**INTERNATIONAL CIVIL AVIATION ORGANIZATION**

**AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP**
**NINETEENTH MEETING (APIRG/19)**
**(Yamoussoukro, Cote d'Ivoire, 30 November - 2 December 2015)**

**Agenda Item 2: Performance Framework for AFI Regional Air Navigation Planning and Implementation**

**2.4: Communications, Navigation and Surveillance**

# RESULTS OF THE AFI VHF AND HF COMMUNICATIONS SURVEY – 2015

*(Presented by IATA)*

## 1. INTRODUCTION

1.1 IATA conducts aeronautical mobile communications surveys in the AFI Region every 18 months with an objective to determine VHF/HF coverage within the region, in order to identify deficiencies in communication and arrive at corrective action plans to address them, in coordination with States and Air Navigation Service Providers (ANSPs).

1.2 The last survey was done on the 24th November to 8th December 2014 but was inconclusive due to inadequate data received from airlines and therefore IATA was not able to generate a report for submission to APIRG19. This was an issue of great concern to IATA and ICAO. After a lengthy deliberation by the User's representative in the IATA Regional Coordination Group, RCG, it was decided that a new survey be carried out on the 15-28 June 2015. This was duly done following results as presented in this report.

1.3 However, the RCG meeting recognized the need for feedback to airlines and flight crew on the usefulness of continuing with the survey. It is desirable that feedback is provided to the participating flight crew to encourage positive response to future surveys in order to avoid apathy.

## 2. Airlines participation

2.1. The following airlines; Air Botswana (BP), Air France (AF), British Airways (BA), Delta Air Lines (DL), Kenya Airways (KQ), KLM Royal Dutch Airlines (KL), Lufthansa (LH), Swiss International Airlines (LX) and South African Airways (SA); provided data representing over 1400 communication reports on 24 ATS units. The data covers a good part of the AFI Region.

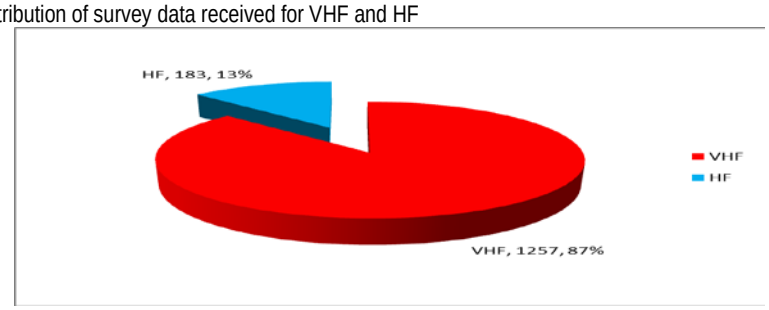
## 3. Participation of States Air Traffic Services Units

3.1. Only the ATS Unit of Botswana participated in the survey. It is commendable that they have done this consistently over the years.

## 4. Summary of the results

4.1. The distribution of the survey data is as depicted in the chart below. VHF represented 87% of the data received from airlines while HF represented only 13% Fig 1). This may not represent the distribution of usage of VHF compared to HF in the AFI Region. However, at the individual FIR level, the proportion of the VHF and HF provides an indication on the coverage of VHF i.e. if attempt in calls over HF indicates some difficulties in VHF communication.

Fig1: Distribution of survey data received for VHF and HF




4.2. Some FIRs namely, Kinshasa, Luanda, Lusaka, Mogadishu and to a small extent Niamey showed a significant level in HF usage indicating that VHF was still unavailable is some parts of the FIR (Fig 2). Although Khartoum is not in the list, there was some attempt to call on HF which was mainly due to the unserviceability of the extended VHF station in Juba, South Sudan.

Fig 2: Distribution of VHF and HF calls for selected FIRs from the survey.

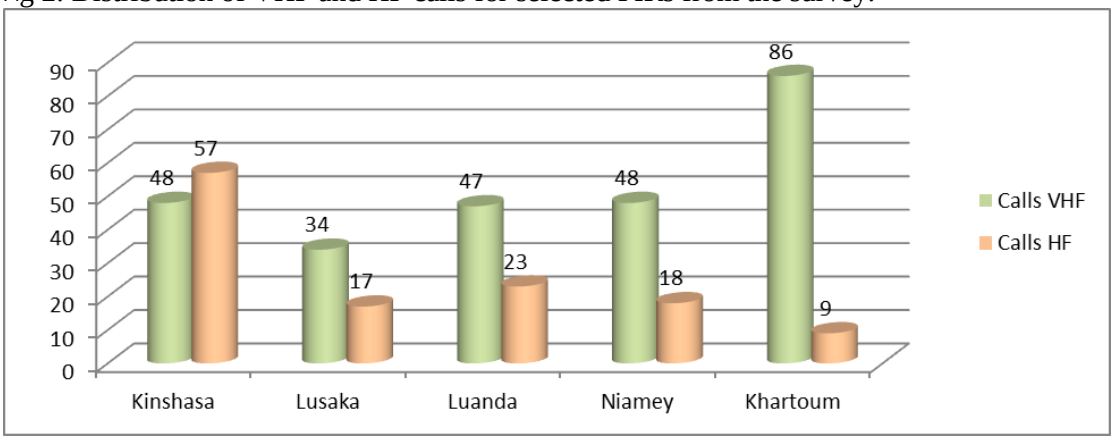
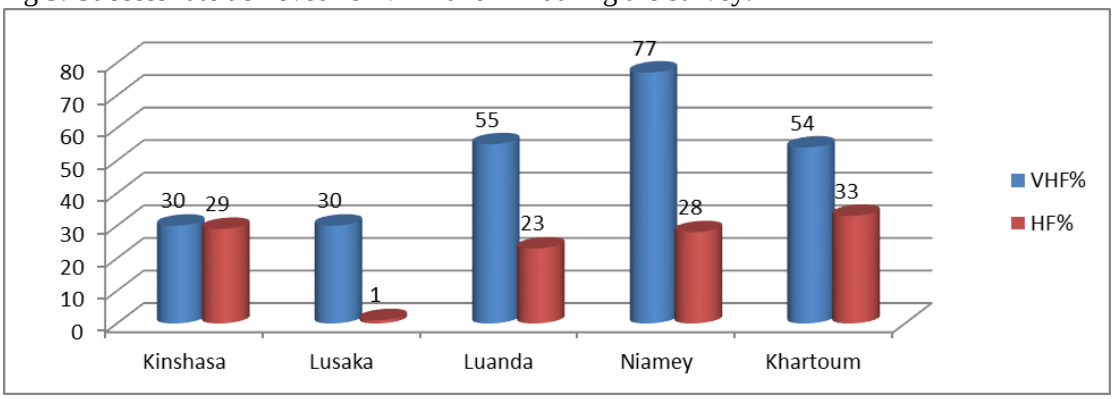



Fig 3: Success rate achieved for VHF and HF during the survey.




