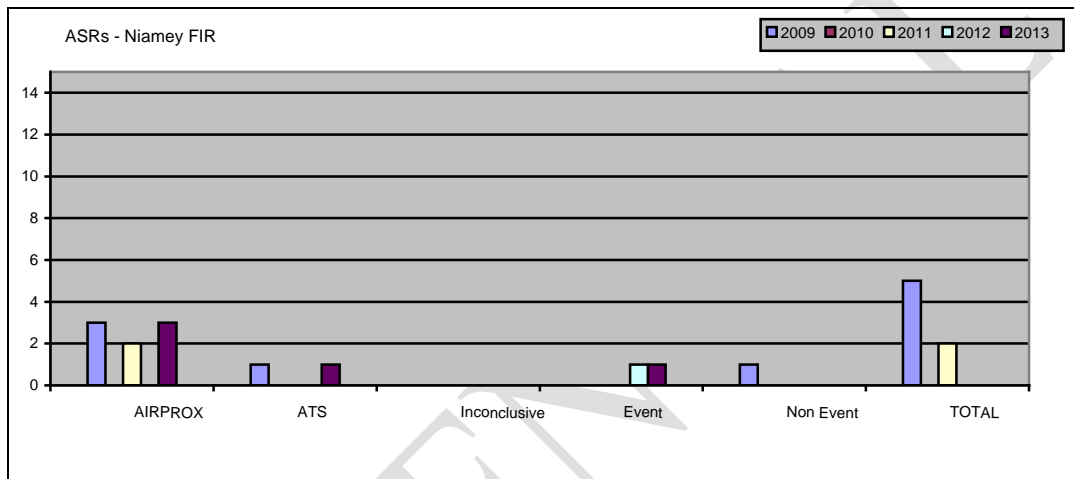
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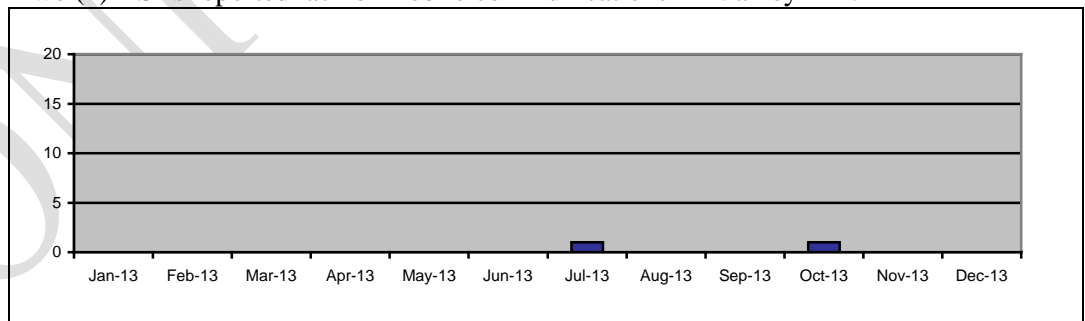


**15c) Niamey FIR**

- Five (5) ASR was reported in Niamey. Feedback had been received for all ASRs – 100% feedback rate.
  - Three ASRs (3) classified as airprox
  - One ASR (1) classified as an incident
  - One ASR (1) classified as an event



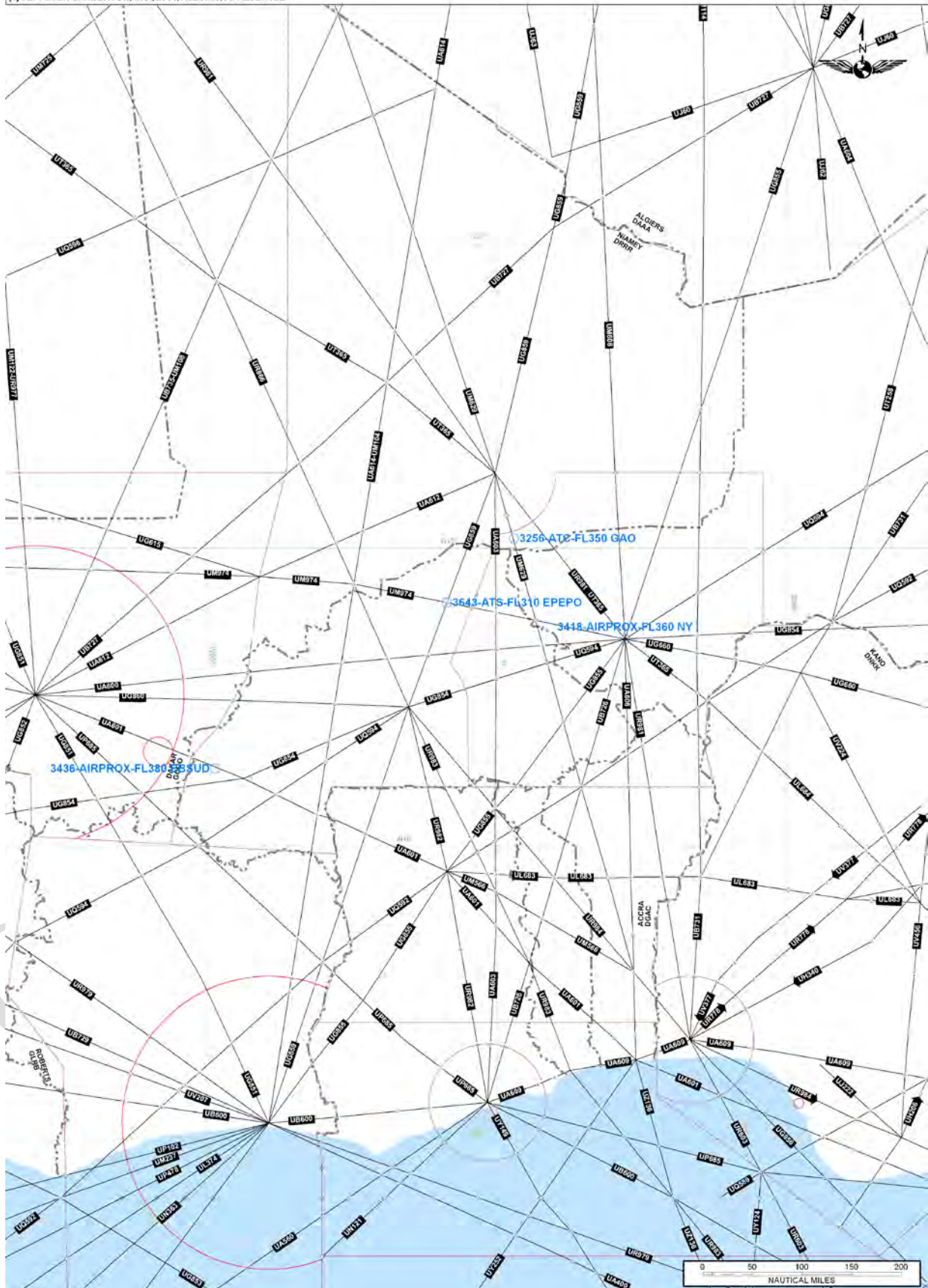
- Causes include (single cause or as combination of):
  - I. Human error (3);
  - II. Communication (1).
- Contributory factors include:
  - III. ATC Error / Training requirement (3);
  - IV. IFBP not being used (3).
- Communications
  - Two (2) ASRs reported lack of mobile communications in Niamey FIR.



- **Recommendation:**
  - ATC proficiency factors to be addressed
  - Usage and Interpretation of CPDLC to be re-enforced based on GOLD Document (TRAINING ATC & CREW).
- Map



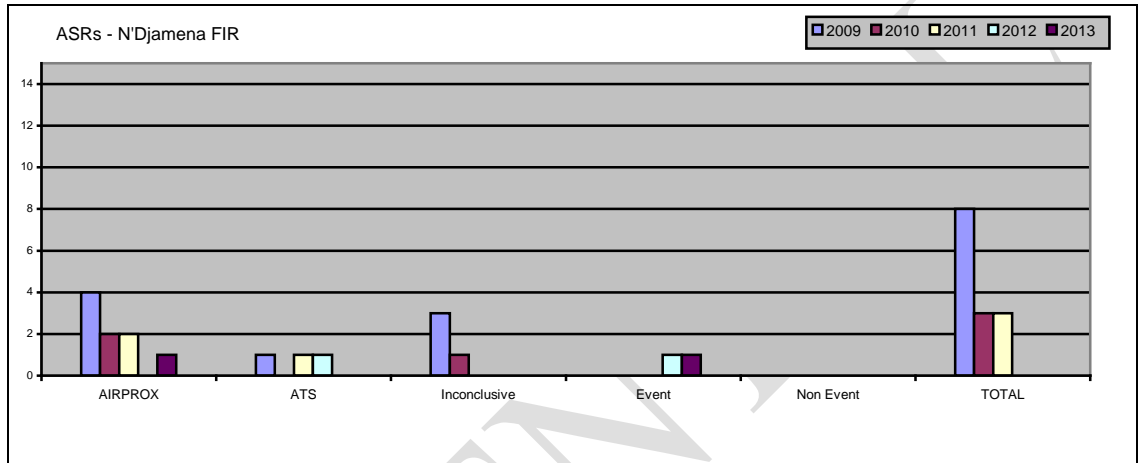
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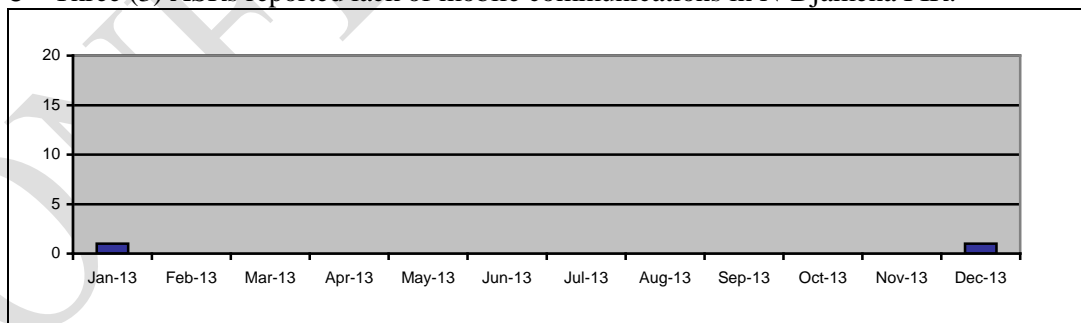


**15d) N'Djamena FIR**

- Two (2) ASRs were recorded in N'Djamena FIR. Feedback had been received for all ASRs – 100% feedback rate;
  - one (1) AIRPROX occurred; and
  - One (1) event occurred.

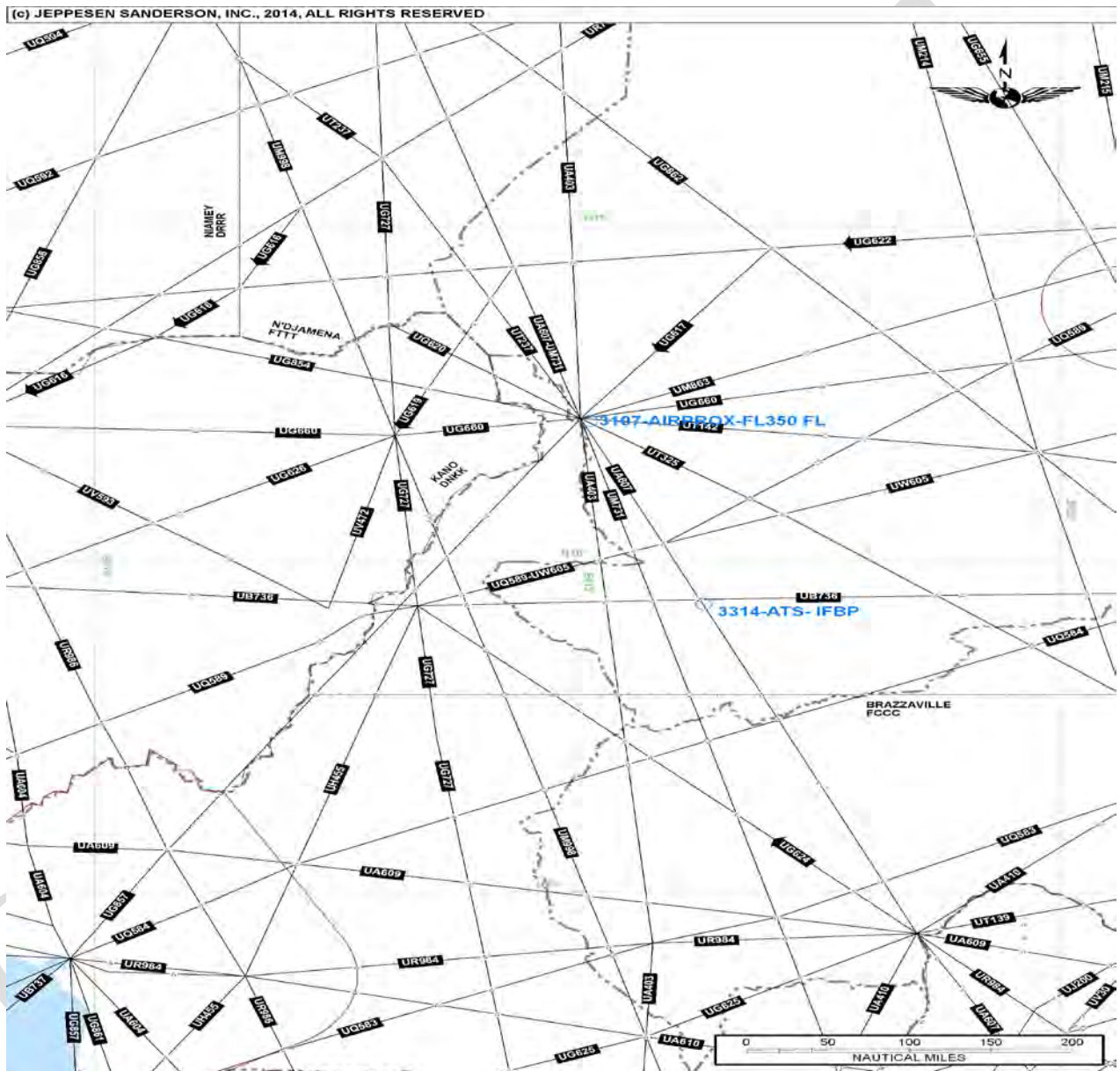


- Causes include (single cause or as combination of):
  - I. Non-compliance (1);
  - II. ATM operations (1).
- Contributory factors include:
  - III. ATC error/Training requirement (1).
- Communications
  - Three (3) ASRs reported lack of mobile communications in N'Djamena FIR.





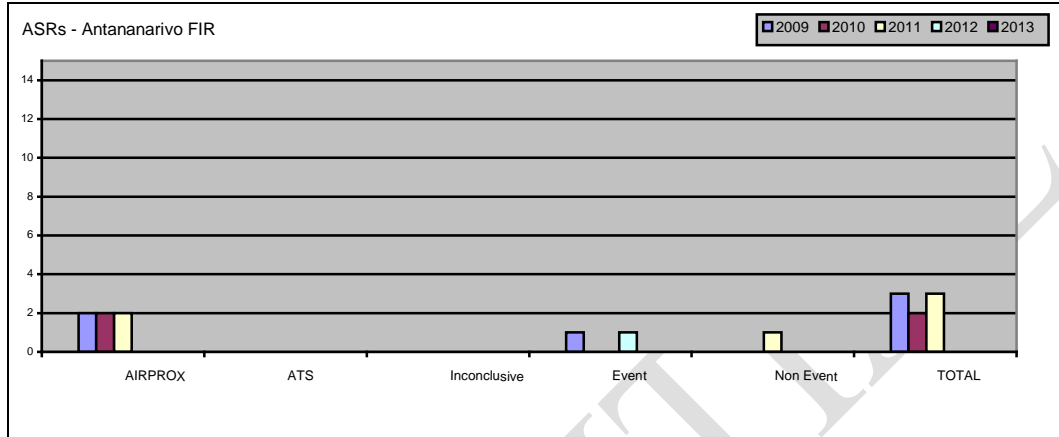
- **Recommendation:**
  - Management of human factors such as but not limited to work load, resulting in inadequate ATC proficiency factors need to be addressed.
- Map



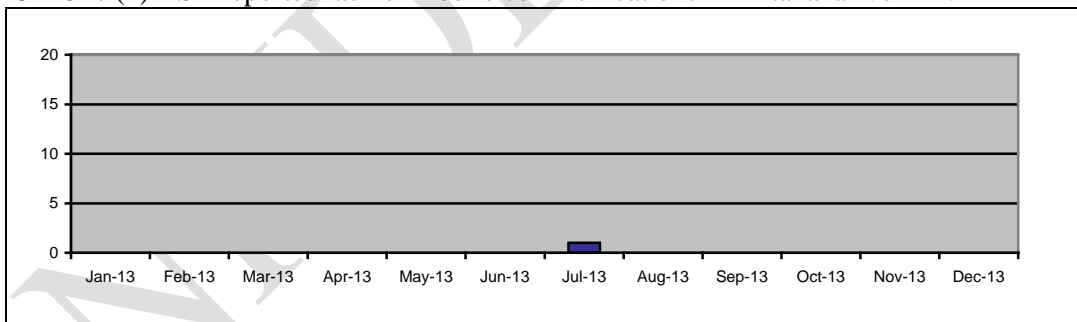


### 15e) Antananarivo FIR

No ASR was reported in Antananarivo FIR.



- Main causes include (single cause or as combination of): Nil
- Main contributory factors include: Nil
- Communications
  - One (1) ASR reported lack of mobile communications in Antananarivo FIR.





