



## INTERNATIONAL CIVIL AVIATION ORGANIZATION

**AFI PLANNING AND IMPLEMENTATION REGIONAL GROUP  
COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SUB-GROUP THIRD MEETING  
CNS/SG/3**

(Nairobi, Kenya, 26-30 April 2010)

(Presented by ASECNA)

**SUMMARY**

This Working paper accounts for the status of Aeronautical Mobile Service (AMS) in ASECNA area. It focuses on the extended VHF coverage and the modernization of HF in the ASECNA FIRs, the results of the last AMS availability survey and calls for cooperative actions to be taken when implementing the communications systems near the boundaries of the FIRs.

**Agenda Item 5: Aeronautical Mobile Service****1. Introduction**

The ICAO AFI/7 RAN Meeting supports strongly the use of VSAT technology to improve the pilot /controller communications. Since 1997 when it experienced the first Remote VHF using VSAT Station, ASECNA pursue the extension of the VHF coverage by implementing in the various FIRs. Up today, more than forty VHF remote stations are implemented and work in various climatic conditions.

In the oceanic areas where remote VHF stations implementation are not possible with the current technologies, HF communication continue to be provided between ATC and airlines crews in support to ADS/CPDLC.

**2. Discussion****2.1 Status of implementation**

Since 1997 that it experienced the first remote VHF station using VSAT technology, ASECNA pursue the improvement of VHF extended coverage by implementing VHF remote stations in the all the FIRs. Up Today, more than forty remote stations are implemented as shown in the following table and in figure 2 in appendix.

FIR	Nb of Remote s VHF	Remote VHF In progress (before end of 2010)	Remarks
Antananarivo	09	1	Coverage of the East part
Brazzaville	06	03	Densification of VHF coverage
Dakar	10	02	Coverage of the north and East part
Niamey	06	03	Coverage of the North East part

N'Djamena	07	03	Coverage of the North and North East part
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In the 200-2013 investment plan adopted by the board of Ministries, the extension VHF coverage constitutes a high priority.

## 2.2 AFI extended VHF coverage availability survey

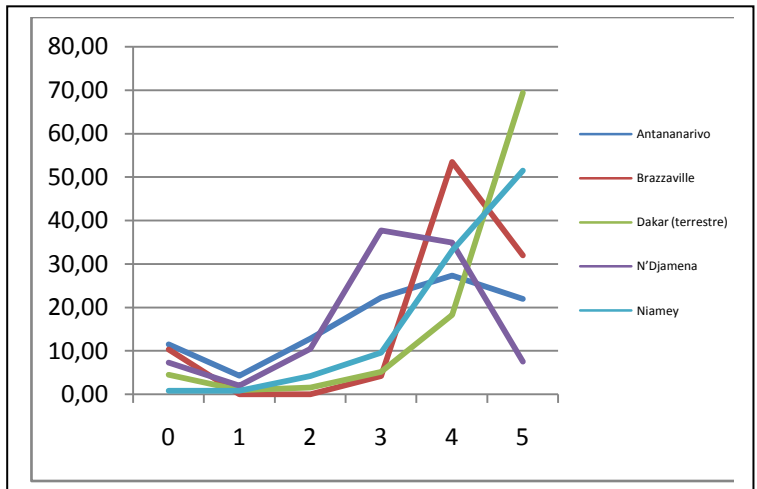
According to **APIRG 16<sup>th</sup> Conclusion 16/19** regarding surveys on AMS/VHF coverage by States and International Organizations, ASECNA centers took part in the VHF/HF availability survey conducted from 02<sup>nd</sup> to 23<sup>rd</sup> February 2009 in coordination with IATA. The objective of the survey was:

- Testing implemented VHF remote stations range
- Diagnosing deficiencies of VHF Coverage
- Improving and extending VHF Coverage

The Methodology used was based on the survey fiche form (in annex which put at the disposal of the controllers which allows to report the quality of the communications according to the flight level, the time of flight and the reports positions and to analyze the results of the survey.