It is generally assumed that an increase in VHF communication usage vis-à-vis a decrease in HF communication usage usually indicates an improvement in the overall status of communication in the FIR as more airlines tend to use the more effective VHF communication channels.

Improvement in Khartoum FIR is not visible in fig 3 above (success rate). This is because of an increased usage of HF which is mainly restricted to the South-Eastern part of Sudan FIR bordering Ethiopia FIR according to the survey results; as well as the communication issues in Juba. It should be recognized that Khartoum has invested tremendously in aeronautical mobile communication infrastructure but unfortunately

the benefits are not visible according to this survey. A more vigorous survey needs to be done to establish the results of this survey with more data spread all over the FIR.

4.3. The table below (fig 3) summarizes the VHF/HF and CPDLC usage and the respective success rate. The figures in the table have been arrived at based on the data received during the survey period and are indicative of the reality on the ground.

Fig 4: Table of the summary of the VHF, HF and CPDLC Survey

| | | NO. OF CALLS | | | % COMMUICATION SUCCESS | | %VHF | %HF | CPDLC | %CPDLC |
|---|---|---|---|---|---|---|---|---|---|---|
| N0. | ATS UNIT | VHF | HF | TOTAL | VHF | HF | Usage | Usage | Log on tried | success |
| 1 | Abidjan | 4 | 5 | 9 | - | - | 44 | 56 | - | - |
| 2 | Accra | 35 | 8 | 43 | 80 | - | 81 | 19 | 16 | 76 |
| 3 | Addis Ababa | 43 | 0 | 43 | 60 | - | 100 | 0 | - | - |
| 4 | Algiers | 86 | 5 | 91 | 83 | - | 95 | 5 | 53 | 38 |
| 5 | Antananarivo | 8 | 0 | 8 | - | - | 100 | 0 | - | - |
| 6 | Beira | 38 | 0 | 38 | 50 | - | 100 | 0 | - | - |
| 7 | Brazzaville | 32 | 6 | 38 | 84 | - | 84 | 16 | 25 | 80 |
| 8 | Cairo | 17 | 0 | 17 | 82 | - | 100 | 0 | - | - |
| 9 | Dakar | 7 | 0 | 7 | - | - | 100 | 0 | - | - |
| 10 | Dar es salaam | 66 | 0 | 66 | 52 | - | 100 | 0 | - | - |
| 11 | Entebbe | 13 | 0 | 13 | - | - | 100 | 0 | - | - |
| 12 | Gaborone | 401 | 0 | 401 | 99 | - | 100 | 0 | - | - |
| 13 | Harare | 12 | 0 | 12 | - | - | 100 | 0 | - | - |
| 14 | Johannesburg | 10 | 0 | 10 | - | - | 100 | 0 | - | - |
| 15 | Kano | 29 | 0 | 29 | 59 | - | 100 | 0 | - | - |
| 16 | Khartoum | 86 | 9 | 95 | 54 | 33 | 91 | 9 | - | - |
| 17 | Kinshasa | 48 | 57 | 105 | 30 | 29 | 46 | 54 | - | - |
| 18 | Lagos | 17 | 0 | 17 | 71 | 0 | 100 | 0 | - | - |
| 19 | Lilongwe | 6 | 0 | 6 | - | - | 100 | 0 | - | - |
| 20 | Luanda | 47 | 23 | 70 | 55 | 23 | 67 | 33 | 23 | 65 |
| 21 | Lusaka | 34 | 17 | 51 | 30 | 1 | 67 | 33 | - | - |
| 22 | Mogadishu | 7 | 35 | 42 | - | 49 | 17 | 83 | - | - |
| 23 | Nairobi | 49 | 0 | 49 | 84 | - | 100 | 0 | - | - |
| 24 | N'djamena | 21 | 0 | 21 | 81 | - | 100 | 0 | 21 | 90 |
| 25 | Niamey | 48 | 18 | 66 | 77 | 28 | 73 | 27 | 42 | 69 |

4.4. Notes

Successful (use of VHF/HF) communication or VHF/HF success rate is described in this survey as;
• 'Communication established' -strength/Clarity 4-5,
• 'Communication established and is excellent' -strength/Clarity 5.

A review of the classification of the strength and clarity of the communication based on ICAO Annex 10 Volume II, 5.2.1.8.4 was discussed and adopted. Crew and ANSPs should be sensitized on readability scale as follows;
Read you one=unreadable; read you two=readable now and then
Read you three=readable but with difficulty
Read you four=readable
Read you five=perfectly readable.

4.5. The 'old' model used for determining strength and clarity of the calls before 2013 was based the following;

- 'Nil communication'=strength 1-2
- 'Communication established'=strength 3-4
- 'excellent communication'= strength 5

This old model was discarded after discussions with RCG, IATA and IFALPA

Part II – Analysis of the results by FIR

Abidjan FIS

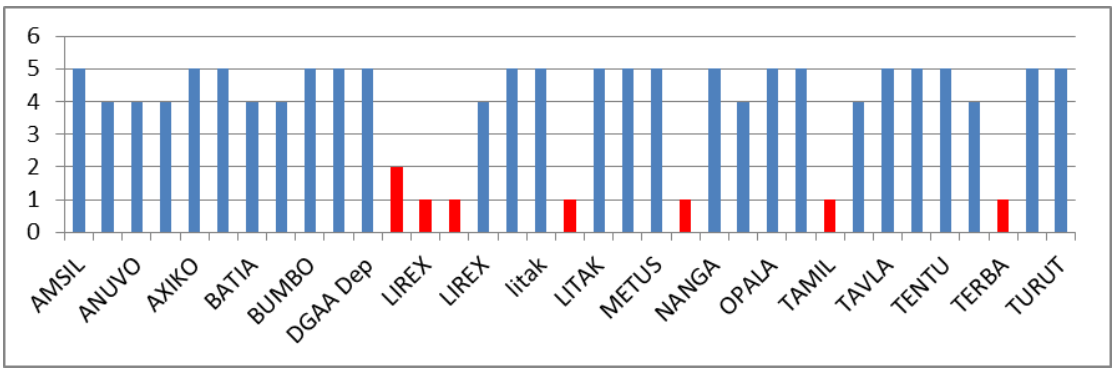
VHF/HF

Not enough calls to provide any meaningful results

CPDLC

See results under Dakar FIR

**Accra FIR**




VHF/HF
A total of 43 calls were made (35 on VHF and 8 on HF).
Success rate; VHF 80% and HF data was not enough to make valid conclusions.

In previous surveys, VHF calls at TATAT, SENOR and LITAK had logged poor communication. In 2015, only LITAK had 'Nil Communication'. However, this was not enough to arrive at conclusive results regarding position LITAK.