▪ **Recommendation:**

- Nil
- Map: N/A

**15f) ASECNA Update on 10th AIAG Recommendations (incidents that occurred in 2013)**

<b>Recommendations</b>	<b>Status</b>	<b>Comment</b>
Management of human factors such as but not limited to fatigue, workload, working conditions, and equipment resulting in inadequate ATC proficiency factors need to be addressed.	On-going	Emphasizing on ATCos recurrent training.  New training system at school for the recruitment in progress (adapted for each work position).  Controllers shifts according to the traffic evolution.  ACC building in progress : Nouakchott, Bamako, Bangui, Douala, Ouagadougou.
Investigate reasons for missing flight plans.	Completed	After new FPL implementation outcomes: Collective AFTN address attributed ASECNA FIR. REF to AIC NR 02/A/13FC issued on 07/02/2013 and 03/A/13GO du 08/02/2013.
Usage and interpretation of CPDLC to re-enforce using GOLD Document (TRAINING ATC & CREW ).	Completed	Training has been done at All FIRs except Ndjamenana where it's planned for March 2014.
Full implementation of ADS-C/CPDLC in Ndjamenana FIR is priority.	Completed	Completed since April 05th 2012.  AIP SUP 11/A/12 FC.  (ADS-C/CPDLC not available from to time DUE ACARS LINE FAILURE (NOTAM Published).
Re-establish ATS/DS link between N'Djamena and Khartoum Re-establish ATS/DS link between N'Djamena and Khartoum.	Completed	ATS/DS between N'Djamena and Khartoum ACCs is working perfectly via NAFISAT link since August 2008.
Enhancement of VHF Coverage in all FIRs.	On-going	Concern all FIRs.
Investigate the short coming of CPDLC	On-going	Concern all FIR

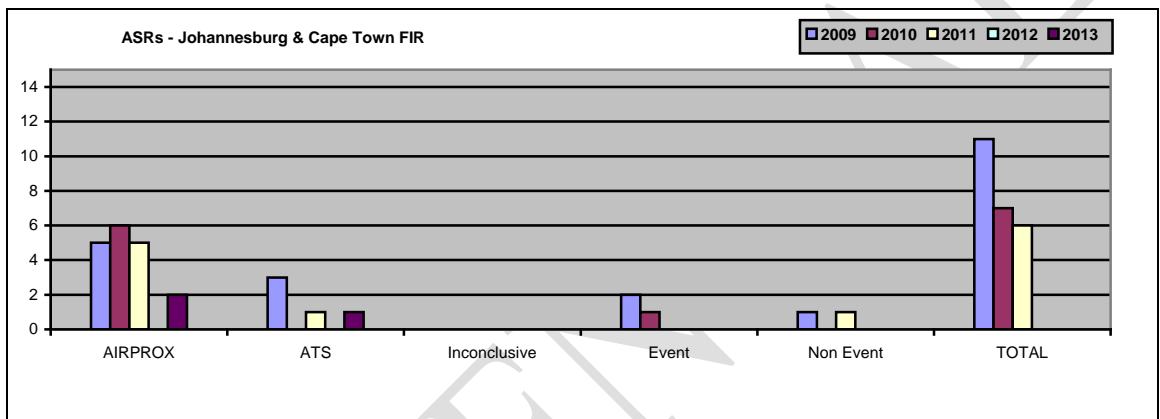




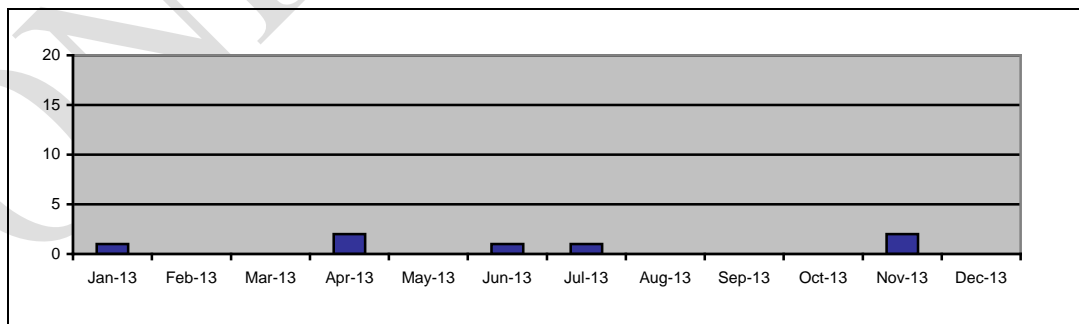
**16. Johannesburg, Cape Town and Johannesburg Oceanic FIRs**

- Three (3) ASRs were reported; two (2) in Johannesburg and one (1) in Cape Town FIRs respectively. Feedback had been received for all ASRs – 100% feedback rate.
  - Two reported ASRs classified as AIRPROX (Johannesburg);
  - One reported ASR classified as ATS incident (Cape Town).

Although not covered under AIAG TOR, high number of coordination failures between Johannesburg FIR and neighbouring FIRs were noted.



- Causes include (single cause or as combination of):
  - I. Non-compliance (1)
- Contributory factors include:
  - II. Cockpit discipline/Non-compliance (1)
- Communications
  - Seven (7) ASRs reported lack of mobile communications in Johannesburg Oceanic FIR.



- **Recommendation:**
  - ATNS engage with neighbouring FIRs to resolve coordination failures issues.



- **ATNS shares with the meeting its staff calculator model:**

- a. For airspace capacity declaration we consider the results from a work study, a fast time simulation tool and historic traffic numbers. The three values are evaluated in a comparative manner and an informed decision is made. I will gladly expand on the topic if required. We at ATNS have a formal capacity declaration for each type of airspace controlled by ATNS. These include Aerodrome Traffic Zones (ATZs), Control zones (CTRs), Terminal Movement Areas (TMAs) and Control areas (CTAs). It is important to note that a specific set of weather conditions (IMC / VMC) are considered along with type of flight rules (VFR / IFR). The ATNS values are based on IFR and VMC. Twenty percentile based “pace levels” are then declared (e.g. pace level 4 will equal 80 % of the declared capacity) and traffic demand and supply balancing targets pace level 4 at all times. Again, I will gladly elaborate if required.
- b. Staffing levels are determined on a service demand and staff supply balancing basis. We calculate the number of shifts that any controller can give us and then compare this to service demand, as expressed as shifts. E.g. to provide a 16 hour service per day may require a morning shift and an afternoon shift on every day of the year (2 x 365 shifts). Without considering break or standby staff we need to cover 730 shifts at this tower. If 1 controller can give you 200 shifts, you will require 4 controllers (3.65 controllers, rounded up). Please let me know if you require additional information.

Additional information:

- a. Staff per shift at ACC depends on the service demand as described above
- b. Controller capacity pace level 4 is targeted
- c. Overload should not occur as we have CAMU regulating our demand levels.

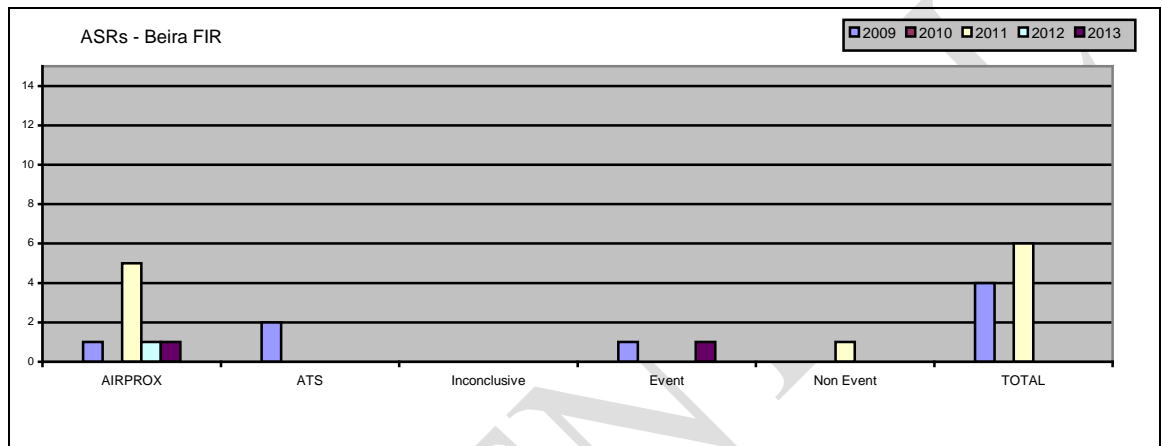
- Map



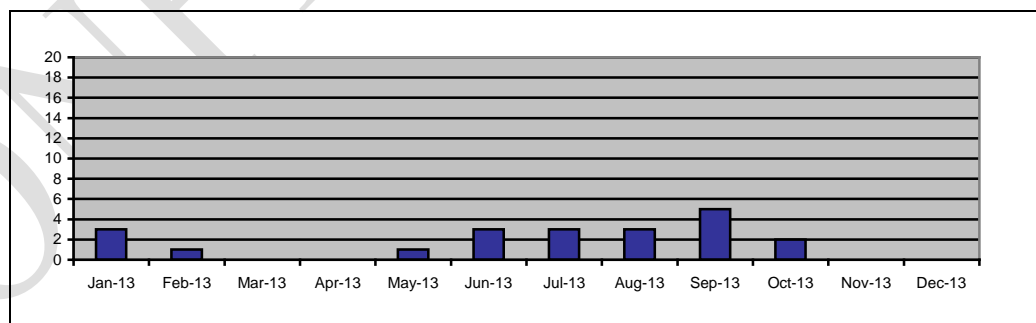


## 17. Beira FIR

- Two (2) ASRs were recorded in Beira FIR and occurred on FIR boundary with Johannesburg FIR. Feedback had been received for all ASRs – 100% feedback rate.
  - One (1) AIRPROX and one event occurred



- Causes include (single cause or as combination of):
  - I. Non-compliance (1)
- Contributory factors include:
  - II. Cockpit discipline/Non-compliance (1)
- Communications
  - Twenty-one (21) ASRs reported lack of mobile communications in Beira FIR.



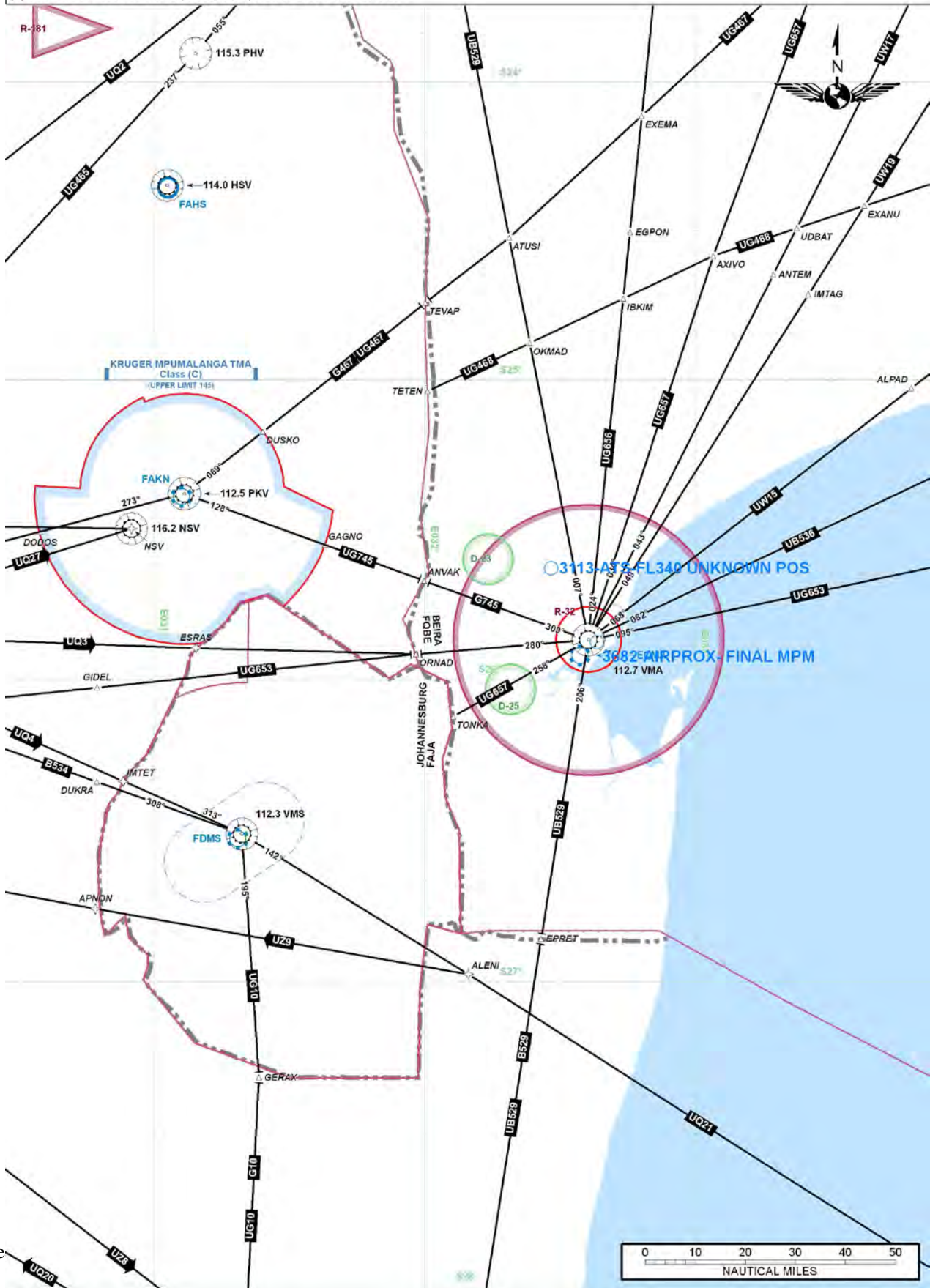


- **Recommendation:**
  - Necessary actions to be taken to improve VHF communication.
- Information on airspace capacity (provided by Mozambique):
  - BEIRA FIR airspace capacity - 130.000 movements attended in 2013;
  - Required and existing staff: 76, New cadets in the pipeline;
  - Number of ATS Units 10;
  - APP-5 Units;
  - FIC/ACC1;
  - ACC 1;
  - Number of staff per shift 2;
  - Overload situations regularly - NIL;
  - Max capacity per controller, 6 at a time.
- Map

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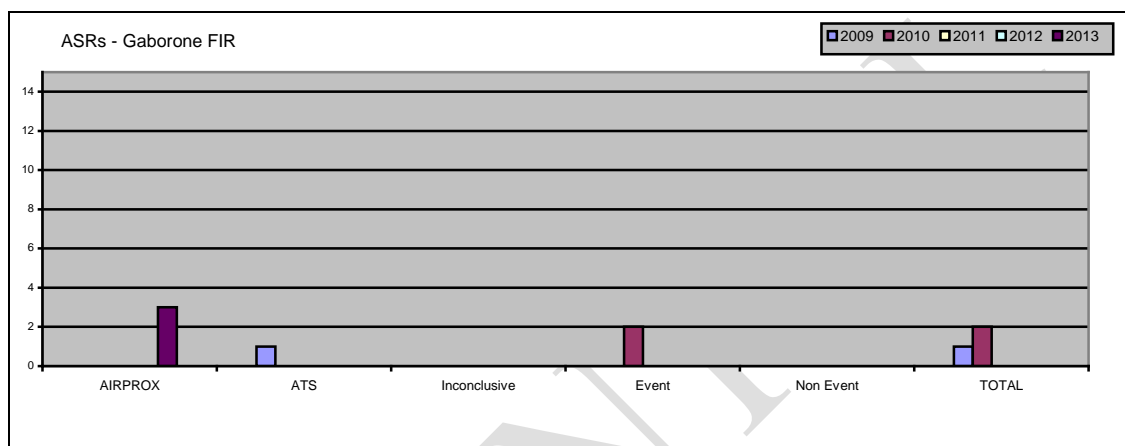
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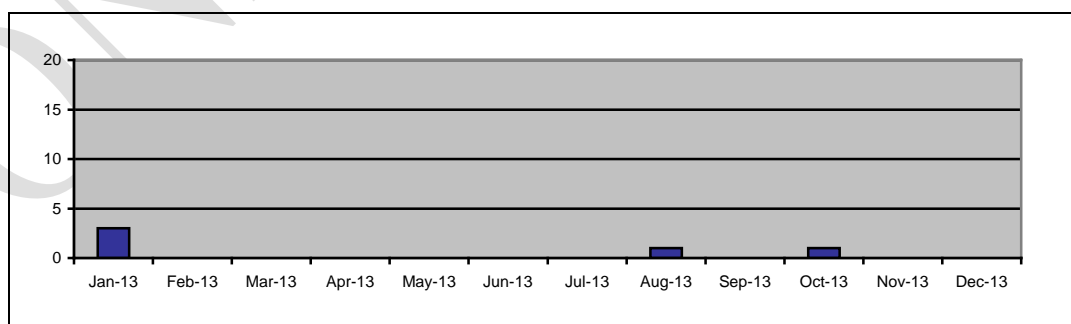


## 18. Gaborone FIR

- Three (3) ASRs that fall under AIAG TOR were reported in Gaborone FIR. However there is still a high number of coordination failures between Gaborone and Johannesburg FIRs occurring.
  - All ASRs classified as AIRPROX



- Causes include (single cause or as combination of):
  - I. Human error (3)
  - II. ATM operations (1)
  - III. Procedures (1)
- Contributory factors include:
  - IV. ATC Error / Training requirement (2)
  - V. ATC Overload (1)
  - VI. Airspace organization/ATM procedure (1)
- Communications
  - Five (5) ASRs reported lack of mobile communications in Gaborone FIR.



- **Recommendation:**
  - Management of human factors such as but not limited to fatigue, ATC work load, working conditions in inadequate ATC proficiency factors need to be addressed
  - Improve coordination procedures with neighbouring units especially Johannesburg ACC.



- Gaborone Flight Information Region Airspace capacity and Required Staffing level
  - What is captured is the aircraft movement in the Gaborone FIR Air space Sectors including all airports and TMAs and ATC staffing as per current ATC structure as well as vacant posts.