CPDLC

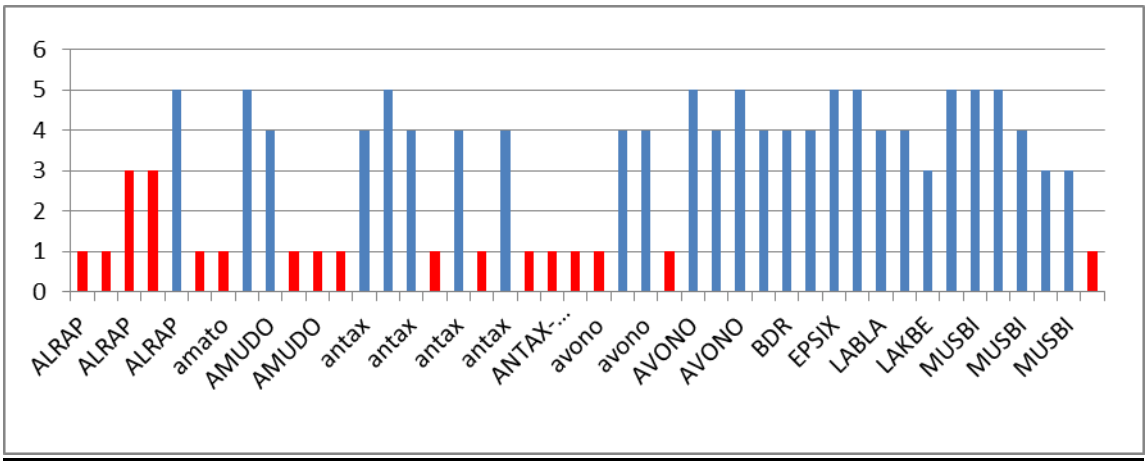
Total of 13 attempts on CPDLC were made. Out of these, 85% had successful LOG-INs. Crew were able to log-in at position LITAK.

Addis FIR

VHF/HF

A total of 43 calls were made all on VHF with success rate of 60% which is way lower that 94% in 2012.

In 2009, 50% of VHF and HF calls at EPSIX, ANTAX and AMATO had 'Nil Communication'. All calls at position TIKAT recorded 'Nil Communication'. In 2012 survey, position ALRAP and ANTAX had 'Nil Communication' in all calls.

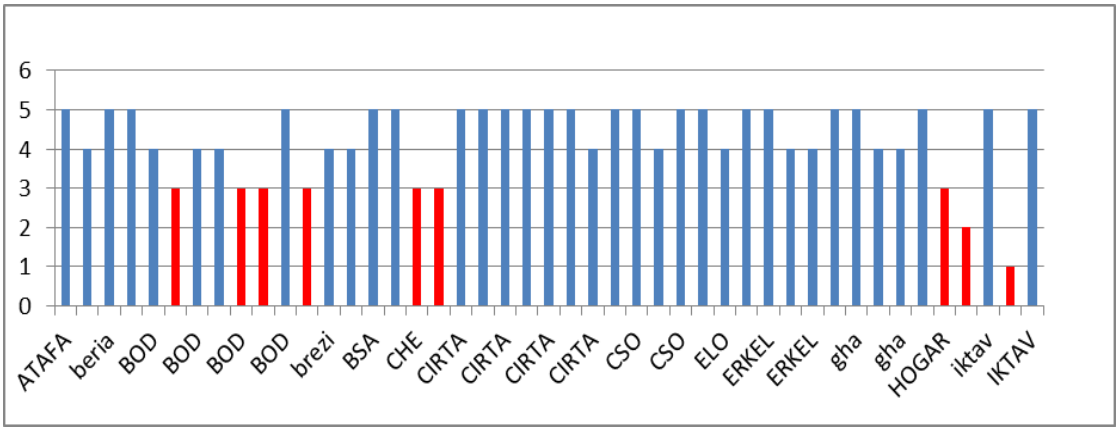



In 2015, these positions; ALRAP, ANTAX, AMATO and now AMUDO which are at the north-west and west of the FIR, are still problematic. Investigation was requested and no report has been received. The probable 'Blind' spot at these positions need investigations and conclusive remedial actions.

CPDLC

No CPDLC available in Addis FIR.

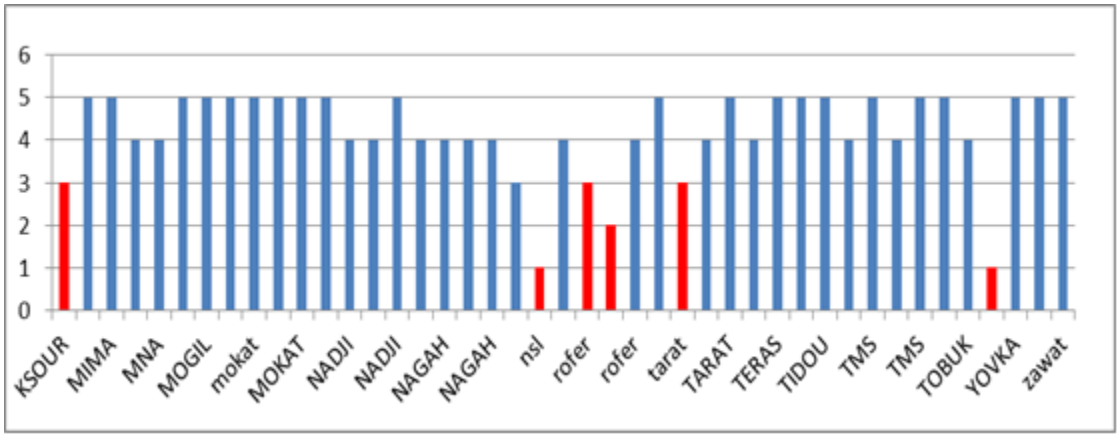
**Algiers FIR**




VHF/HF
A total of 91 calls were made (86 on VHF and 5 on HF).
Success rate for VHF was 83%. Only six calls were registered on HF which was inadequate to make any meaningful conclusions.

In general, communication is adequate.

However, positions BOD (Bordj Omar Driss VOR), HOGAR and IKTAVI have shown some challenges in VHF communication even in previous surveys. In this particular survey, only 57% of the calls registered at BOD were successful. Investigation may be required to find out if this is a one-off or a problematic area that needs to be addressed. HOGAR also needs investigation due to historical information although not much data was received.




CPDLC

In 2012 survey a total of 187 attempts on CPDLC were made out of which 84% had successful LOG-Ins. In 2015 survey, out of the 53 LOG-Ins only 38% were successful. This is an area of concern and requires urgent investigation. The data collected is adequate for this determination.

**Antananarivo FIR**

VHF/HF

Only 8 calls were registered on VHF. No conclusion was possible based on the data received.
In 2012, the success rate on VHF was 97% while HF was 100%.