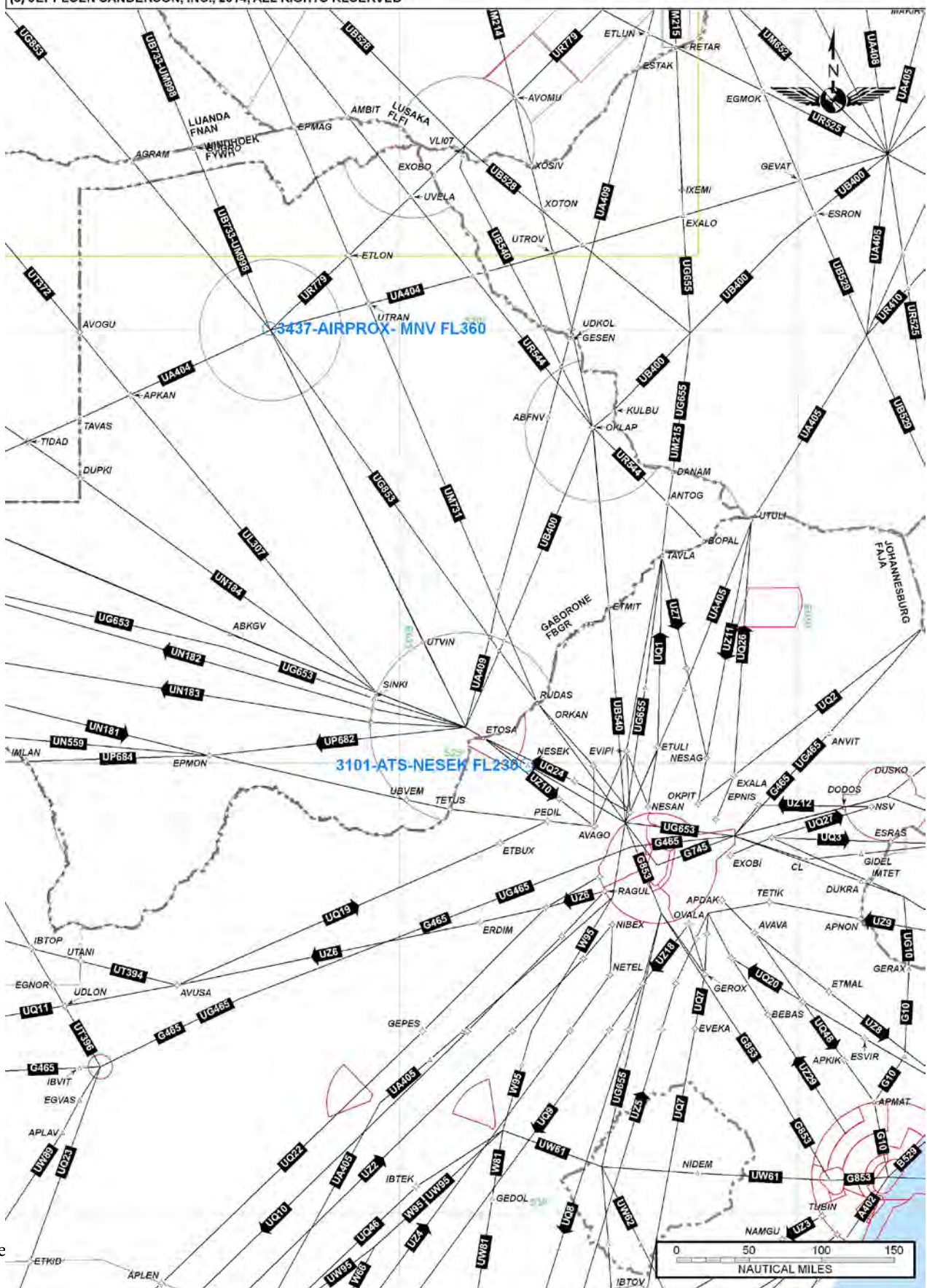
<b>AIRSPACE SECTORS</b>	<b>TRAFFIC MOVEMENT PER ANNUM 2012</b>	<b>REQUIRED STAFFING LEVEL</b>	<b>VACANCIES</b>
Gaborone Area Control Center	53 571	12	5
Gaborone Approach/ Tower	16 156	6	0
Maun Approach/Tower	47709	11	3
Francistown Approach/ Tower	30 87	4	0
Kasane Approach/Tower	12 398	4	0
Gantsi	248	1	0

- Regarding GBE ACC staff per shift, we have three (3) officers per shift one (1) manning area west, one (1) area east and one (1) supervisor (SATCO) who provides short reliefs and supervisory duties, in case of abnormal situations we have the 2 PATCOs at the station (PATCO Training and PATCO Officer Station In charge) they also provide short reliefs and increase man power when so found required, but PATCOs are not on shift.
- Map





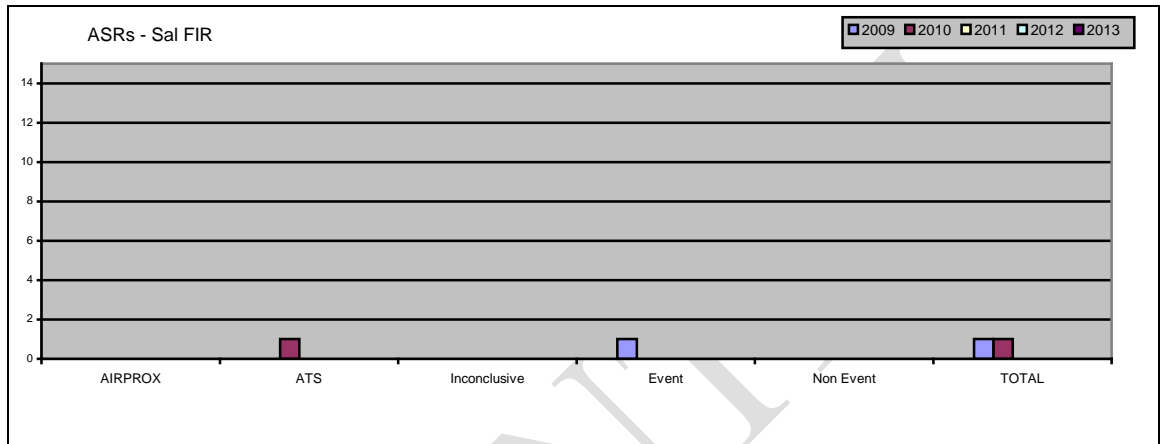
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### 19. Sal Oceanic FIR (Cape Verde)

- No ASRs that fall under AIAG TOR were reported in Sal FIR.

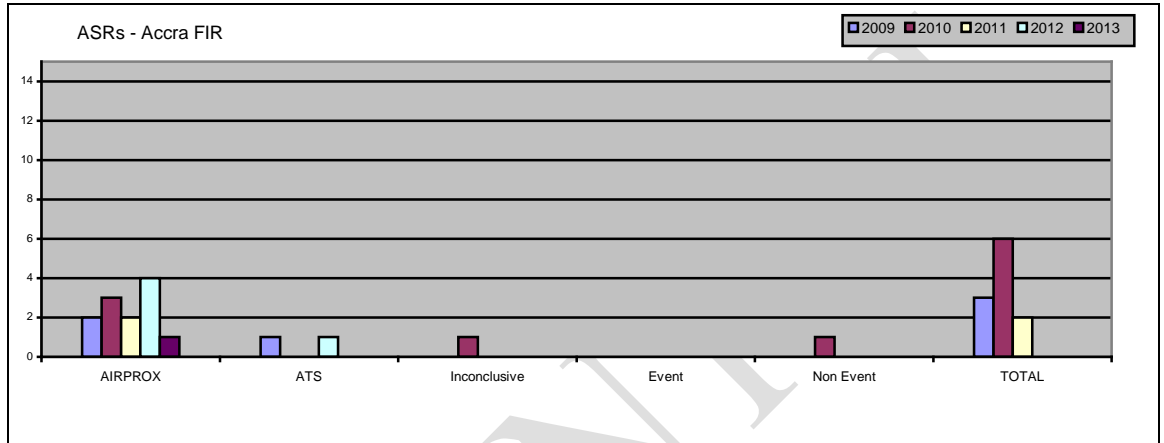


- Main contributory factors include:
  - N/A
- Communications
  - N/A
- **Recommendation:**
  - N/A.
- Map
  - N/A.

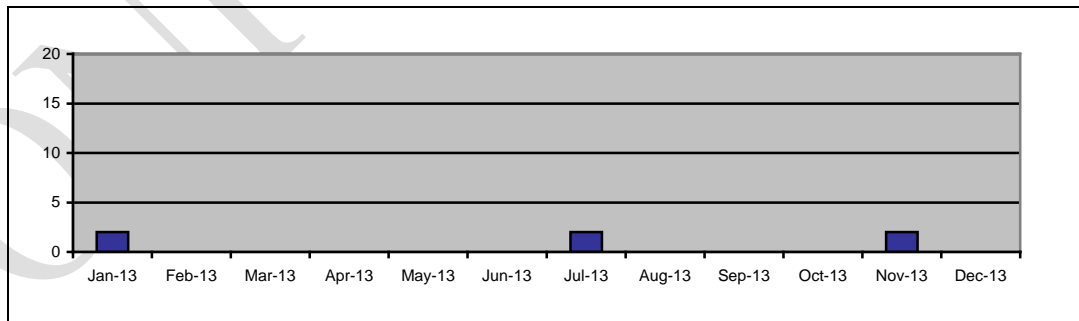


**20. Accra FIR**

- One (1) ASR was reported in Accra FIR. Feedback had been received for all ASRs – 100% feedback rate.
  - One (1) AIRPROX occurred.



- Causes include (single cause or as combination of):
  - I. Human error (1)
  - II. Equipment (1)
  - III. Communication (1)
- Contributory factors include:
  - IV. ATC Error / Training requirement (1)
- Communications
  - Six (6) ASRs reported lack of mobile communications in Accra FIR.





▪ **Recommendation:**

- Refresher training and proficiency checks, which are integral part of our training and procedures must be adhered to
- Automatic update of flight plan data to be implemented to avoid the extra work by controllers manually forwarding flight plans
- Meet and confer with NAMA to address FIR Boundary coordination issues in NE Ghana between Kano and Niamey ACCs.

▪ Ghana information on airspace capacity and staffing

The airspace is sectorized horizontally into 3, Accra North (11 degrees north to 3 degrees north), Accra South (3 degrees north to 3 degrees south), and Oceanic (3 degrees south to 9 degrees south).

There is one ACC in Accra, 4 TMAs in Accra, Tamale, Lome, and Cotonou. There is one international airport each in Accra, Lome, and Cotonou. There are 3 civil domestic aerodromes, one each in Kumasi, Tamale, Sunyani, and one military aerodrome in Takoradi. There are a number of unmanned aerodromes and airstrips scattered across the FIR.

Averagely there are 300 flight movements in the FIR daily.

Accra Tower handles an average of 120 movements daily

Kumasi Tower handles 36 scheduled movements a day, while Tamale Tower handles 10 scheduled movements daily, and Sunyani handles only 2 scheduled movements in a day.

**STAFF STRENGTH**

Total ATCO strength in Accra FIR (excluding ASECNA managing the lower airspace of Togo and Benin) is 76, including 10 operational managers and 15 Aerodrome/Approach ATCO trainees, leaving 50 operational ATCOs.

National service personnel are brought in yearly to assist in some clerical work.

There are 5 ATCOs in Kumasi, 3 in Tamale, 2 in Sunyani, and 40 in Accra. In addition there are 5 military controllers manning the Tower for Takoradi military airport.

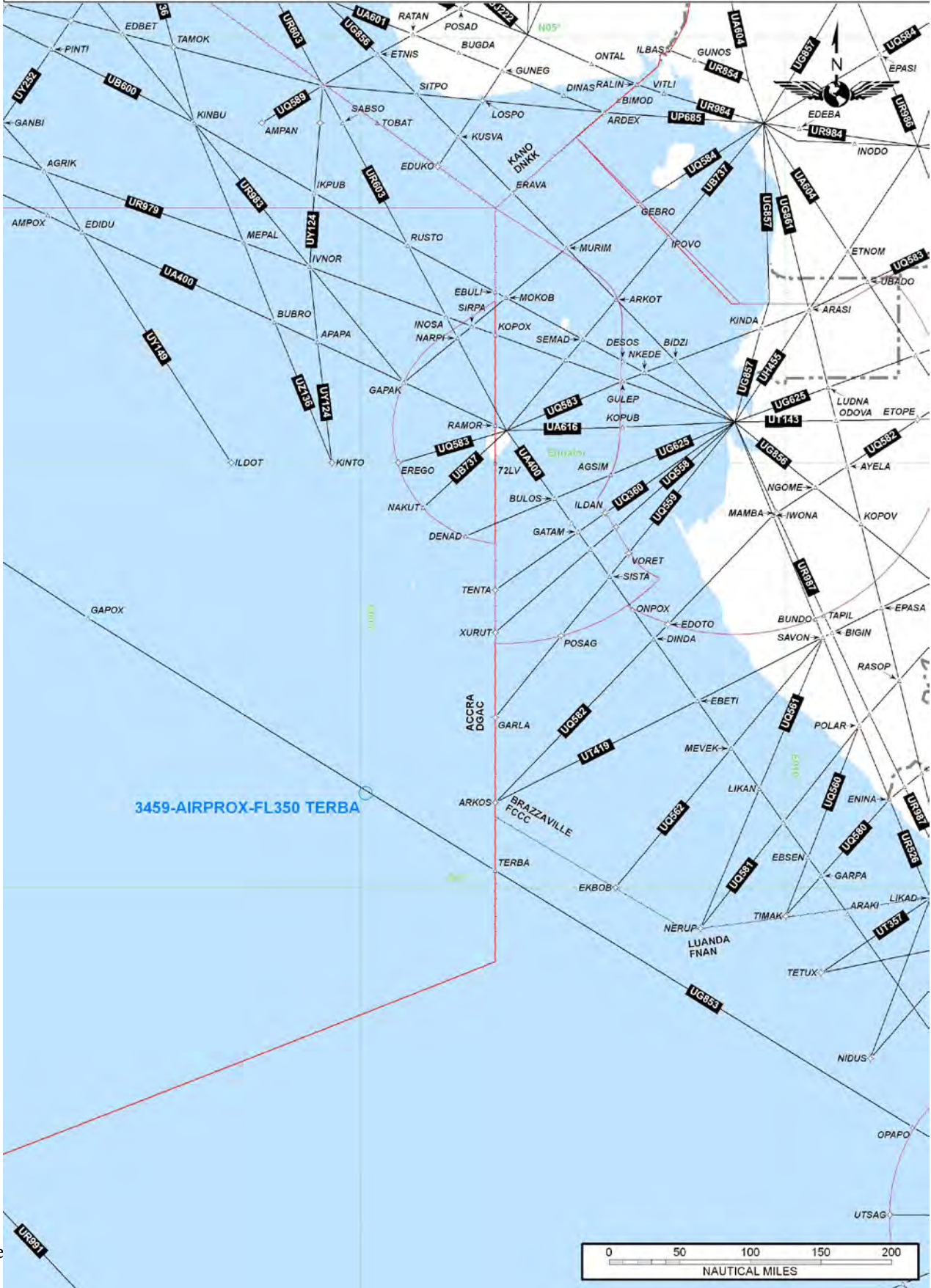
Accra ACC runs a six shift system with between 5 to 6 staff on each shift.

Maximum capacity is about 20 flights an hour per a controller. There are occasional overload at Accra ACC, South sector with maximum capacity of about 30 flights an hour. This is normally dealt with by regular rest periods.

▪ Map



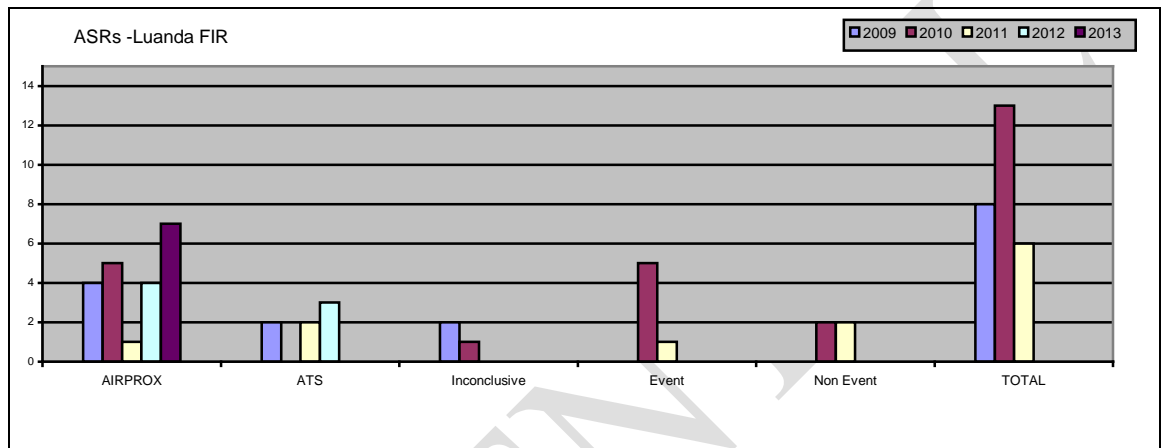
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## 21. Luanda FIR

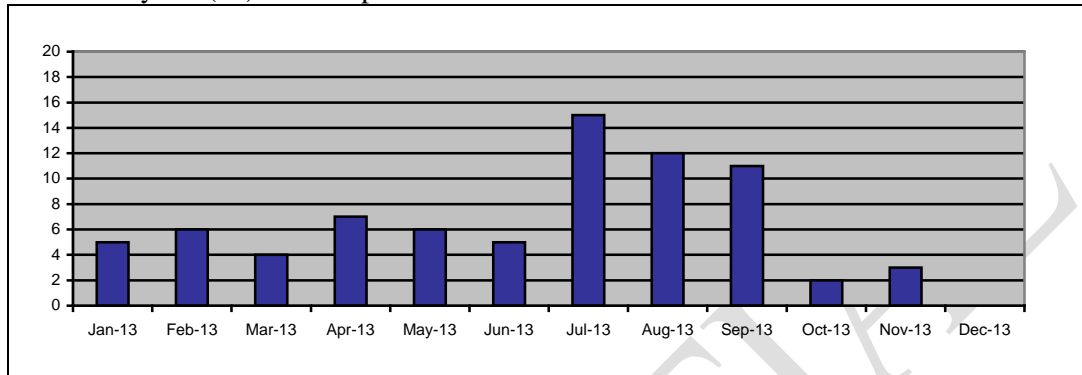
- Seven (7) ASRs were reported in Luanda FIR. 100% feedback rate.
  - Seven (7) AIRPROX occurred;



- Causes include (single cause or as combination of):
  - Human error (4)
  - Coordination (2)
  - Non-compliance (1)
  - ATM operations (1)
  - Procedures (1)
- Contributory factors include:
  - Crew error (1)
  - IFBP not being used (2)



- Communications
  - Seventy-six (76) ASRs reported lack of mobile communications in Luanda FIR.



**Recommendations:**

- Management of human factors such as but not limited to fatigue, work load, working conditions, and equipment resulting in inadequate ATC proficiency factors need to be addressed.
  - Ensure effective coordination procedures established and complied with Letter of Agreement provisions.
  - Mobile communications has taken a turn for the worse. ADS-C/CPDLC should be implemented in Luanda FIR oceanic part and all published VHF frequencies operational to be operational.
  - Crew discipline in IFBP use.
- Luanda report on 10<sup>th</sup> AIAG recommendations:

Angola air navigation Service provider ENANA is seriously engaged in the project to implement the Luanda ADS-C/CPDLC system in the Luanda Oceanic Airspace in order to provide surveillance service and availability of data link communication, as well Luanda CAFSAT Station at the International Airport “4 de Fevereiro” with the view to provide availability of communication service through ATS/DS voice and AFTN/AMHS data circuits between Atlântico and Luanda ACCs.

**Current Status of Implementation of ADS-C/CPDLC system:**

SITA AIRCOM ADS-CPDLC Workstation Operational and Technical Pre-FAT Training as well Factory Acceptance Test were carried out in Paris from 06th to 13th of December 2013; the shipped equipment is already in Luanda.

The full installation and Site Acceptance Test (SAT) will be accomplished during month of February 2014.

The Trial Basis with full Operational system will take place from March to May 2014.

In March and April of 2014 will be trained the first 17 Air Traffic Controllers in Ilha dos Açores -Portugal.



#### CAFSAT Station:

In 2013 ENANA and ISDEFE of Spain signed two contracts to supply equipment and provide a service that includes the design, installation, testing and commissioning of satellite communications system in Luanda, The Luanda CAFSAT Station, which will be part of the CAFSAT network.

The project consists of the implementation of a C-Band VSAT Station in Luanda, which will establish the ATS/DS voice circuits between Luanda and Recife and provide the coordination capability between Air Traffic Controllers.

#### DISCUSSION-

Current Status of Implementation of Luanda CAFSAT;

Station Factory Acceptance Test was carried out in Madrid from 20th to 24th of May 2013;

Concluding the INACOM form required to make available the CAFSAT station License and the equipment before arriving in Angola;

Concluding the forms required to hiring space capacity and registration of the CAFSAT station with the INTELSAT;

Coordinating with the companies FREQUENTIES (VCCS) and COMSOFT (AMHS) to provide their contacts to ISDEFE in order to clarify the ATS and data circuits;

#### *Short and Medium Term planned Actions – From March to April:*

Ensure the approval of the forms by INACOM and INTELSAT;

Contact Brazil to ensure coordination with ground station of Recife and Luanda to effect circuit communication through AFTN Protocol AMHS;

Organize a familiarization visit to Portugal to ensure coordination with ground station of Lisbon to effect data circuit communication through AFTN Protocol AMHS;

Equipment delivery, equipment installation, Training, Site Acceptance Test Trial & base period.

#### *Long term planned Actions – From May to June:*

Informing airlines and SAT community on the establishment of the circuit.

Operational Assessment;

Publication of an AIC for starting Full operation;

Established/Updated LoA with Atlántico;

Development of a sustainable maintenance policy Plan and Programme.

VHF-ER status - The VHF-ER is to be recovered;

They were already acquired and installed new VCCS of FREQUENTIS supplier;

It is foreseen for April of 2014 the beginning of another trial basis;

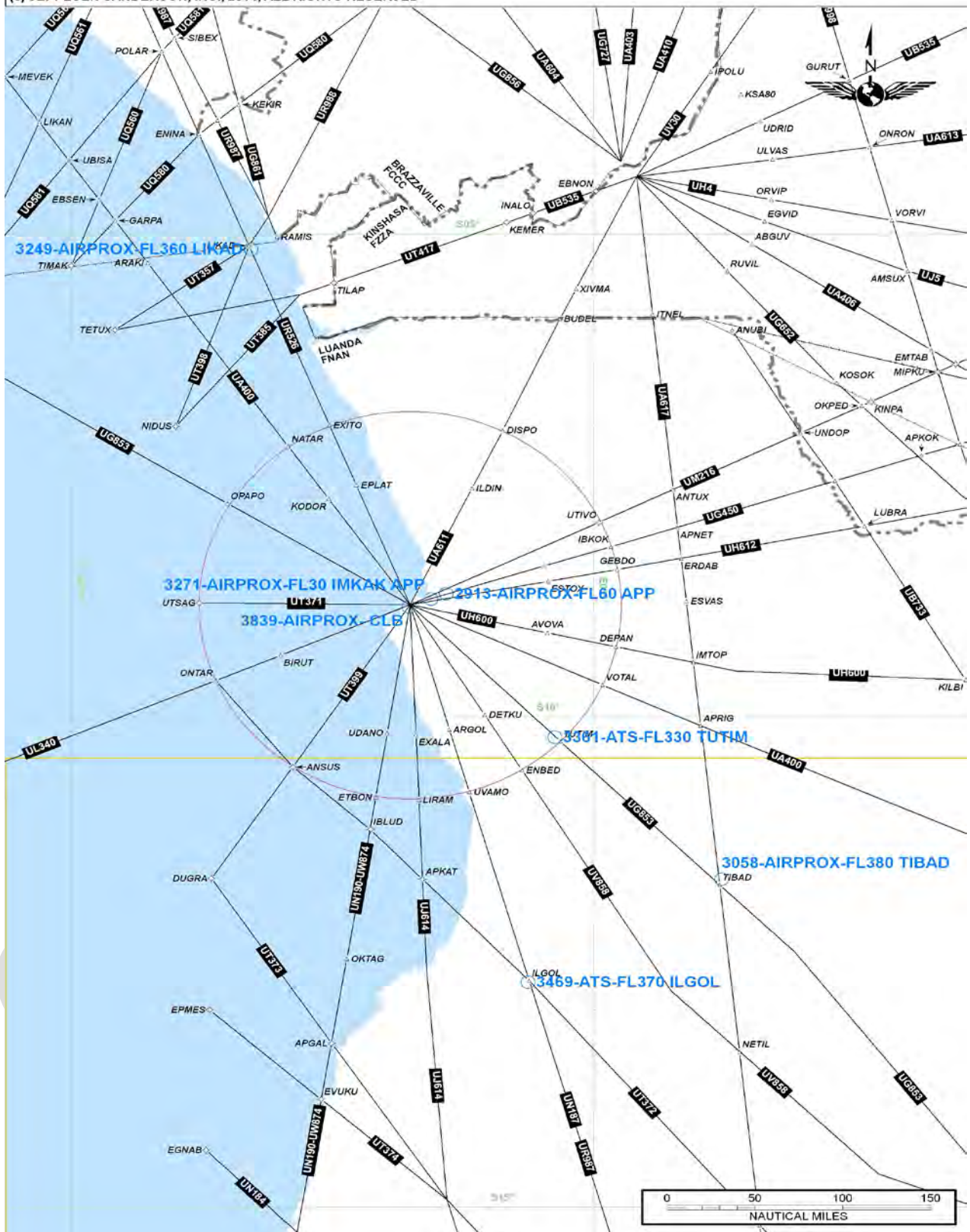
Angolan government allocated a budget to endow the Air Traffic Management with modern technical means.

#### ▪ **Map**





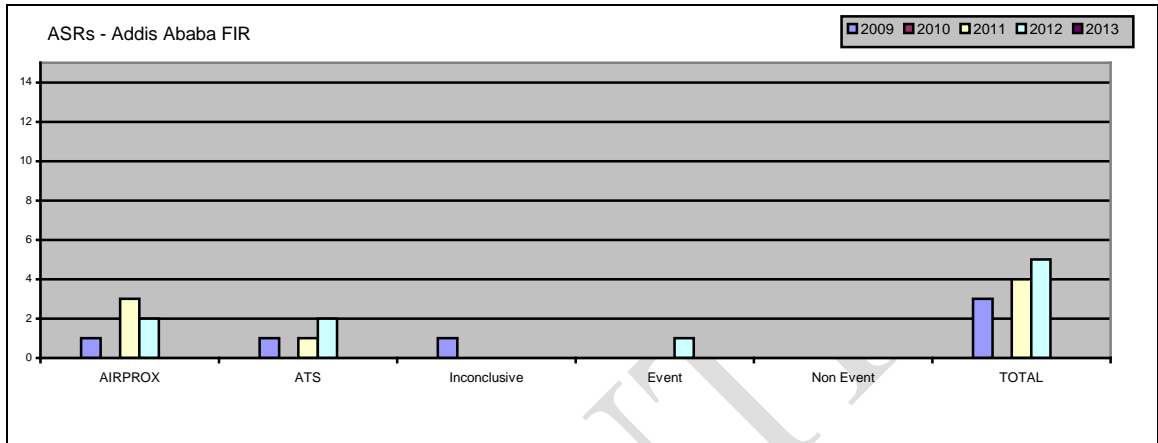
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## 22. Addis Ababa FIR

- No ASR related to AIAG was reported in Addis Ababa FIR.

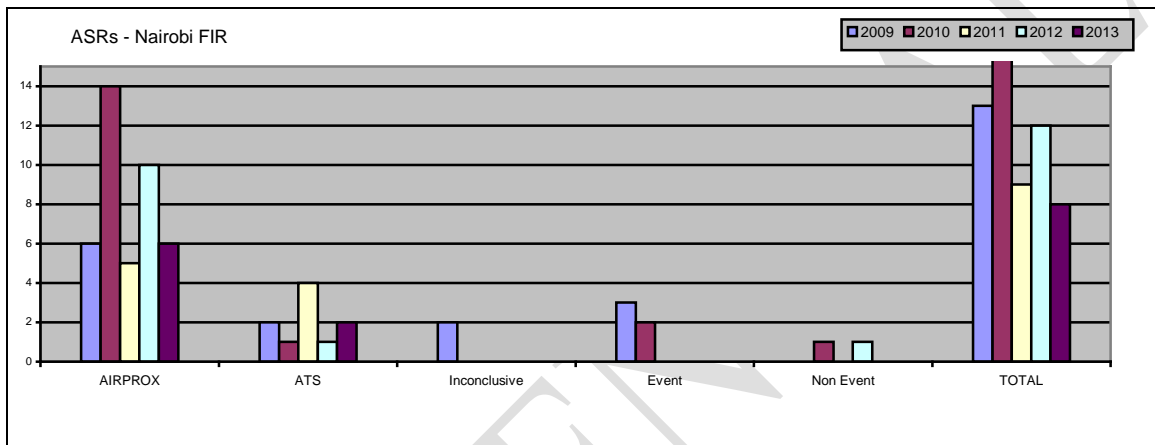


- Communications
  - One (1) ASR reported lack of mobile communications in Addis Ababa FIR.
- **Recommendation: Nil**



### 23. Nairobi FIR

- Eight (8) ASRs were reported in Nairobi FIR. Feedback had been received for all ASRs – 100% feedback rate.
  - Six (6) AIRPROX occurred;
  - Two (2) ATS incident occurred;



- Causes include (single cause or as combination of):
  - I. Human error (5)
  - II. Coordination (3)
  - III. Procedures (1)
- Contributory factors include:
  - IV. ATC Error / Training requirement (2)
  - V. Airspace organization/ATM procedure (1)
  - VI. Crew error (1)
- Communications
  - Three (3) ASRs reported lack of mobile communications in Nairobi FIR.
- **Recommendation:**
  - Complete on going airspace restructure
  - Improve ATC proficiency and Refresher ATC training focusing on approach area (APP)
  - Improve traffic coordination
- **Map**



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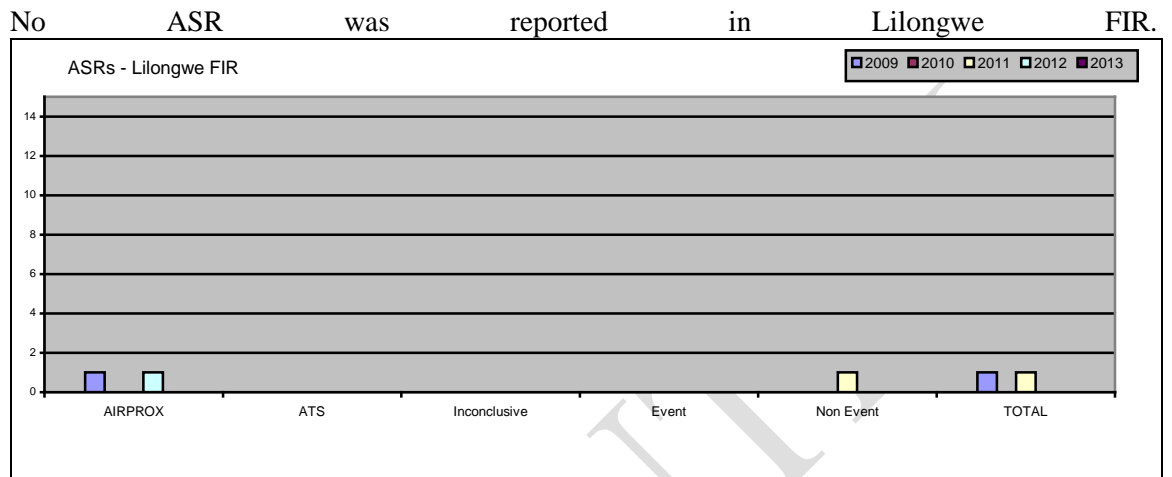
**KCAA ANS declaration on ATCO capacity and deployment:**

International Airport	Type of shift	Number of hours per shift	Hours of rest period between shifts	No of staff per shift
<b>JKIA</b>	5 WAY AND 3 WAY	8 HRS - Day 12 HRS - Night	24HRS	8
<b>MIA</b>	5-WAY	8HRS	24HRS	4
<b>EIA</b>	4WAY	8.30hrs	48HRS	1

<b>Number of ATM Staff and their qualifications</b>		
Professional qualification	Number of staff with this qualification	Training required by staff as per ICAO requirement
<b>1. Aerodrome Control</b>	170	Aerodrome control certificate and licence endorsed with the Rating, medical fitness and English language proficiency
<b>2. APP procedural</b>	150	Aerodrome and Approach control certificates and licence endorsed with the Ratings, medical fitness and English language proficiency
<b>3. APP Radar</b>	98	Aerodrome, Approach control and Approach Radar certificates and licence endorsed with the Ratings, medical fitness and English language proficiency
<b>4. Area Airways</b>	71	Aerodrome and Area Airways control certificates and licence endorsed with the Ratings, medical fitness and English language proficiency
<b>5. Area Radar</b>	27 qualified 11 awaiting Rating Board <b>TOTAL 38</b>	Aerodrome and Area Airways control and Area Radar certificates and licence endorsed with the Ratings, medical fitness and English language proficiency
<b>6. SAR</b>	20	Search and Rescue Mission coordinators certificate
<b>Total number of staff employed in ATM</b>	Total number of staff qualified as per ICAO requirement.	Total number of staff to be trained as per ICAO requirement
<b>170 as at February 2014</b>	<b>170</b>	<b>Continuous training for officers who have not yet attained 3 ratings and SAR training.</b>



## 24. Lilongwe FIR

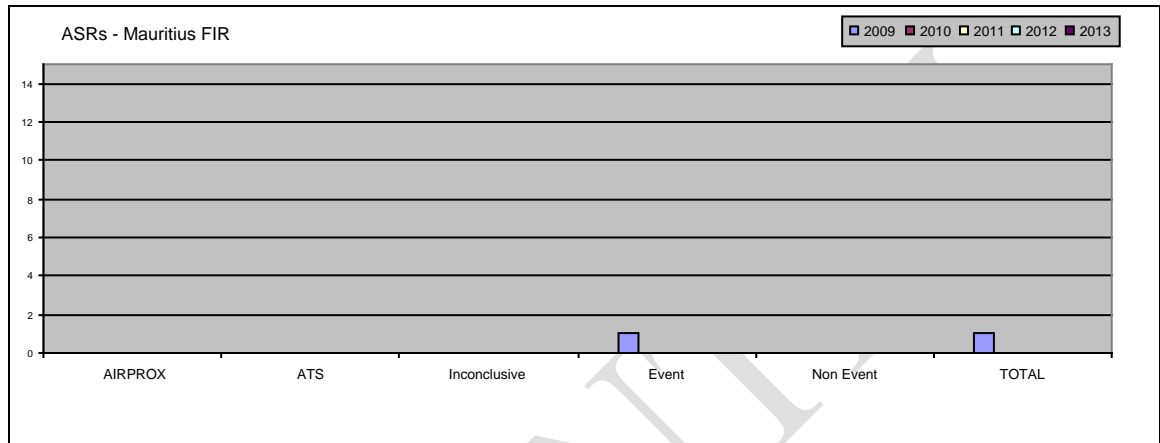


- Main causes include (single cause or as combination of):
  - Nil
- Main contributory factors include:
  - Nil
- Communications
  - No ASR had been reported lack of mobile communications in Lilongwe FIR.
- Recommendation: Nil
- Map
  - N/A.



## 25. Mauritius FIR

- No ASRs that fall under AIAG TOR were reported in Mauritius FIR.

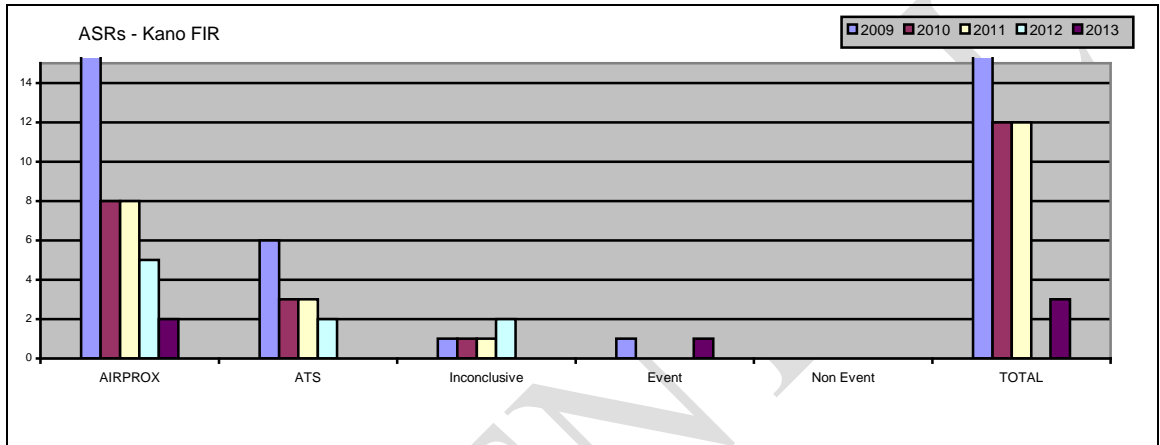


- Main causes include (single cause or as combination of):
  - N/A.
- Main contributory factors include:
  - N/A.
- Communications
  - N/A
- **Recommendation:**
  - N/A
- Map
  - N/A.

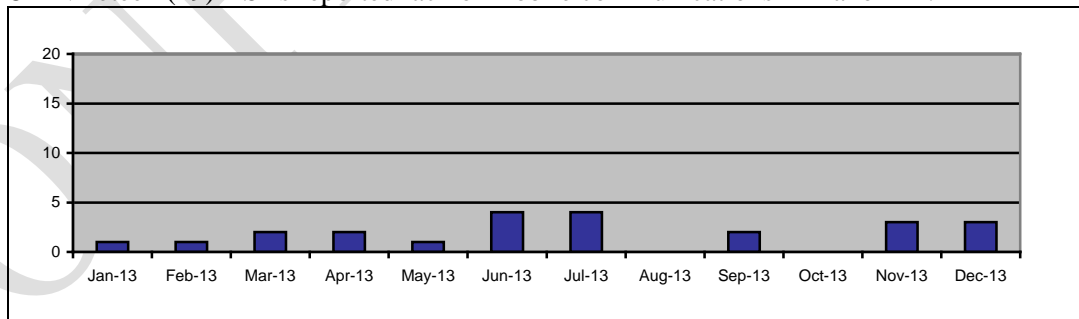


## 26. Kano FIR

- Three (3) ASRs were reported in Kano FIR. 100% feedback rate.
  - Two (2) AIRPROX occurred;
  - One (1) ASR classified as event;



- Causes include (single cause or as combination of):
  - I. Human error (1);
  - II. Non-compliance communication (1).
- Contributory factors include:
  - III. ATC Error / Training requirement (2);
- Communications
  - Nineteen (19) ASRs reported lack of mobile communications in Kano FIR.