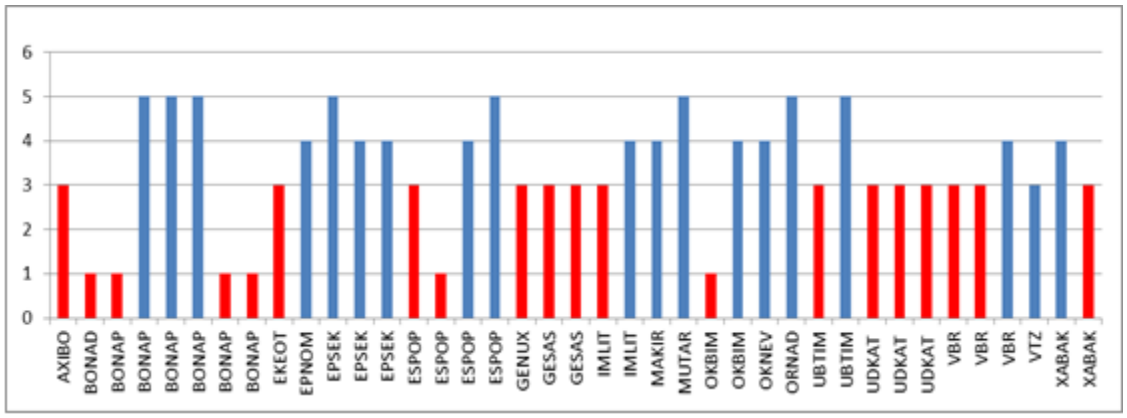
CPDLC

No conclusion was possible based on the data received although both LOG-INs registered were unsuccessful.

**Beira FIR**

**VHF/HF**

A total of 38 calls were recorded of which 50% were successful.
In 2012, the success rate on VHF was 98%.
There was a major drop in the success rate and investigation is required to determine if there is a trend. It is interesting to note that a good number (68%) of the 'Nil communications' were at strength 3 out 5 which is the new threshold for 'Nil communications'. Further investigation and monitoring is required.

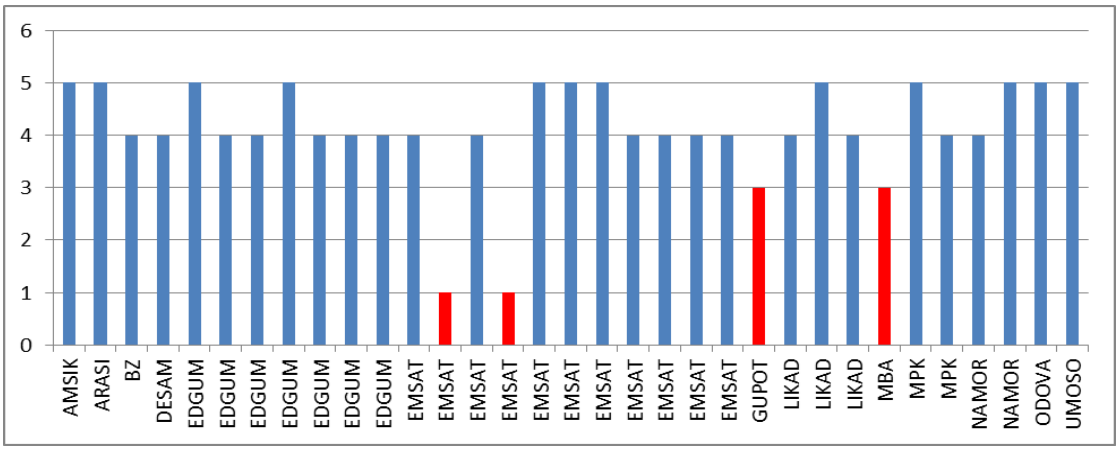



No CPDLC available in Beira FIR.

**Brazzaville FIR**

VHF/HF
A total of 38 calls were registered (32 on VHF and 6 on HF).
Success rate was VHF 84%.
Not enough data was available to make any meaningful conclusion.

The hotspots in the North and North-Eastern part of the FIR identified in 2009 and 2012 surveys seem to have been resolved i.e. EDGUM, UMOSA, AMALOS, GOVEL, ASKON and AMPER .
The only area of concern is at position EMSAT which showed some inadequacies in VHF and also on HF in the 6 calls surveyed and needs investigation especially that is the boundary point between Kinshasa and Brazzaville (UM731).




CPDLC

All the 9 attempts on CPDLC LOG-INs surveyed were successful making it 100%.

**Cairo FIR**

VHF/HF

A total of 17 calls were registered, all of which were on VHF. The success rate was 82%

Communication considered as adequate based on the trend from previous surveys despite the inadequacy of data. In 2012, the success rate was 100%.

CPDLC

No CPDLC data was available for Cairo FIR.

**Canarias FIR**

Nil data was available

**Dakar FIR**

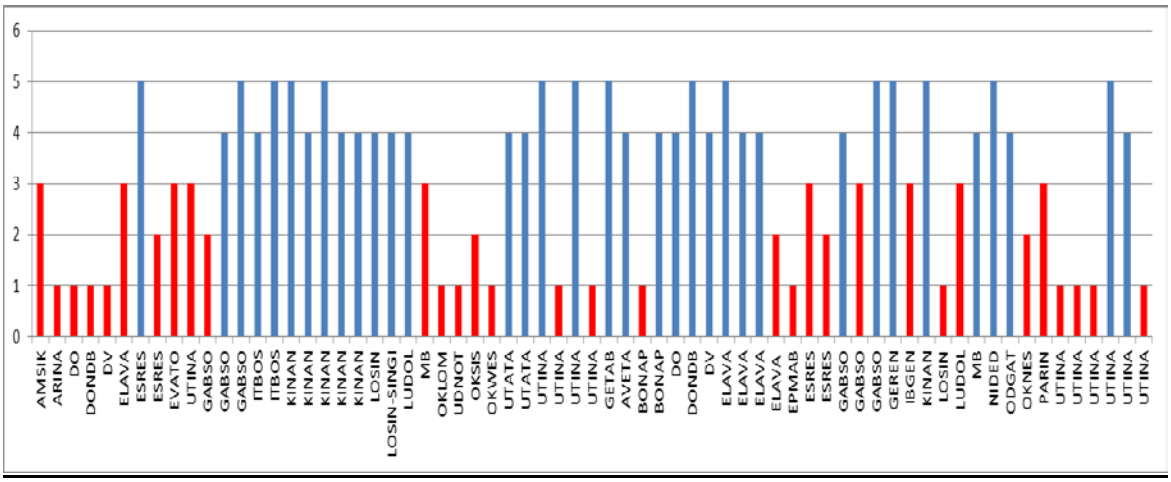
VHF/HF

Data received (7 VHF Calls) was inadequate to make any meaningful conclusions.

CPDLC

Data received (7 VHF Calls) was inadequate to make any meaningful conclusions.

**Dar es Salaam FIR**




VHF/HF
A total of 66 calls were recorded and all on VHF.
The success rate was 52% compared the 2012 rate of 93% which is an issue of concern.

If one uses the 'old' model of determining success, this figure will increase to 76%. In summary, there is a requirement to improve the quality of communication provided by Dar FIR.

Investigation on positions ESRES and UTINA require investigation and resolution. The concern is that these two waypoints are boundary points and are also located in areas where three FIRs meet.

For example, ESRES is at the boundary point located around FIR boundaries of Lusaka FIR, Kinshasa FIR and Dar FIR and UTINA; Lilongwe FIR, Beira FIR and Dar FIR.

CPDLC

No CPDLC available in Dar FIR.

## Entebbe FIR

VHF/HF
A total of 13 calls were made and all on VHF.
Success rate; VHF 92%

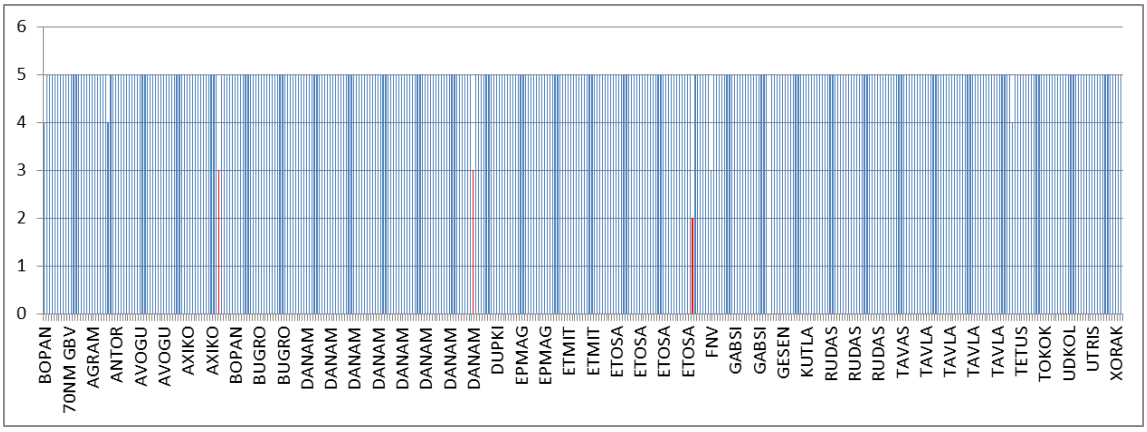
CPDLC

No CPDLC available in Entebbe FIR.

Gaborone FIR

VHF/HF

A total of 401 calls were recorded during the survey and all were on VHF. The success rate was at 99%.




Communication is considered as adequate.

No CPDLC available in Gaborone FIR.

## Harare FIR

VHF/HF

A total of 12 calls were recorded on VHF during the survey with a success rate of 75%.

Communication considered as adequate.

No CPDLC available in Harare FIR.

Johannesburg FIR

VHF/HF

In 2012, a total of 48 calls were made on VHF with a success rate of 100%. The trend has continued in 2015 with only 10 VHF calls surveyed and again with 100% success rate.

Communication considered as adequate. No further report.

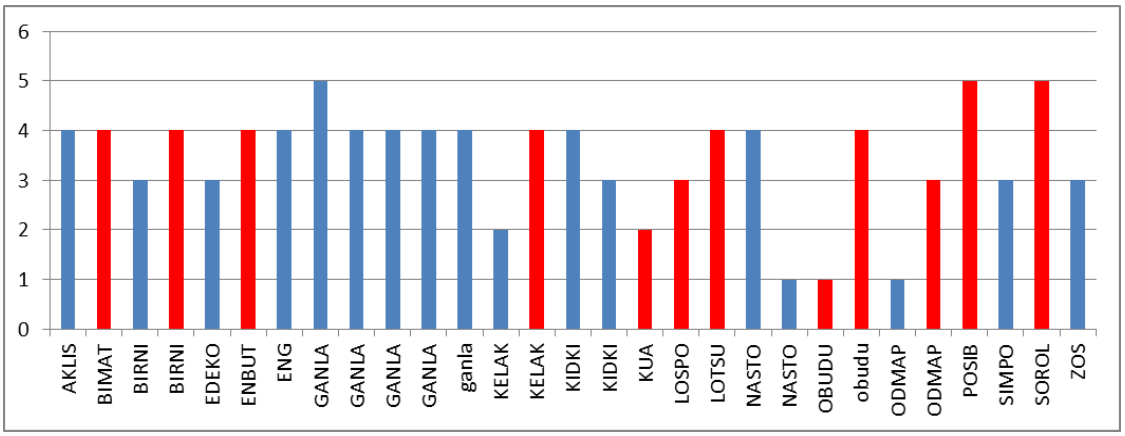
Again, just like in 2012, not enough data was available to assess usage of CPDLC in the FIR.

**Juba CTRL**

Not enough data received. No further report.

No CPDLC at Juba Control

**Kano FIR**



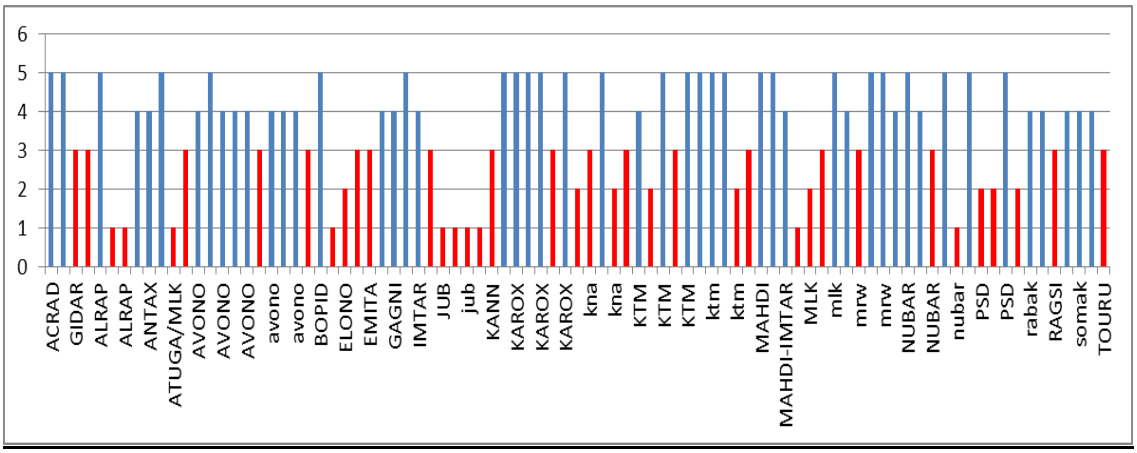

VHF/HF

A total of calls were 29 VHF calls recorded with 59% success rate which is a big drop from the 2012 rate of 92%. No HF calls were recorded during the survey.