▪ **Recommendation:**

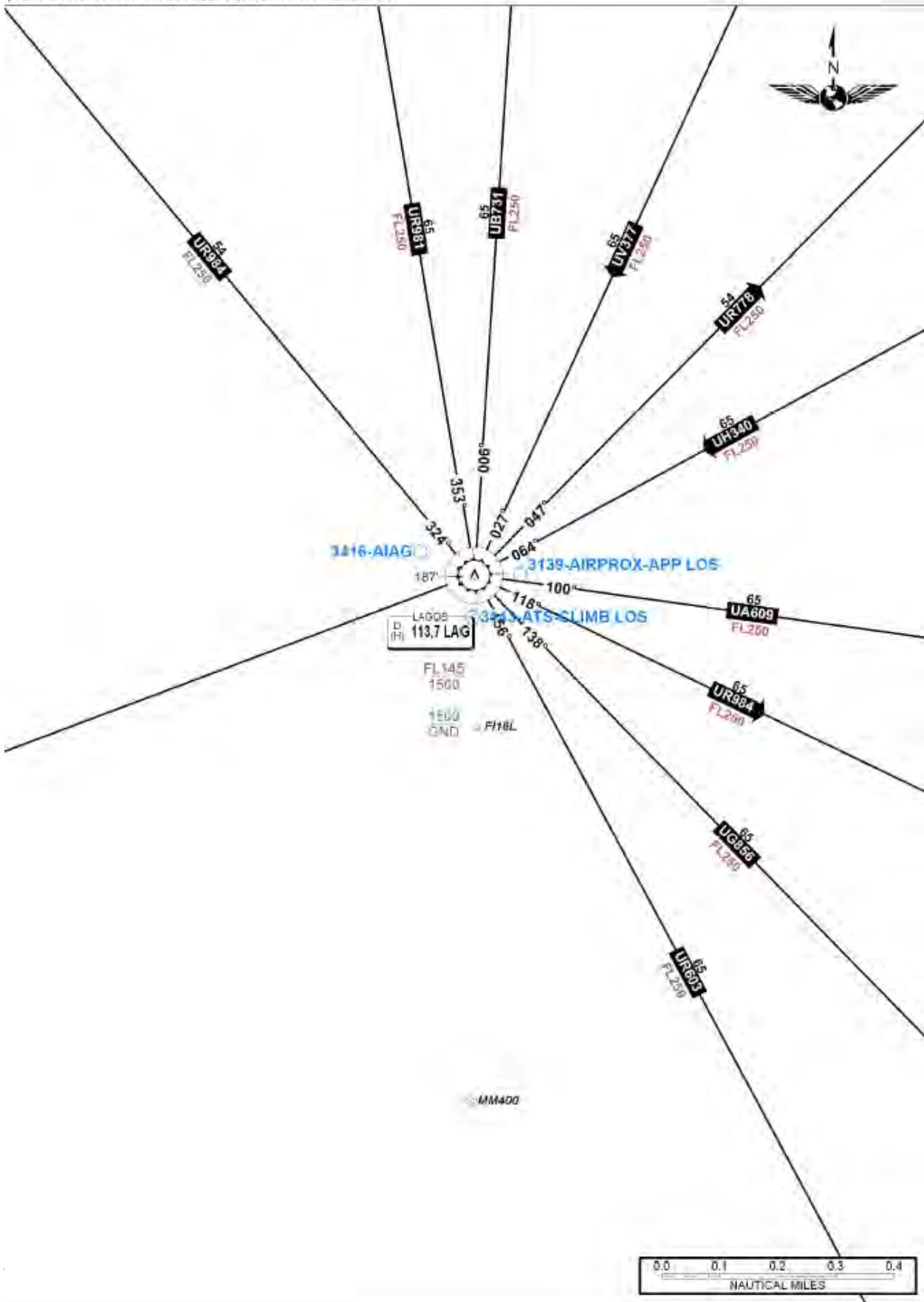
- Improve Coordination/Communications between sectors (Kano East/West) and with neighbouring FIRs
- Lagos ACC sectorisation strongly recommended to address congestion (outstanding from 2011)
- Improve communication facilities;
  - Complete Updated/Integrated ATM system/equipment
  - Complete Communication Equipment (VHF/HF/CPDLC/ADS-C) as able
- Continue to emphasize recurrent/annual qualification training and take necessary provisions to ensure ATCO are trained on PBN
- Increase controller staffing
  - Will allow dedicated supervision of trainees.

▪ Map

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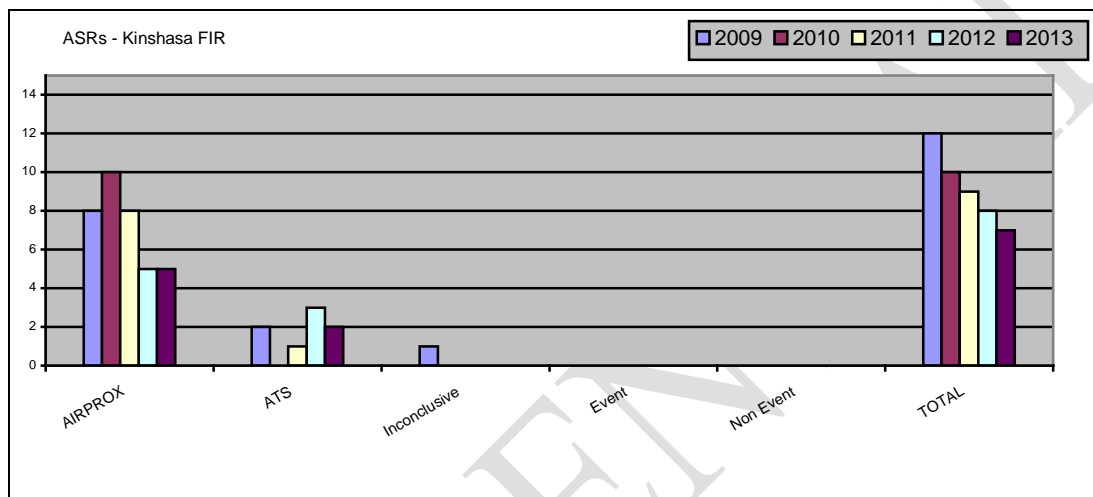
### **NAMA update on 10th AIAG Recommendations (incidents that occurred in 2012)**

- **Communications:**
  - *VHF RADIO*. Improvements have been made in these with ranges above 250nm from each RCAG in both sub FIRs of Lagos and Kano.
  - Following the queries of the group in the meeting, the management of the agency employed the services of *TELERAD* of France to take a feasibility study of the airspace to unravel the cause of the challenges being experienced. As we meet, contractors like *MOCOM* of Germany have been invited to install RCAGs at the black spots sites as shown in the appendix.
  - Coordination meeting between us and contiguous FIRs, was held 9-12 December, 2013 to address the issues that had arisen.
  - AFTN data links between the FIR and contiguous airspaces are operating optimally. The issue of non AFTN Data link between us and Brazzaville is now past tense.
  - Extra telephones have been provided to support the ATS/DS links awaiting final installations of the TOTAL VHF & AIS AUTOMATION projects that have been stalled by the security challenges in the high traffic density north east region of the country.
- **Surveillance:**
  - As reported last year, modern surveillance system is in place and operational in the four major airports for approach radar services.
  - The Area Radar services commenced on the 29 May, 2013 at both sub FIRs of Lagos and Kano.
  - Except for the security challenges experienced to the north east of the airspace mentioned above, the entire airspace is under complete surveillance.
  - Arrangements to procure and install CPDLC, ADS-C equipment have been reached with a Canadian company recommended by *NAVCANADA*.
  - In the pipeline also is the procurement of the MLAT surveillance system to capture low level flight operations in the delta region of the airspace. Reconnaissance survey has since been completed.
- **Air Traffic Management (ATM):**
  - Sectorization of Lagos ACC. This has not received needed attention resulting from inadequate manpower challenges which the agency is making efforts to address. These efforts will be explained in a later query.
- **Training:**
  - Four batches of 20 ATCOs in each batch are currently undergoing the ab-initio training in the local ATO in Zaria.
  - 30 ATCOs have been rated for the Aerodrome and Approach services in 2013.
  - 15 are awaiting approach radar rating in March 2014.
  - Two batches of 8 in each class will commence the Area non-radar training in in the same local ATO in April 2014.
  - Arrangement was concluded to train two batches of 20 ATCOs for the approach radar training at the Cairo ATS Academy in 2014.
  - 12 ATCOs will be undergoing the Area radar rating in May 2014.
  - The Cairo Aviation Academy has been selected to train a batch of 10 supervisors using the *TRAINAIR*. These will be used as train-the trainers with the agency.



## 27. Kinshasa FIR

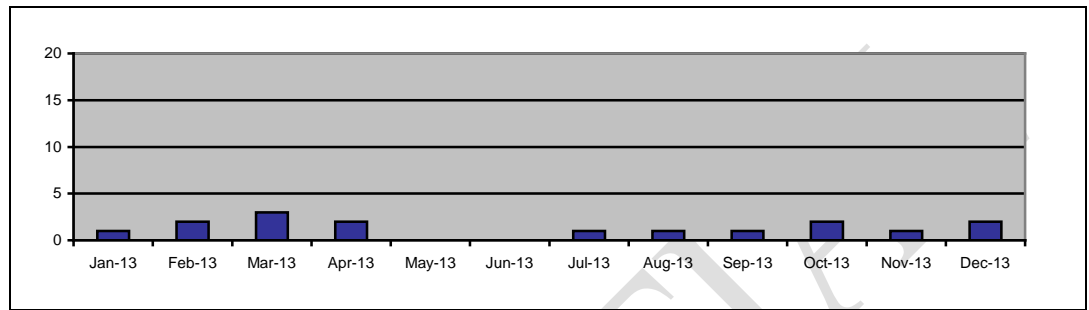
- Seven (7) ASRs were reported in Kinshasa FIR. 100% feedback rate.
  - Five (5) AIRPROX occurred;
  - Two (2) ATS incidents occurred.



- Main causes include (single cause or as combination of):
  - I. Human error (2);
  - II. Communication (3);
  - III. Non-compliance (1);
  - IV. Procedures (1);
- Main contributory factors include:
  - V. ATC error / Training requirement (4);
  - VI. ATC workload (1);
  - VII. Airspace organization/ATM procedure (6);
  - VIII. Inadequate mobile communications (4);
  - IX. Coordination between FIR/sectors (2);
  - X. Cockpit discipline/Non-compliance (4);
  - XI. IFBP not being used (7).



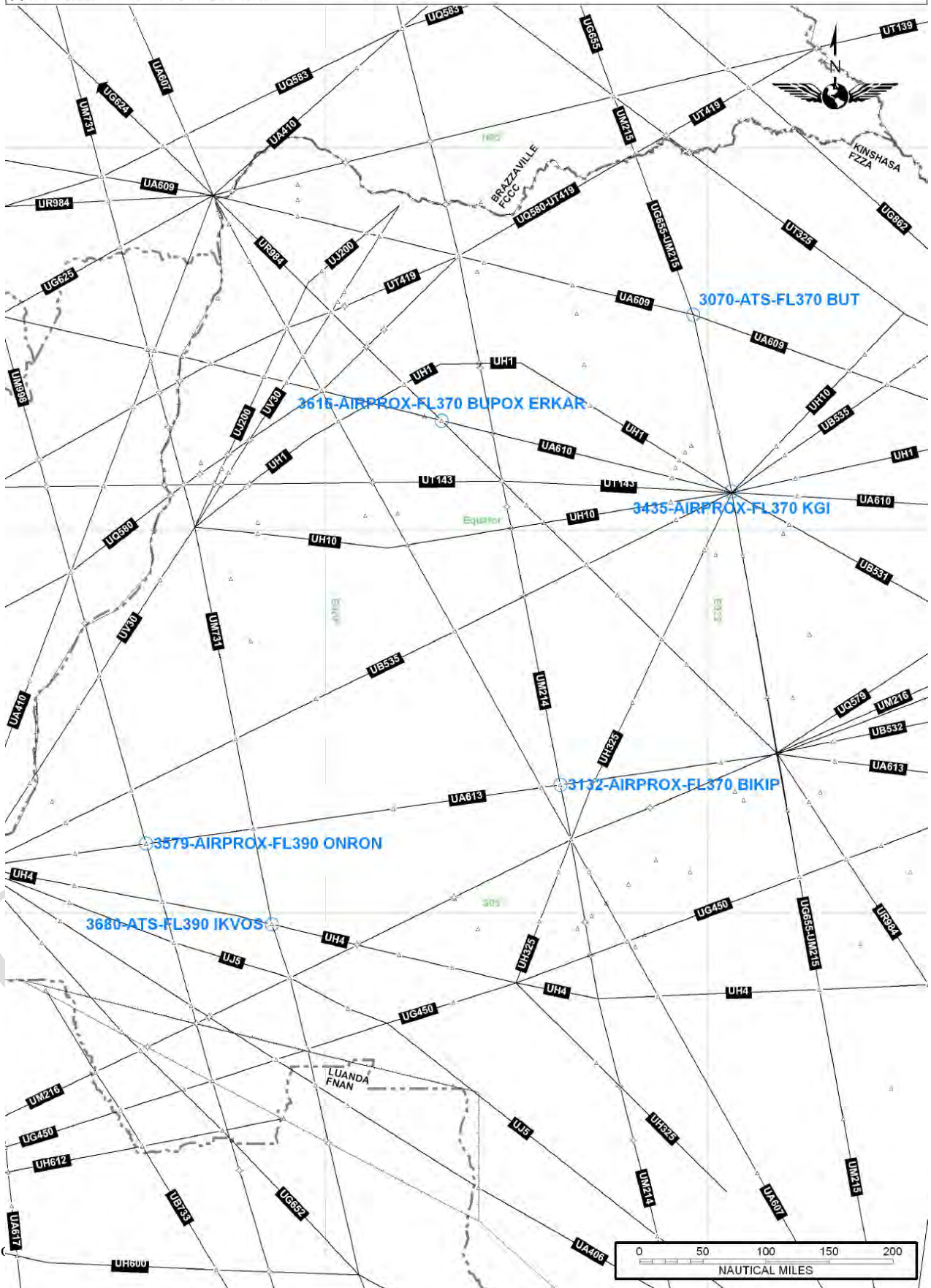
- Communications
  - Sixteen (16) ASRs reported lack of mobile communications in Kinshasa FIR.



- Recommendation:
  - Airspace organization to be reviewed
  - Implementation of ADS-C/CPDLC in Kinshasa FIR to improve mobile communications and facilitate maintenance equipment;
  - Improve ATC English proficiency;
  - Review and ensure adequate controller staffing;
  - Ensure ATS Communication Recording Equipment is Operational;
    - Install Backup System in event of Primary failure
  - Emphasize value of IFBP to identify/de-conflict Loss of Separation events;
  - Crew to apply IFBP procedures;
  - Improve cockpit discipline
    - Follow-up communications and request for feedback
    - Charter & Non-Scheduled carriers; Emphasize training.
- Map



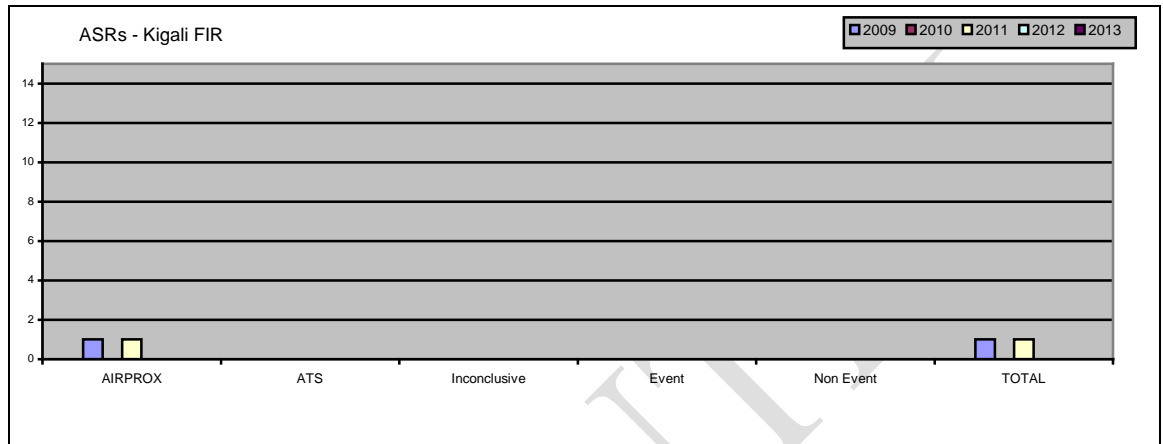
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## 28. Kigali FIR

- No ASR was reported in Kigali FIR, No feedback had been received.

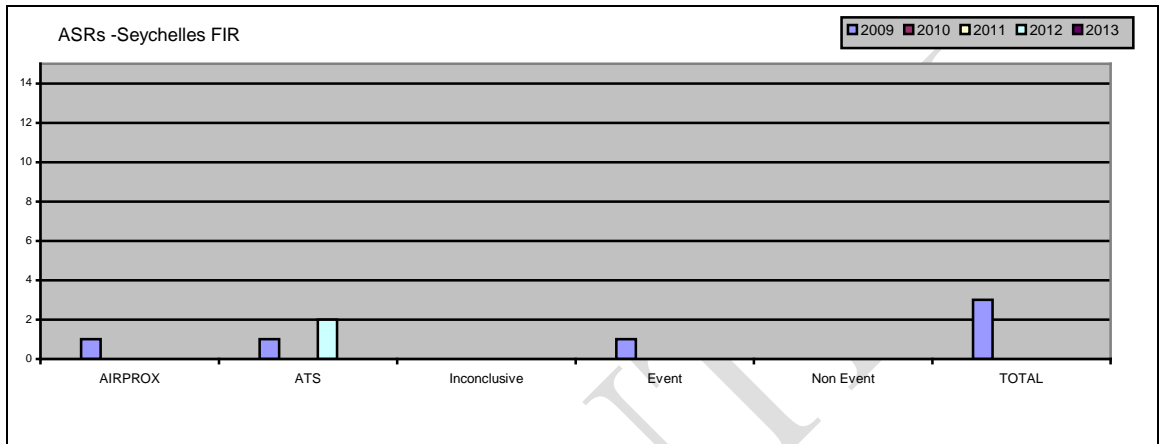


- Main causes include (single cause or as combination of):
  - N/A
- Main contributory factors include:
  - N/A
- Communications
  - N/A
- Recommendation:
  - Rwanda CAA to provide investigation feedback.
- Map
  - N/A.

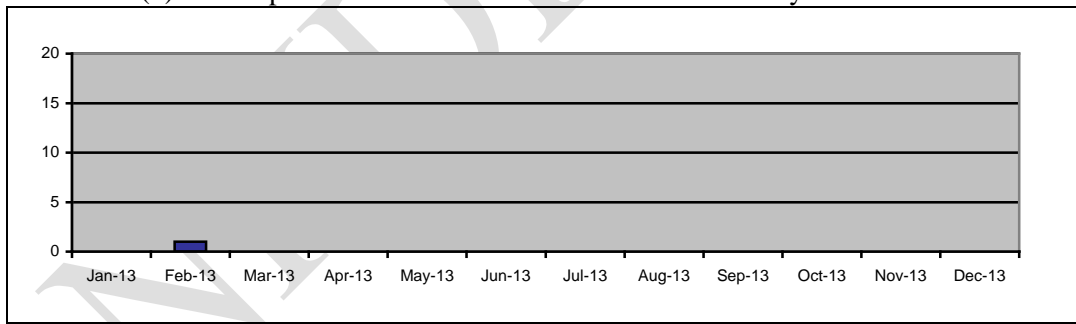


## 29. Seychelles FIR

No ASR was reported in Seychelles FIR.



- Causes include (single cause or as combination of): N/A
- Contributory factors include: N/A
- Communications
  - One (1) ASR reported lack of mobile communications in Seychelles FIR.



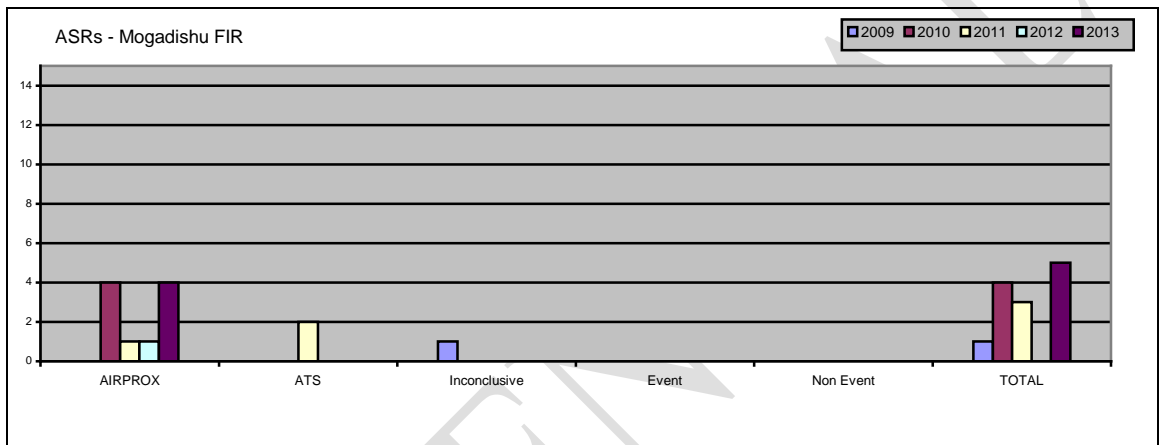
- **Recommendation:**
  - N/A
- Map
  - N/A





### 30. Mogadishu FIR

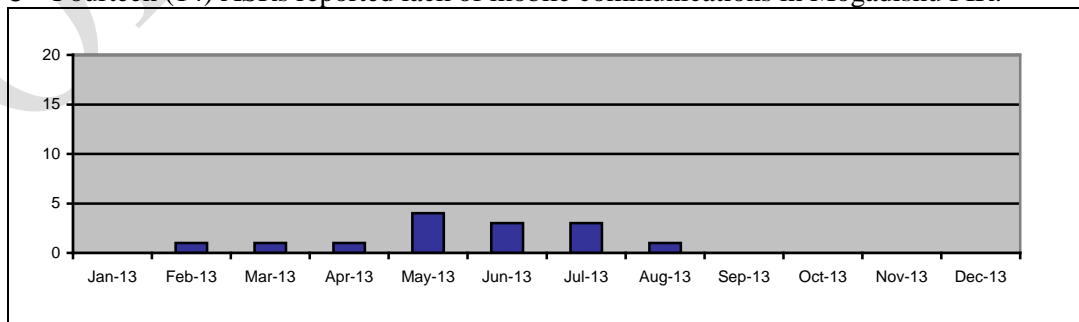
- Five (5) ASRs was reported in Mogadishu FIR. Three feedbacks had been received– 60% feedback rate.
  - Four (4) AIRPROX occurred;
  - One (1) was inconclusive.



- Causes include (single cause or as combination of):
  - I. Human error (2)
  - II. Procedures (1)
- Contributory factors include:
  - III. ATC Error / Training requirement (1)
  - IV. ATC Overload (1)
  - V. Airspace organization/ATM procedure (3)
  - VI. Inadequate communications (2)
  - VII. Coordination between FIR/sectors (2)

#### ▪ Communications

- Fourteen (14) ASRs reported lack of mobile communications in Mogadishu FIR.



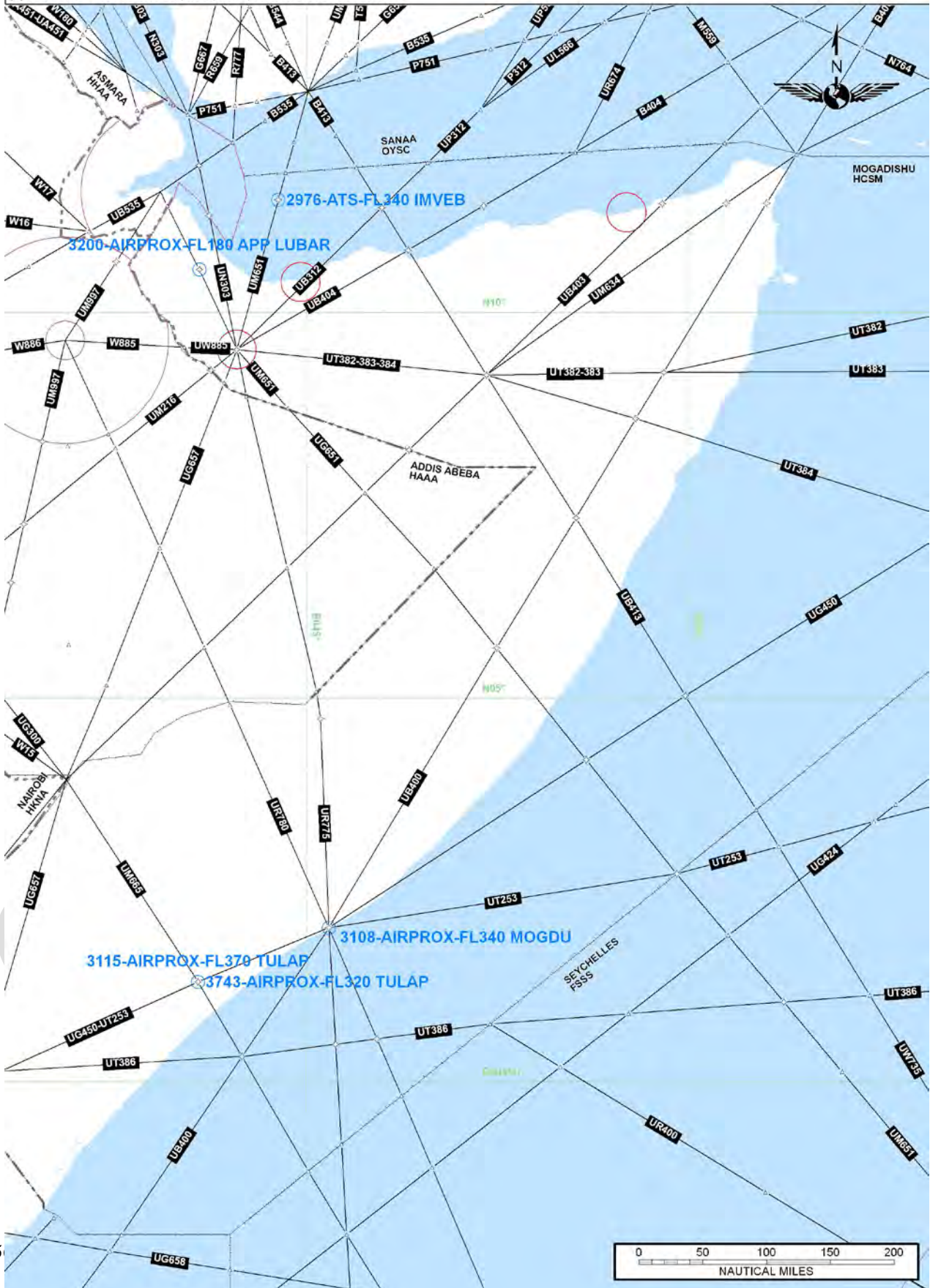


- **Recommendation:**
  - Implement ADS-C/CPDLC to improve mobile communications
  - Review airspace organization
  - Improve coordination with neighbouring ACCs
- Map

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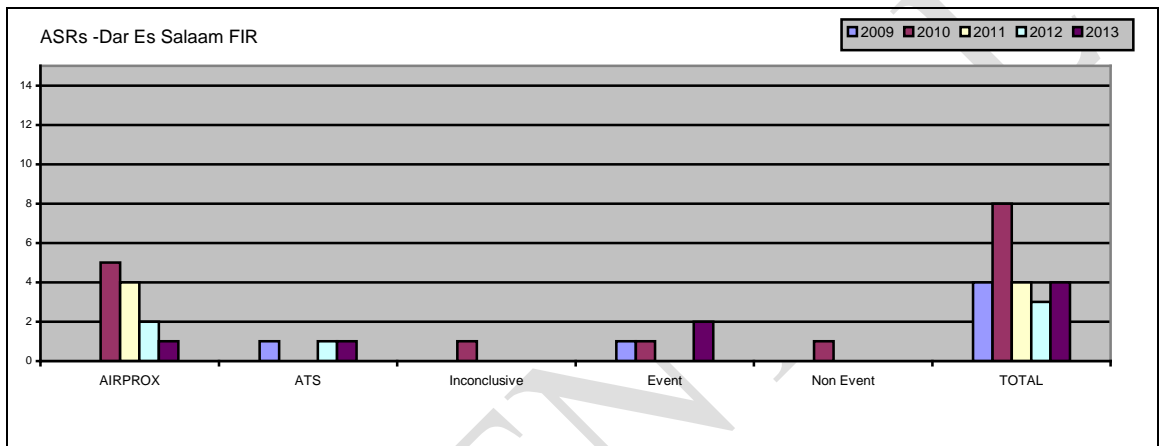
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### 31. Dar Es Salaam FIR

- Four (4) ASRs were reported in Dar Es Salaam FIR. No feedback had been received for those ASRs – 0% feedback rate.
  - One (1) AIRPROX occurred;
  - Two (2) ATS incidents occurred;
  - Two (2) events.



- Causes include (single cause or as combination of):
  - I. Human error (2)
- Contributory factors include:
  - II. ATC Error / Training requirement (2)
  - III. Airspace organization/ATM procedure (2)
  - IV. Inadequate communications (1)
- Communications
  - No ASR reported lack of mobile communications in Dar Es Salaam FIR.



▪ **Recommendation:**

- Review of airspace organization and establish contingency plans
- ATC Refresher training to be conducted regularly and sensitization on the use of runway (one at the same time)
- Necessary provisions to be taken to provide feedback to ensure investigations are conducted

▪ **Information on airspace capacity declaration and required staffing level**

*Air navigation services:*

Tanzania Civil Aviation Authority (TCAA) is the main Air Navigation Service Provider (ANSP) in Tanzania within Dar Flight Information Region. It provides En-route Air Traffic Control Services to flights within Dar FIR and provides Air Traffic Control Services to 11 airports and AFIS at 2 airports. Total of 4 airports are manned 24 hours.

TCAA is full member of CANSO in Africa Region.

*TMA/UTA*

Dar FIR is comprised of two TMAs namely Dar TMA to the East and Kilimanjaro TMA at North East.

*TMA dimensions/ Class*

Dar TMA – Radius of 100 NM from 1500 FT AGL up to FL 245 (Dar APP control/ Radar Control) Class D airspace;

Dar UTA – from FL245 –UNL (Dar ACC East & West) Class A airspace;

Kilimanjaro TMA - From 1500 FT AGL up to FL 245 (Kili APP) Class D airspace;

Kilimanjaro UTA - From FL245 –UNL (Dar ACC East & West) Class A airspace.

*Control Zones/ Dimensions*

Dar FIR has 5 airports with defined control zones.

- i. Dar Control zone – 15NM radius from Ground up to 3500FT ALT
- ii. Zanzibar Control Zone - 15NM radius from Ground up to 3500FT ALT
- iii. Kilimanjaro Control Zone - 15NM radius from Ground up to 9000FT ALT
- iv. Dodoma Control Zone - 25NM radius from Ground up to 1000FT ALT
- v. Mwanza Control Zone - 30NM radius from Ground up to 10500FT ALT



### Air Traffic Services Airspace Capacity

Number of Upper ATS Routes	Number of Lower ATS Routes	Number of RNAV Routes	Number of sectors	Segregated Airspace	Degree of Automation	Availability of CNS Infrastructure (NAVAIDS)
20	4	6	6	7	85%	80%

#### STAFF STRENGTH

Workforce of TCAA at Julius Nyerere International Airport is mainly made up of Air Traffic Management Officers (ATMOs), Aeronautical Navigation Engineers (ANEs), Aeronautical Information Officers (AIOs) and Administrative and support staff makes up the remainder of 128.

Section	Number of staff avbl at Dar (JNIA)	Number required	Provision of Service
Air Traffic Control Management Officers (ATMOs) Ops	46	62	<ul style="list-style-type: none"> <li>• Air Traffic Control Services Procedures/ Radar</li> <li>• Airspace organization</li> <li>• SAR</li> <li>• Incident/Accident Investigation</li> </ul>
Administration	4	6	<ul style="list-style-type: none"> <li>• Incident/Accident Investigation</li> </ul>
Aeronautical Navigation Engineers (ANEs)	22	32	<ul style="list-style-type: none"> <li>• Control centre systems</li> <li>• Maintenance of ATM equipment and Nav aids</li> <li>• Infrastructure development planning</li> </ul>
Aeronautical Information Officers (AIOs)	41	50	<ul style="list-style-type: none"> <li>• Aeronautical charting</li> <li>• Aeronautical Information Management</li> <li>• Procedure design</li> <li>• Surveillance data</li> </ul>

#### Shift Operations ATC

##### Dar Area Control Centre

##### Type of shift - 5 way watch

Number of positions	Number of ATCOs per shift	Number of shift per 24H	Number of movements per day	Maximum capacity per hour	Overload Capacity Regularly per hour	Availability of ATM Equipment	Availability of Nav aids
6	12	3	275	15	20-30	85%	80%



SECTOR	No. of movement per year	No. of movement per month	No. of movement per day
ACC	92892	7741	258
TWR	80184	6682	223
APP/TRANSIT	99012	8251	275
<b>TOTAL</b>	<b>191904</b>	<b>15,992</b>	<b>533</b>

According to the current assessment, controller workload is the summation of times spent on:

- i. Communication (transmission/reception);
- ii. Manual activities (filling out flight progress strips) and coordination;
- iii. Traffic planning and distribution;
- iv. Training supervision

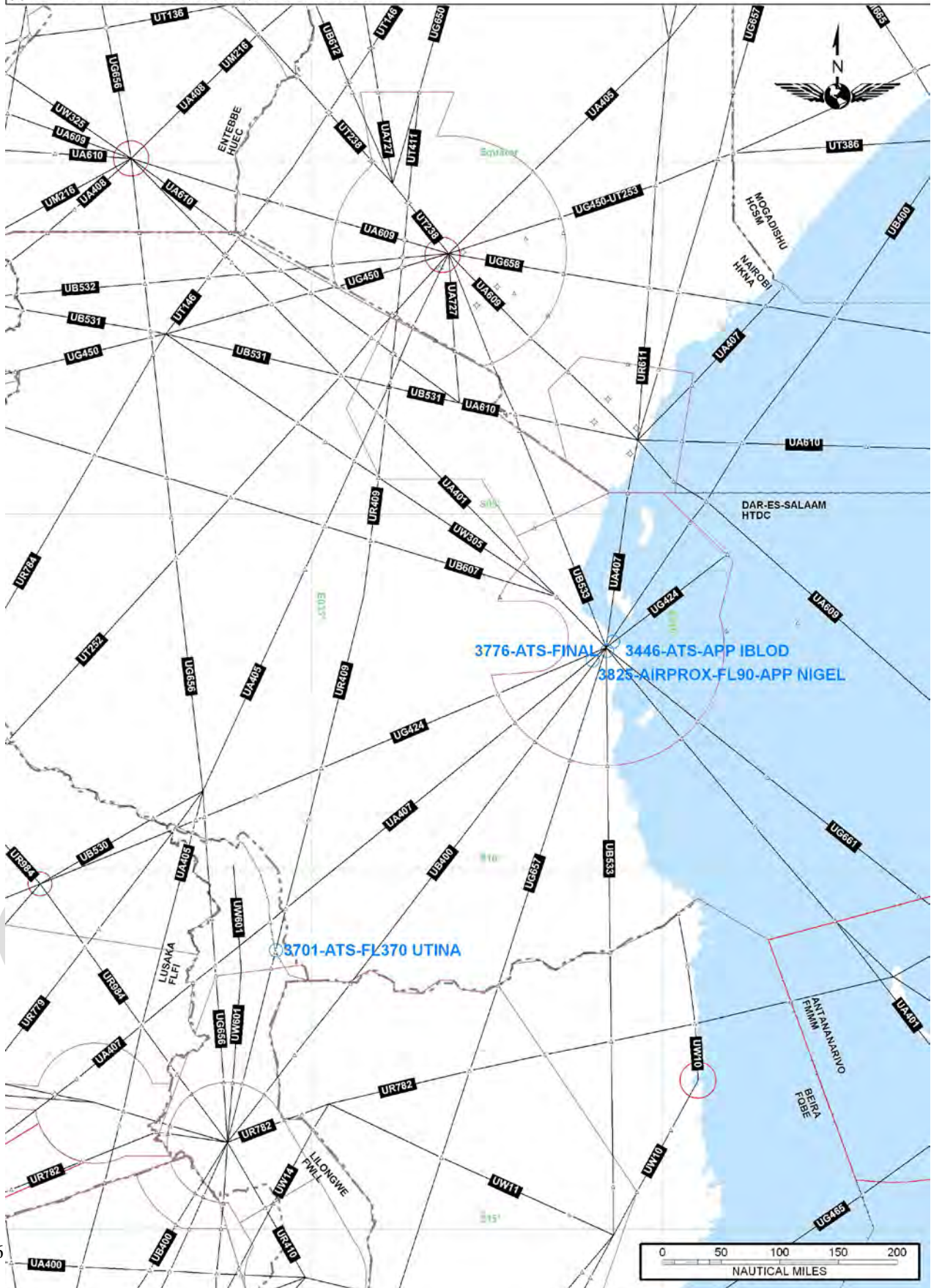
Note:

In summary, this report serves as an overview to define the Airspace capacity and the ATC workload based on simple short time research by reporter. The Authority need to do more research including all parameters and indicators to be taken into account for analysing delays, to identify best practices leading to increased capacity, and to detect the differences and similarities of the models used in the Region, thus creating a sound baseline.

- Map



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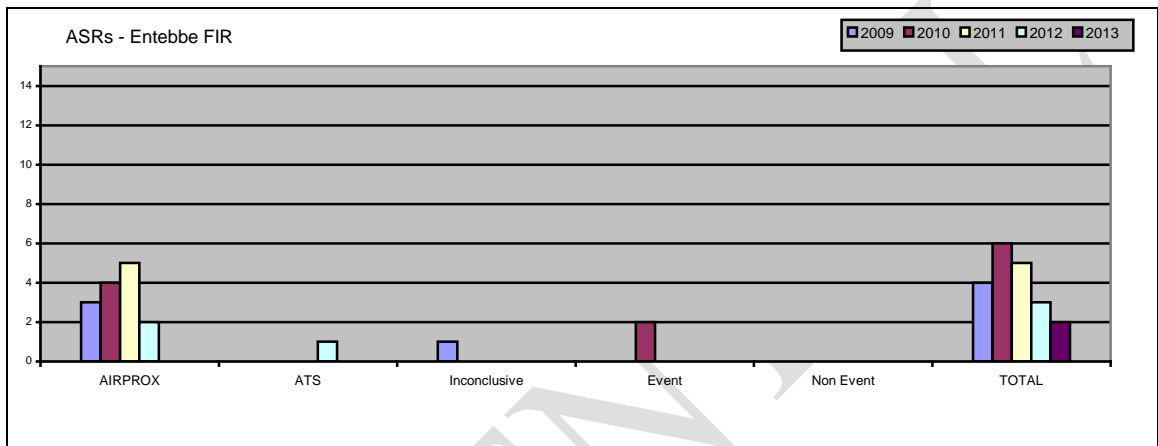






### 32. Entebbe FIR

- Two (2) ASRs were reported in Entebbe FIR. Feedback had been received for all ASRs – 100% feedback rate.
  - Two (2) AIRPROX occurred.