With the exception for EDEKO and BIMAT which are 'interior' of the FIR, all the other waypoints with 'Nil communication' i.e. BIRNI, KELAK, KIDKI, ODMAP, NASTO and OBUDU are all boundary waypoints. Investigation to establish the reason behind this commonality or trend is desirable. This may explain the 33% drop in VHF success rate in 2015 compared to 2012.

No CPDLC available in Kano FIR.

**Khartoum FIR**




VHF/HF

A total of 95 calls were made (86 on VHF and 9 on HF).
Success rate for VHF 54% and HF 33% was recorded.

The VHF communication trend for previous surveys are; 67% in 2009 and 73% in 2012. In 2015, the success rate was below the results calculated for 2009 at 54%.

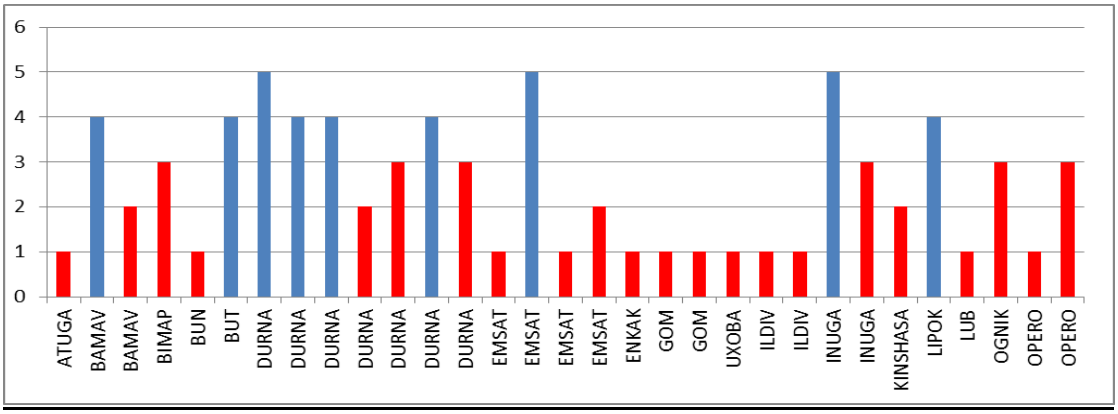
If we calculated the success rate based on the on the 'old' baseline where strength '3' is considered 'Nil communication' (2009 and 2012) then the rate will be 77% which would be an improvement of 4% compared to 2012.

In 2012, the discussion was the impact of the improvement in communication infrastructure in Khartoum over the years and the benefits realized thereof. Users expect more improvements in this regard. Possible issues at the south of the FIR (Juba VHF extended-rage facility u/s) may have affected the success rate and requires urgent resolution.

The positions ALRAP, MALAKAL and AVONO (see Addis FIR) continue to be areas of concern.
Investigation that was recommended in 2012 on the 'Blind' spot at these positions has not been availed (if it was done at all).

No CPDLC available in Khartoum FIR.

**Kinshasa FIR**




VHF/HF

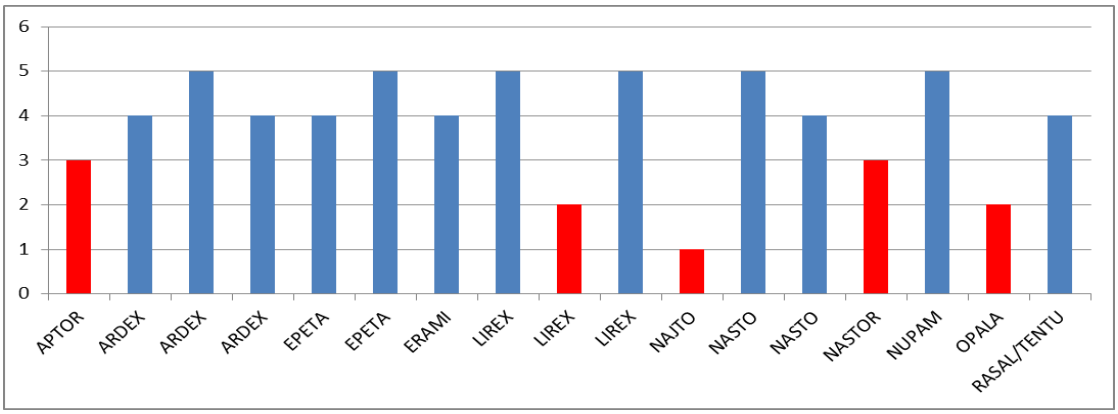
A total of 46 calls were made (48 on VHF and 57 on HF).
Success rate; VHF 30% and HF 29%

There still exist major communication inadequacies in Kinshasa FIR. The low success rates in 2009 are still experienced in 2015. Even if we used the 'old' baseline where strength '3' is considered as 'Nil communication' the success rate will only increase to 50%.

In the previous reports, it was suggested that remote stations be revamped to improve VHF communications. ADS-C/CPDLC is still considered the best alternative to improve communication in the FIR.

No ADS-C/CPDLC is available in Kinshasa FIR.

**Lagos FIR**




VHF/HF
A total of 17 calls were recorded all on VHF with 71% success rate. CPDLC

No CPDLC available in Lagos FIR.

Lilongwe FIR

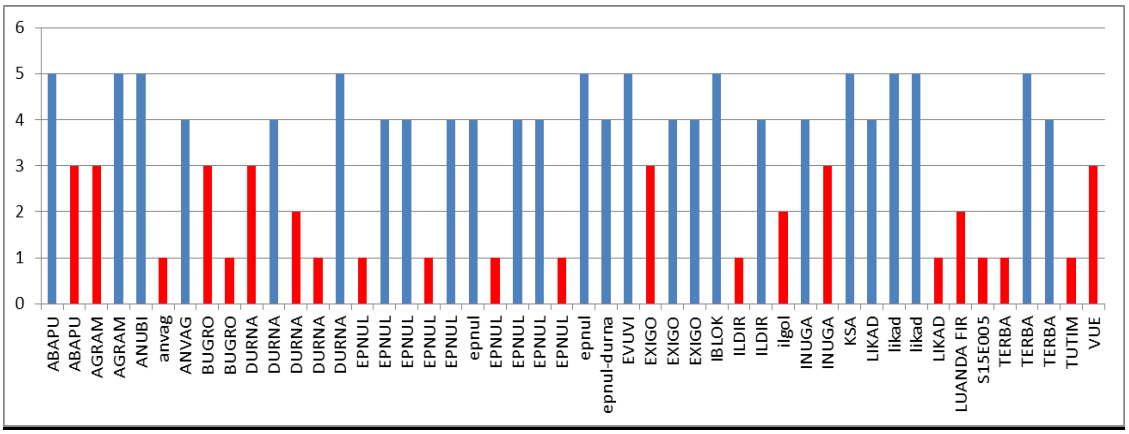
VHF/HF
A total of 6 calls were recorded all on VHF with 100% success rate which has been consistent over the years. The success rate in 2012 was 93%.