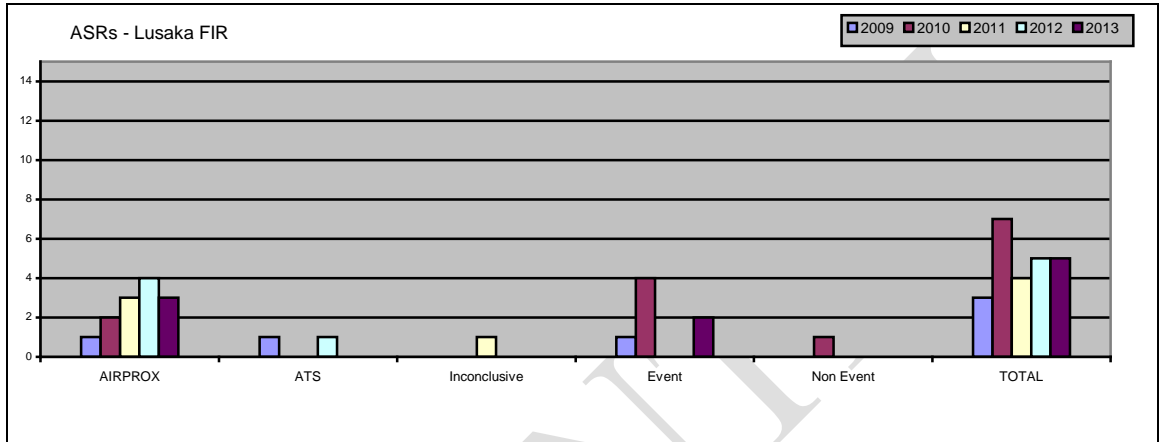
- Causes include (single cause or as combination of):
  - I. Human error (1)
  - II. Procedures (1)
- Contributory factors include:
  - III. ATC Error / Training requirement (1)
  - IV. Airspace organization/ATM procedure (2)
- Communications
  - No ASR reported lack of mobile communications in Entebbe FIR.
- **Recommendation:**
  - Establish appropriate civil-military coordination procedures
  - Improve ATM operational management and staffing
- Map



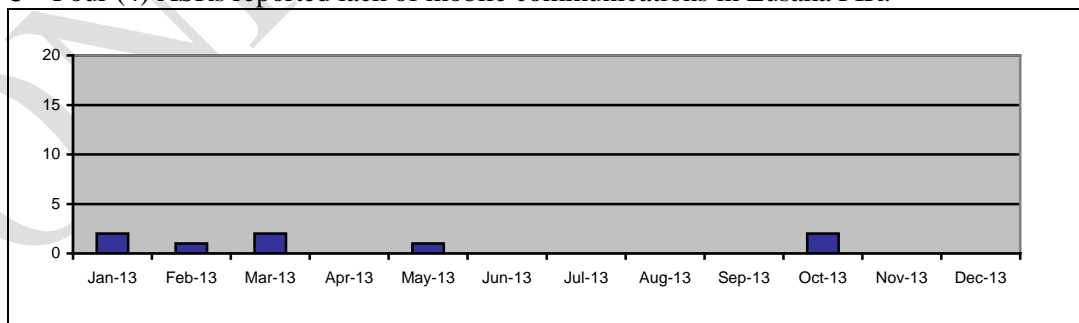


### 33. Lusaka FIR

- Five (5) ASRs were reported in Lusaka FIR. 100% feedback rate.
  - Three (3) AIRPROX occurred;
  - Two (2) ATS incidents occurred.



- Causes include (single cause or as combination of):
  - I. Human error (2)
  - II. Procedures (2)
- Contributory factors include:
  - III. ATC Error / Training requirement (3)
  - IV. Airspace organization/ATM procedure (1)
  - V. Inadequate communications (1)
  - VI. Coordination between FIR/sectors (1)
- Communications
  - Four (4) ASRs reported lack of mobile communications in Lusaka FIR.



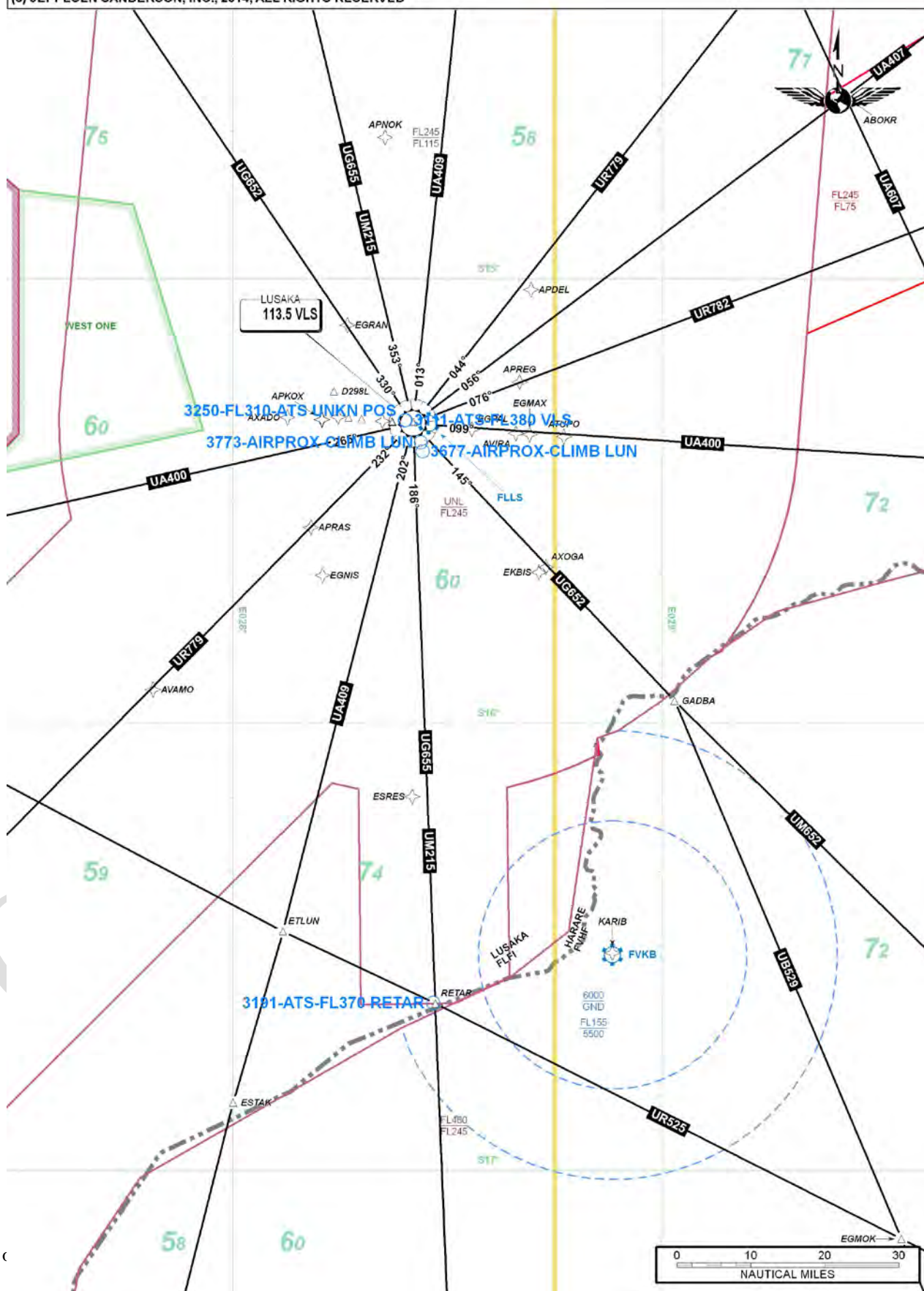


- **Recommendation:**
  - Review arrival procedures at Entebbe airport
  - Review airspace organization
  
- Map

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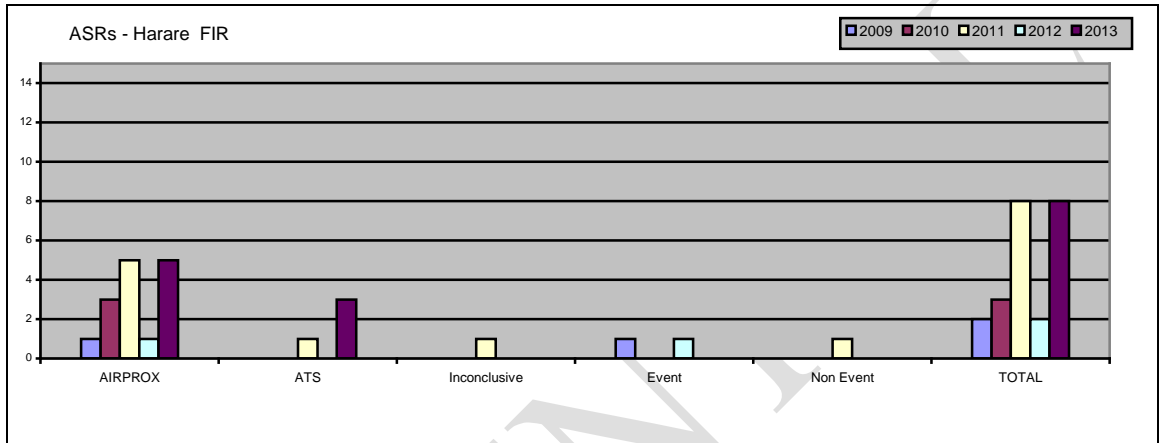
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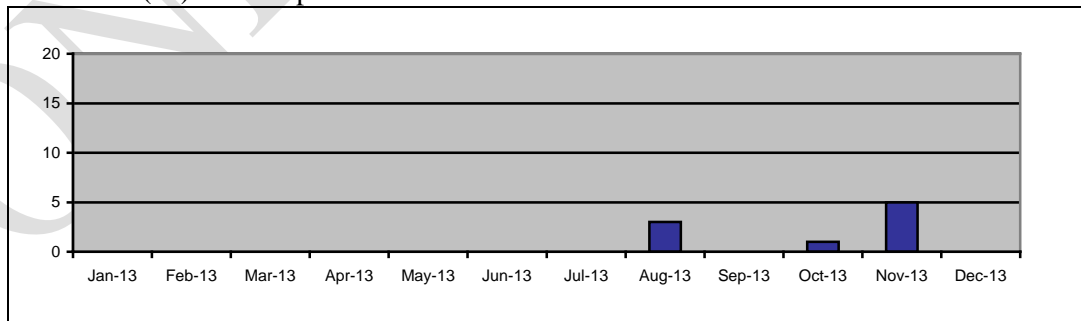


### 34. Harare FIR

- Eight (8) ASRs were reported in Harare FIR. Feedback had been received for all– 100% feedback rate.
  - Five (5) ASRs were AIRPROX;
  - Three (3) ASRs were ATS incidents.



- Causes include (single cause or as combination of):
  - I. Human error (2)
  - II. Coordination (1)
  - III. Communication (1)
  - IV. ATM operations (3)
- Contributory factors include:
  - V. ATC Error / Training requirement (1)
  - VI. Airspace organization/ATM procedure (1)
  - VII. Cockpit discipline/Non-compliance (1)
- Communications
  - Eleven (11) ASRs reported lack of mobile communications in Harare FIR.



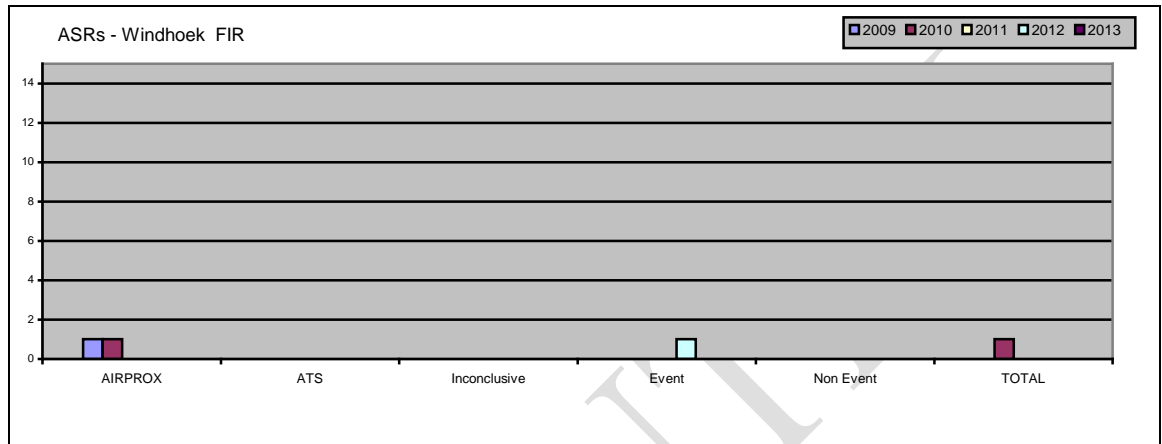
- **Recommendation:**
  - Continuation of Training and awareness
  - Improvement of mobile communications
  - Staffing
- Map





### 35. Windhoek FIR

- No ASR was reported in Windhoek FIR.



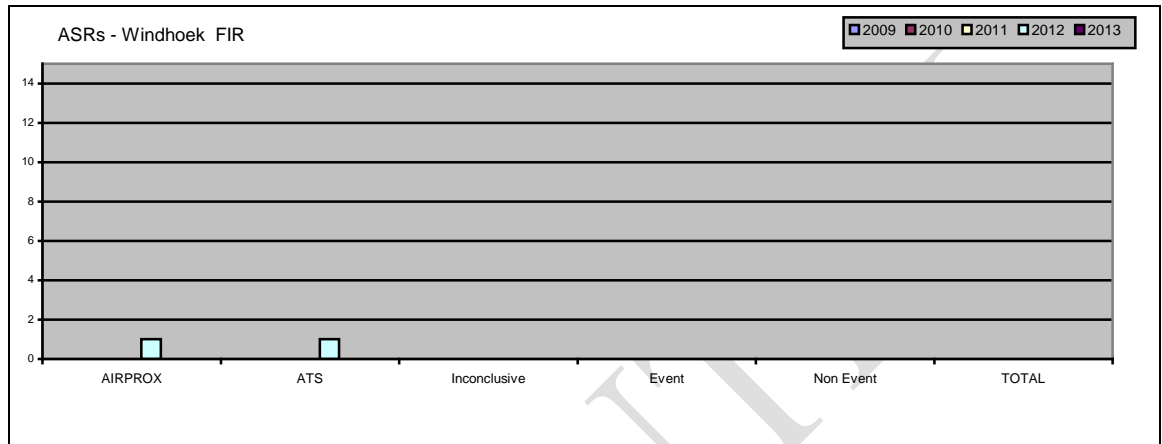
- Main causes include (single cause or as combination of):
  - N/A
- Main contributory factors include:
  - N/A
- Communications
  - N/A
- **Recommendation:**
  - N/A
- Map
  - N/A





### 36. Roberts FIR

- No ASR was reported in Roberts FIR.

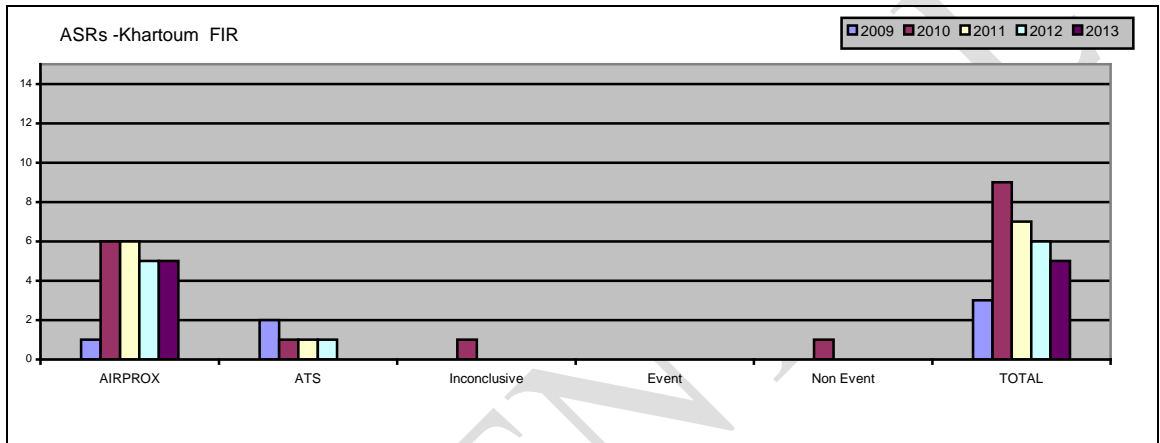


- Main causes include (single cause or as combination of): N/A
- Main contributory factors include: N/A
- Communications
  - No ASR reported lack of mobile communications in Roberts FIR.
- **Recommendation:**
  - N/A
- Map: N/A

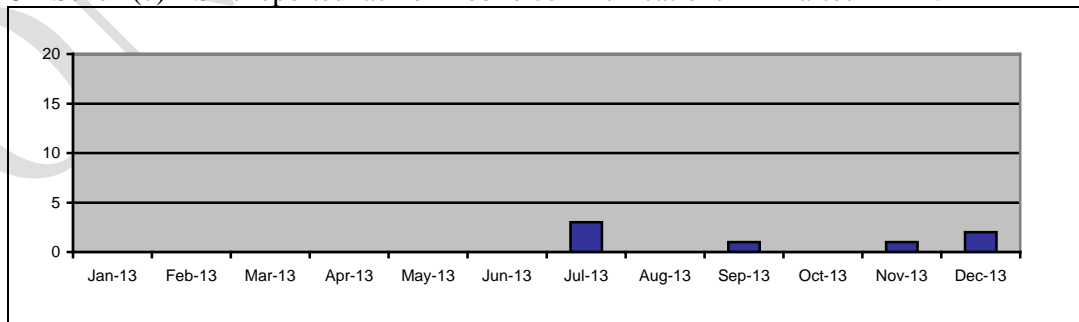


### 37. Khartoum FIR

- Five (5) ASRs were reported in Khartoum FIR. Five feedbacks had been received– 83% feedback rate.
  - Five (5) AIRPROX occurred;



- Causes include (single cause or as combination of):
  - X. Human error (1)
  - XI. Coordination (3)
  - XII. Communication (4)
- Contributory factors include:
  - XIII. ATC Error / Training requirement (2)
  - XIV. Airspace organization/ATM procedure (5)
  - XV. Coordination between FIR/sectors (1)
- Communications
  - Seven (7) ASRs reported lack of mobile communications in Khartoum FIR.



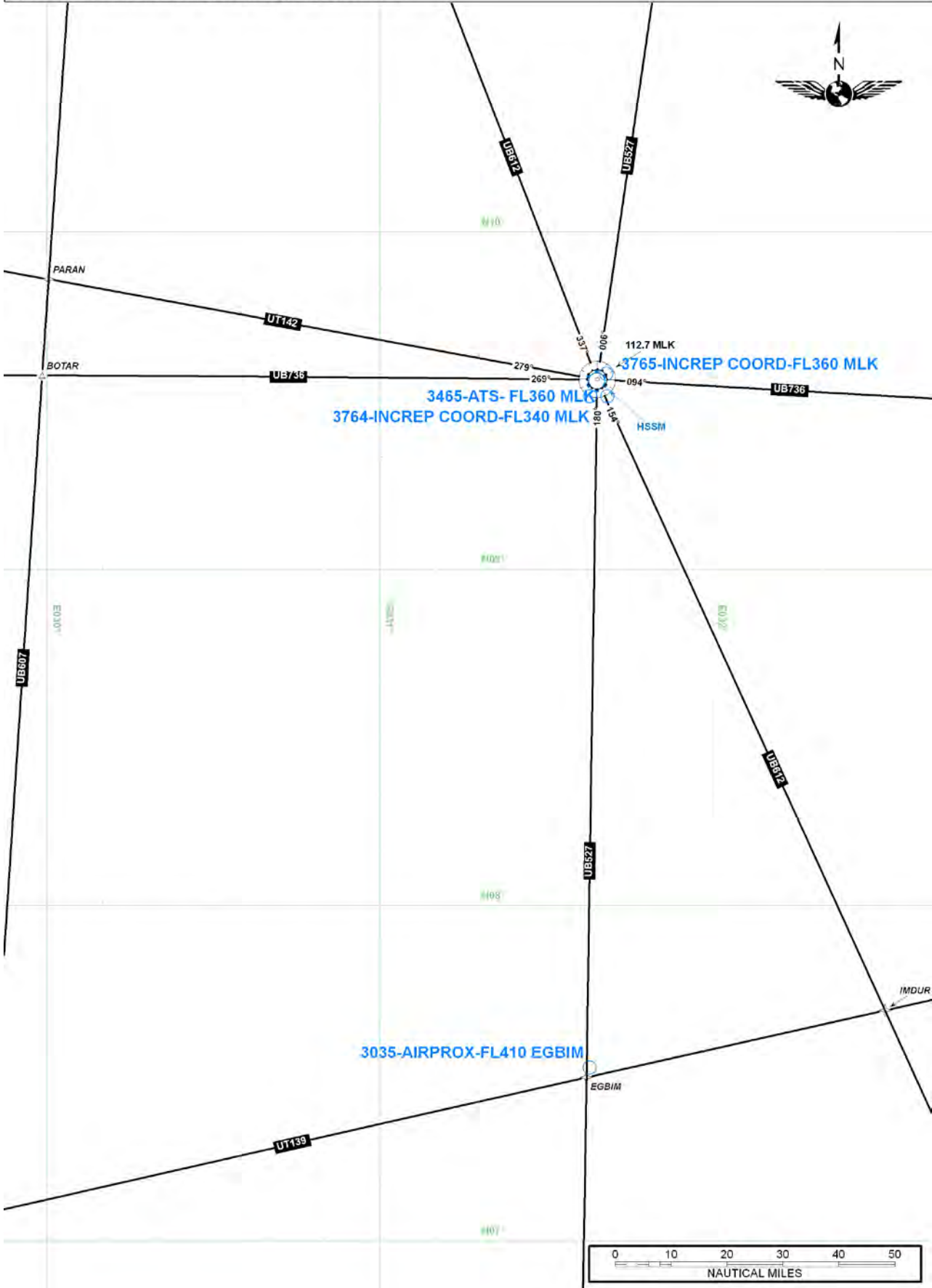


- **Recommendation:**
  - Review airspace organization
  - Prioritize Organization & Implementation of ATM/ATC system and mobile communications in South Sudan
  - Improve coordination procedures with neighbouring FIRs (Tripoli and Addis Ababa)
  - Improve Communications
    - Install Equipment where required. (VHF/HF/CPDLC/ADS-C).
    - Emphasize aircrew Procedures (10 minutes prior)
  - Address ATC staffing and working conditions at the highest level
  - Emphasize value of IFBP to identify/de-conflict Loss of Separation events.
  
- Map

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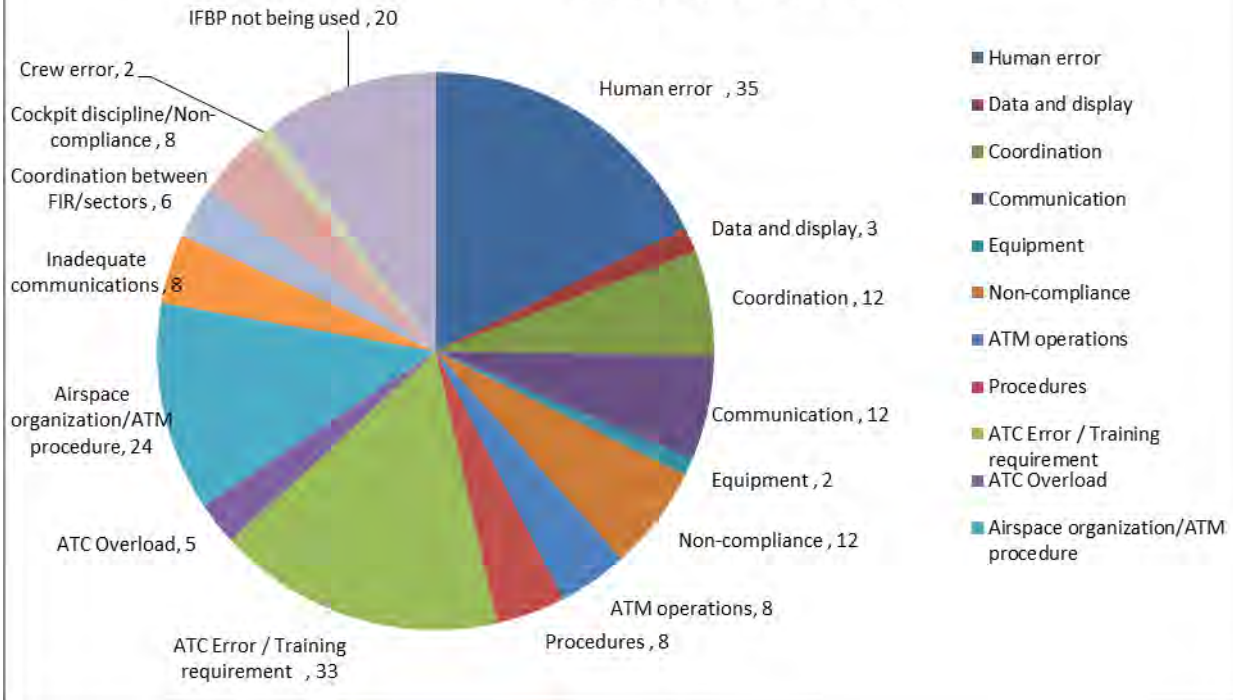


38. Causes of incidents and contributing factors:

- I. Human Factors - either ATC or cockpit crew, remains a main cause of incidents or a combination factor:
  - Human error was either the main cause or as combination factor causing incidents in thirty-five (35) instances:
    - ATC error/Lack of proficiency was contributing factor in thirty-three (33) instances;
    - Crew error was contributing factor in two (2) instances;
  - Non compliance was either the main cause or as combination factor causing incidents in twelve (12) instances;
    - Cockpit discipline / no compliance from crew was contributing factor in eight (8) instances.
- II. Lack of procedures or lack of appropriate procedures and lack of appropriate ATM operations are second cause of incidents:
  - Procedure was either the main cause or as combination factor causing incidents in eight (8) instances
  - ATM operations was either the main cause or as combination factor causing incidents in eight (8) instances
  - ATM operations (ATC overload) was either the main cause or as combination factor causing incidents in five (5) instances.
- III. Lack of mobile communications is third cause of incidents or a contributing factor to incidents:
  - It was either the main cause or as combination factor causing incidents in twelve (12) instances
    - It was contributing factor in eight (8) instances.
- IV. The lack of coordination between ATC sectors, civil and military and FIRs continues to be dominant cause of incidents or a contributing factor:
  - It was either the main cause or as combination factor causing incidents in twelve (12) instances
    - It was contributing factor in six (6) instances.
- V. Facilities (equipment) was the main cause of incidents in two (2) instances.
- VI. Deficiencies in airspace organization was contributing factor in thirty-three (33) instances.
- VII. Crew failing to establish contact on IFBP was contributing factor in twelve (12) instances.



## Incident causes





### 39. General recommendations

- I. Management of human factors such as but not limited to fatigue, work load, working conditions, and equipment resulting in inadequate ATC proficiency factors need to be continuously addressed.  
The SMS concept of “Just culture” appears to improve and Non-Punitive System and Culture should be implemented in the ACCs.
- II. Coordination between ATS units / FIRs needs to be improved. Civil military coordination bodies should also be implemented to support coordination between sectors.
- III. VHF/HF communications need to be enhanced in order to enable positive Air Traffic Control. Controller-pilot data link communications (CPDLC) for en-route operations in accordance with the Regional Air Navigation Plan (ICAO Doc 7474) to be implemented and Global Operational data Link Document (GOLD) procedures implementation to be re-enforced.
- IV. Airspace re-organisation where more sectors are required and clarifying ATC procedures. Appropriate classification of airways.
- V. Encourage the use of IFBP in the corresponding applicability area with regard to the last version of In-Flight Broadcast Procedures. The lack of positive Control by ATC remains a reason for IFBP to be maintained as a safety in the some African areas.
- VI. Emphasize Importance of Crew Advance Communication prior to FIRs Boundaries.
- VII. ANSPs to continue providing investigation report in compliance with ICAO Annexes and format should contain:
  - 1. FACTUAL INFORMATION**  
History of flight - a brief narrative giving the following information:
    - Flight number, type of operation, last point of departure, time of departure (local time or UTC), point of intended landing;
    - Flight preparation, description of the flight and events leading to the accident, including reconstruction of the significant portion of the flight path, if appropriate;
    - Location (latitude, longitude, elevation), time of the accident (local time or UTC), whether day or night.
  - 2. ANALYSIS**  
Analyze, as appropriate, factual information which is relevant to the determination of conclusions and causes.



### 3. CONCLUSIONS

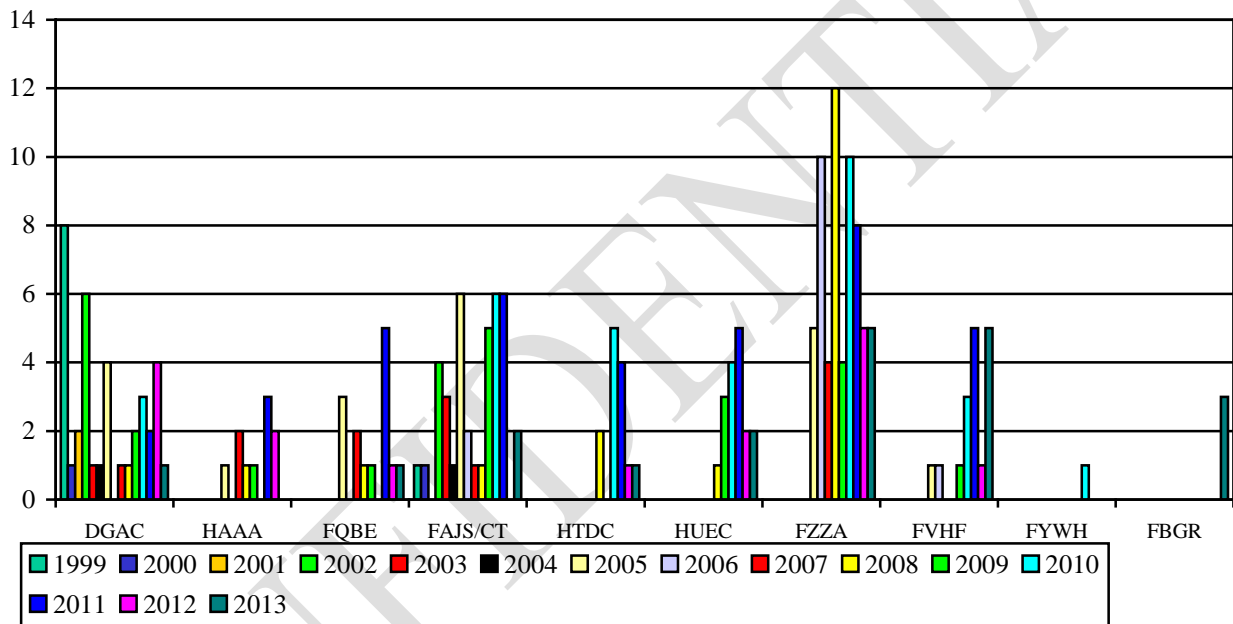
List the findings and causes established in the investigation.

The degree of risk involved in aircraft proximity should be determined in the incident investigation and classified as “risk of collision”, “safety not assured”, “no risk of collision” or “risk not determined”.

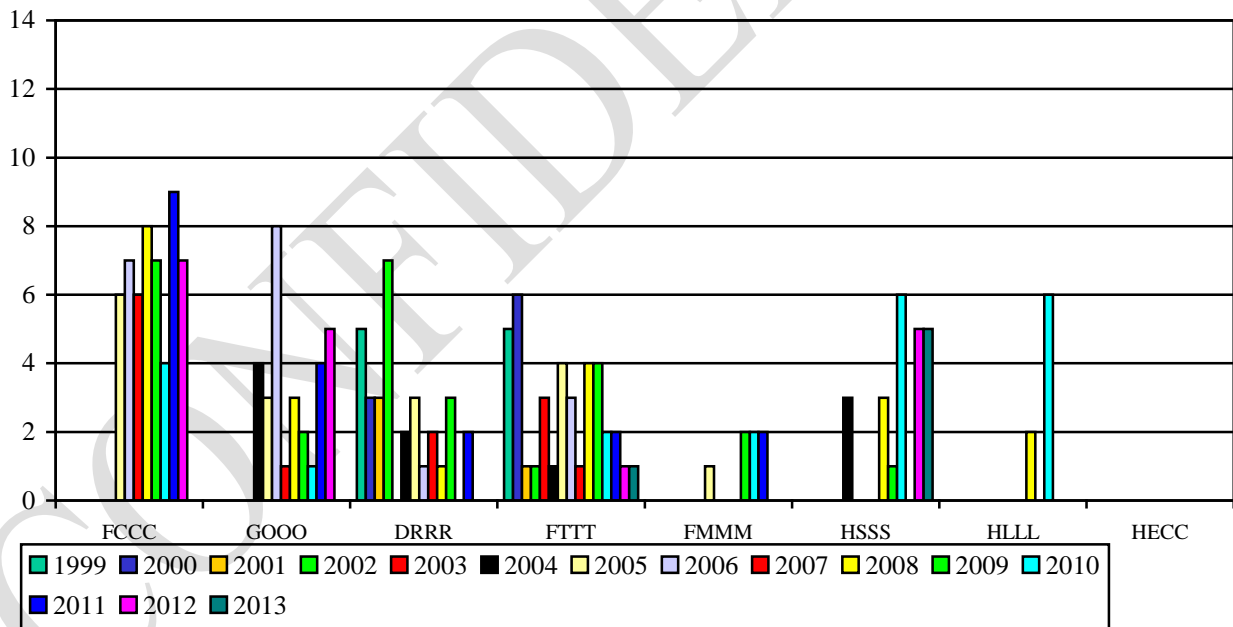
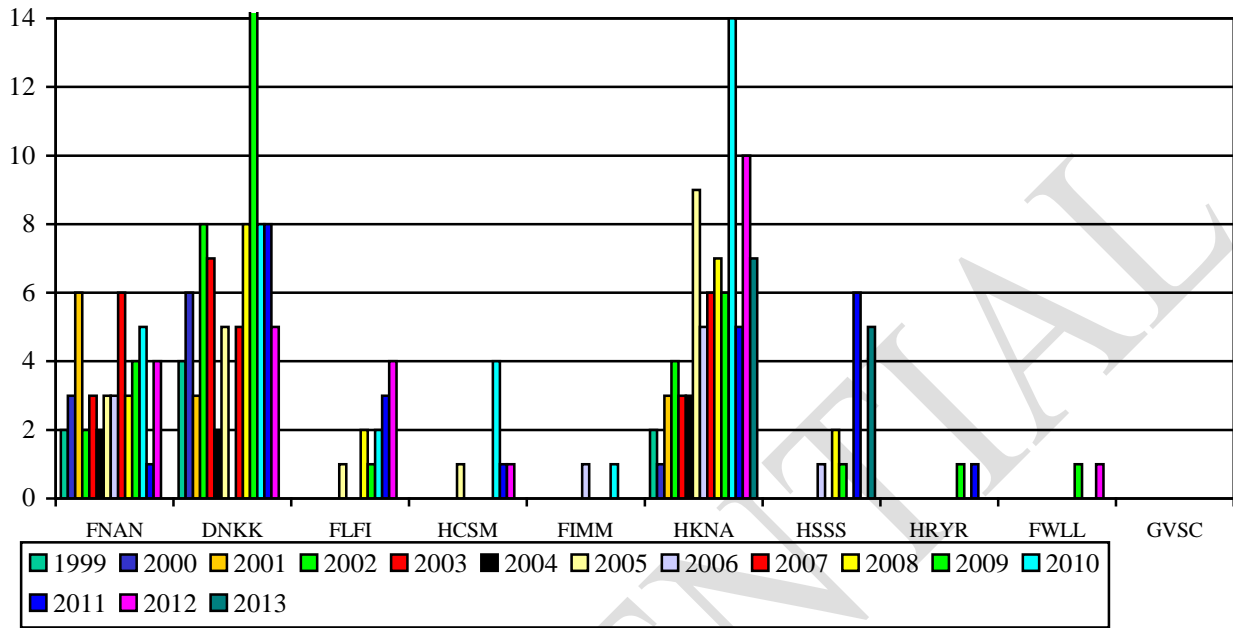
### 4. SAFETY RECOMMENDATIONS

As appropriate, briefly state any recommendations made for the purpose of accident prevention and any resultant corrective actions.

Contribution of AIRPROX per FIR

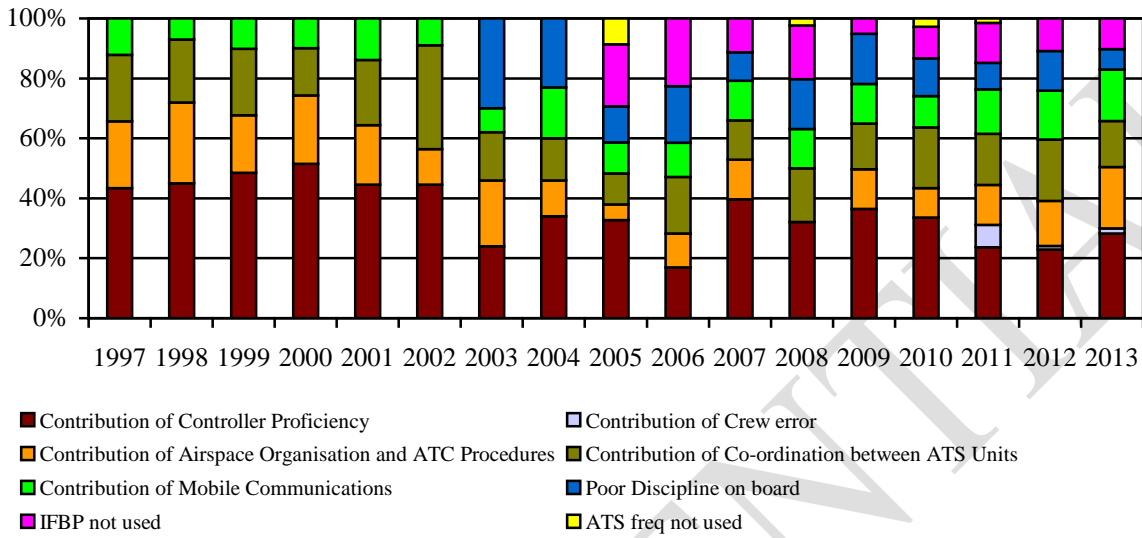








Contributing factors of AIRPROX:



40. Date & Venue of the Next Meeting

Eleventh (12<sup>th</sup>) AIAG will meet in March 2015 in Johannesburg. Actual dates and full logistical details including premises will be advised accordingly.