CPDLC

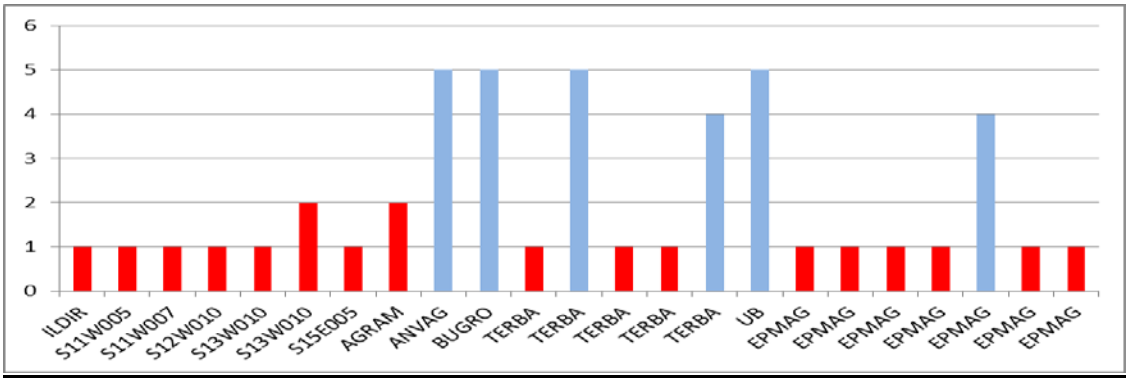
No CPDLC available in Lilongwe FIR.

**Luanda FIR**

VHF




HF




VHF/HF

A total of 70 calls were made (47 on VHF and 23 on HF).
Success rate; VHF 55% and HF 23%

Compared to 2012 survey, there was a significant decrease (39%) in successful communication. Even if the 'old' baseline is used, the decline was still significant, from 94% to 70%.

Luanda has invested heavily in communication infrastructure in the last few years. There was a revamp in VHF and HF equipment including implementation of CPDLC. Originally, CPDLC was implemented in the oceanic airspace and now has been extended into continental airspace of Luanda FIR.
With all these investments, the expectations of the users are that of an improvement in aeronautical communication service. Sadly this is not the case, going by the survey results.

Positions that were problematic were mainly to the south-east of the FIR i.e. ABAPU, BUGRO, EPNUL and EPMAG. TERBA experienced poor communication on HF.

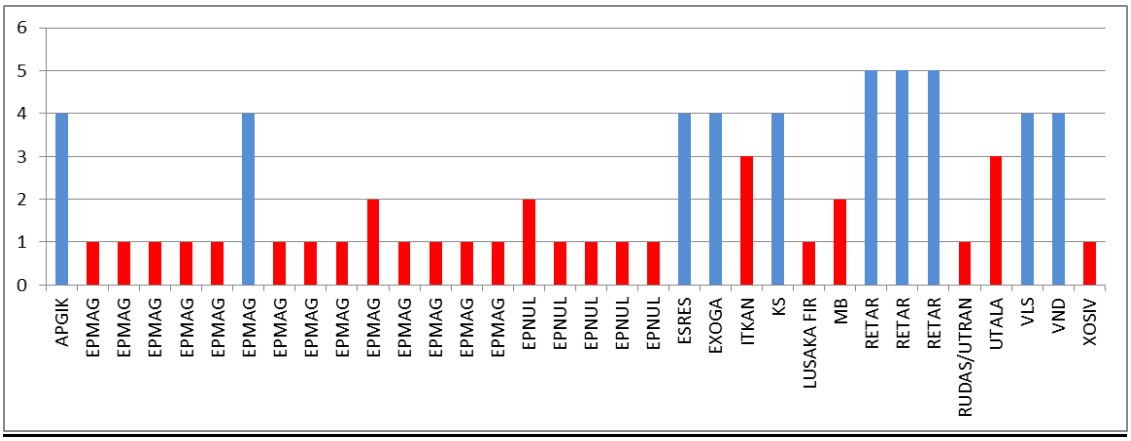
**CPDLC**

CPDLC is now available in Luanda FIR but still on trial basis.

At position TERBA (oceanic area), the rate of successful LOG-IN was 100%. The same was achieved at positions AGRAM and ABAPU. However, it was mixed results at positions EPNUL (40%) and BUGRO (50%) although more data is required to validate this result.

Note: Trial reports received from Users that was requested by Luanda showed positive results in CPDLC LOG-INs.

Lusaka FIR




**VHF/HF**

In 2012, the success rate for VHF calls surveyed was 97% (no HF calls).

In the 2015, the survey showed that only 30% of the VHF calls were successful. The remaining 60% of VHF calls were mostly localized in the western sector of the Lusaka FIR.

Several attempts on HF communication were observed with only one (1) being successful out of 17 attempts. These were at positions EPMAG and EPNUL (Lusaka and Luanda FIR boundary).

The 30% success rate for VHF communication validated flight crew reports that the equipment VHF station in the western sector of Lusaka FIR was unserviceable.

**CPDLC**

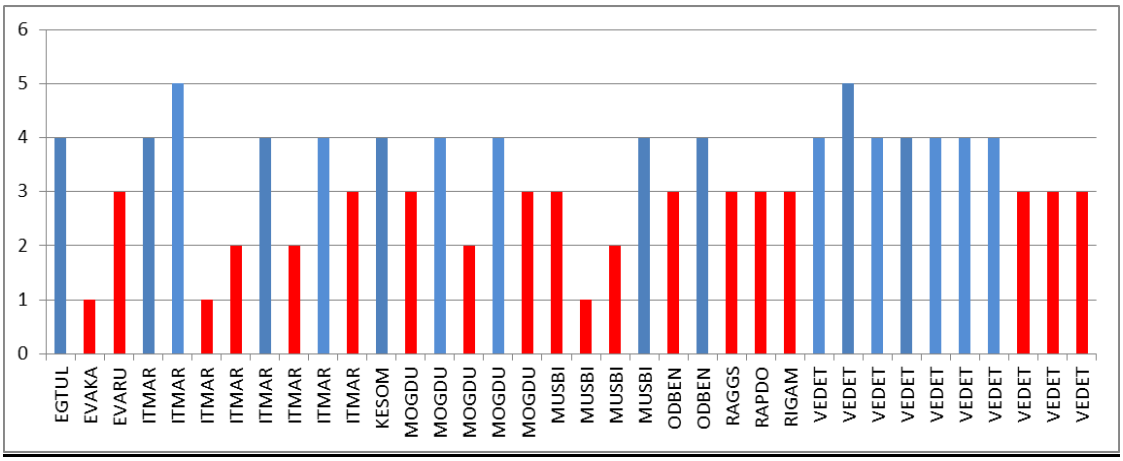
No CPDLC available in Lusaka FIR.

**Mauritius FIR**

VHF/HF

Nil Report as no data was available from the airlines who participated in the survey.

**Mogadishu FIR**




VHF/HF

A total of 42 calls were recorded (7 on VHF and 35 on HF).
The success rate; VHF 86% and HF 49%

Communication in Mogadishu is mostly only based on HF. The generalized observation is that HF communications continue to be deficient considering that HF is the main mode of aeronautical communication in the FIR (no fallback mode).

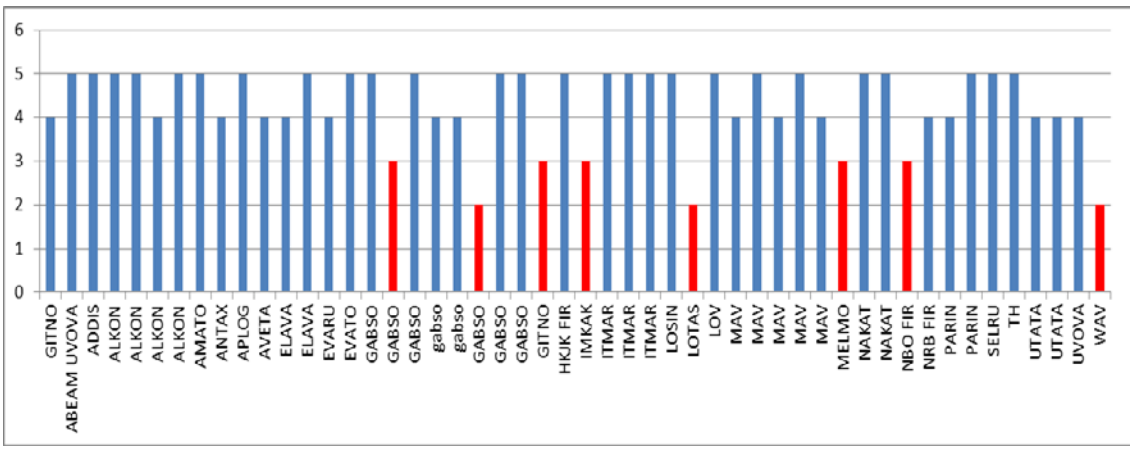
Improvement is required urgently to address communication deficiencies for VHF and HF.

There is a need to implement ADS-C/CPDLC.

CPDLC

No CPDLC available in Mogadishu FIR.

## Nairobi FIR



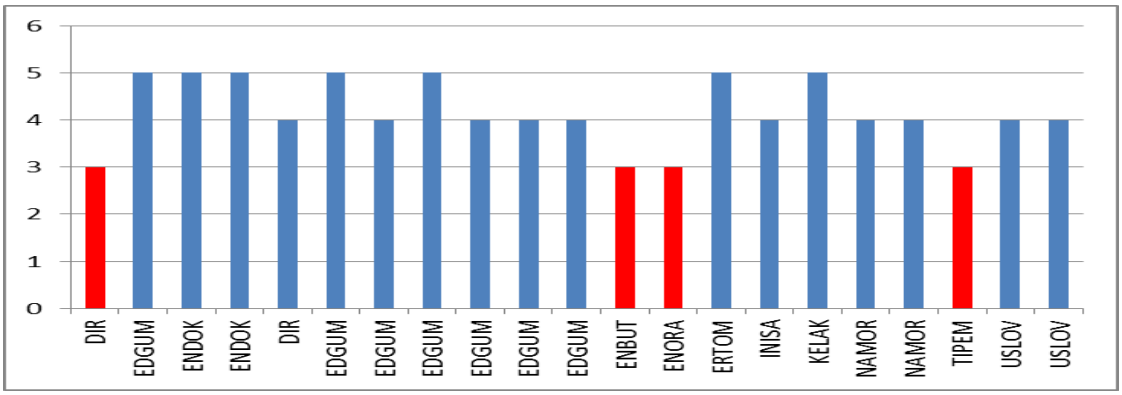

VHF/HF

A total of 49 calls were registered only on VHF with a success rate of 84% compared to 94% in 2012. The areas of concern were rather random with no trend noticed.

Communication considered as adequate.

No CPDLC available yet in Nairobi FIR despite report of its implementation.

N'Djamena FIR




VHF/HF

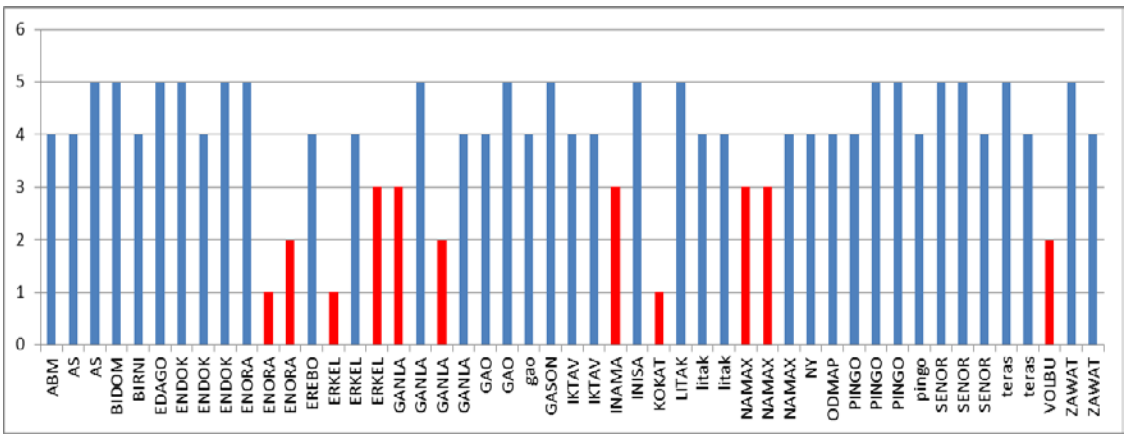
A total of 21 calls were recorded all on VHF with a success rate of 81%. In 2012, the rate was 96%.

CPDLC

Out of the nine (9) ADS-C/CPDLC LOG-INs recorded during the survey, only one (1) failed.

Communication considered as adequate.

**Niamey FIR**




VHF/HF

A total of 66 calls were made (48 on VHF and 18 on HF).
Success rate; VHF 77% and HF 28%

It seems like the communication issues observed in 2009 and 2012 survey on communication inadequacy in the north of the FIR bordering Algiers FIR have been addressed i.e. at positions TOBUK, EREBO and ERKEL.

CPDLC

Total of 25 attempts on CPDLC LOG-INs were made. Out of these on one (1) was unsuccessful therefore showing a high successful rate of 96%.

Communication considered as adequate.

Seychelles FIR

Not enough data was received to arrive at conclusive results.

Windhoek FIR

Not enough data was received to arrive at conclusive results.

**-END-**