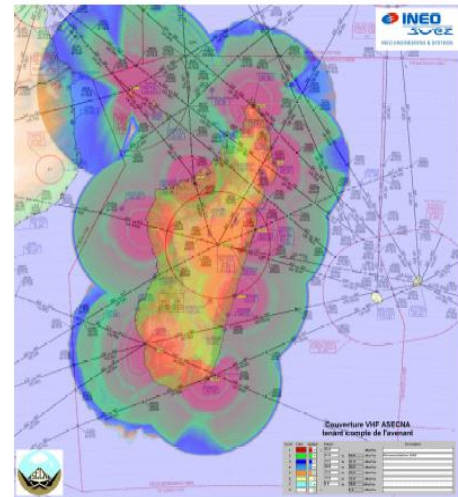
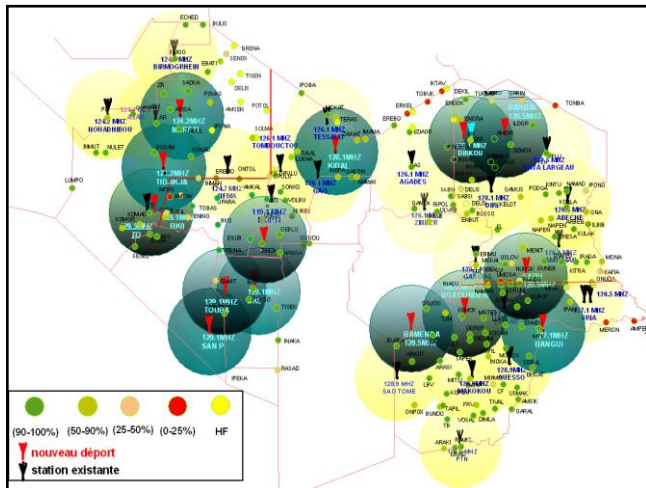
## 2.3 Results

FIR	Number of Reports	Quality of VHF communications					
		0	1	2	3	4	5
Antananarivo	374	11.5%	4.3%	12.8%	22.2%	27.3%	21.9%
Brazzaville	883	10.3%	0.0%	0.0%	4.2%	53.5%	32.0%
Dakar (terrestre)	1930	4.5%	1.0%	1.6%	5.2%	18.3%	69.4%
N'Djamena	600	7.3%	2.0%	10.5%	37.7%	34.9%	7.5%
Niamey	260	0.8%	0.8%	4.2%	9.6%	33.1%	51.5%



The results consolidated on the map below point out:

- Noticeable improvement in quality of communications, in line with increased availability of VHF and HF regarding the passed surveys;
- A quality of communications with an average level between 3 and 5 ;
- Located areas not covered in each FIR and due to the difficulty to implement a remote VHF( sites no secured);
- HF still remains the only means available in some portions of the FIR in the meantime appropriate sites to cover these portions are found;
- The climatic and safety conditions related to some remote VHF stations sites impact on the availability of the service.



## 2.4 Improvement of the AMS

The survey points out the report points not yet covered are located at non secured areas and very difficult to be accessed or near the boundary of non ASECNA FIRs. However ASECNA planned to cover them as far as possible in its 2009-2013 Plan. The improvement ongoing is related to:

- Extension of VHF coverage to the areas not yet covered (secured sites or cooperative actions with other ANSP/ States are required)
- Densification of the VHF coverage to secure the AMS;
- Improvement and Modernization of the HF ( the project is ongoing);
- Implementation of ADS-C/CPDLC(All the (5) FIRs are pre-or full operational, rate of equipped airlines still low);

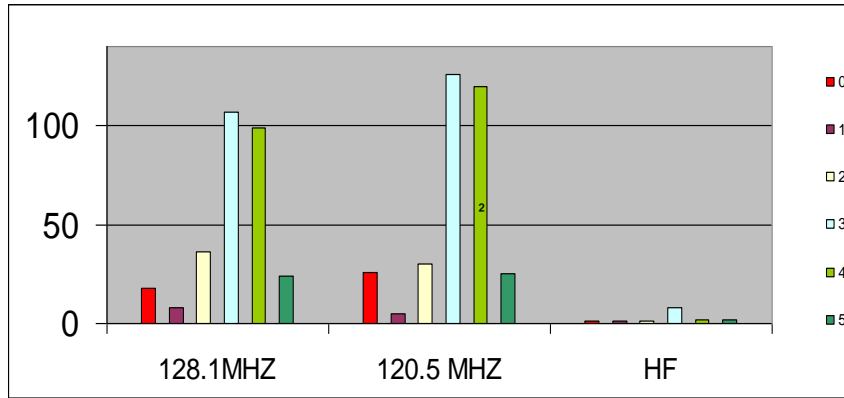
## 2.5 Conclusion

The meeting is invited to:

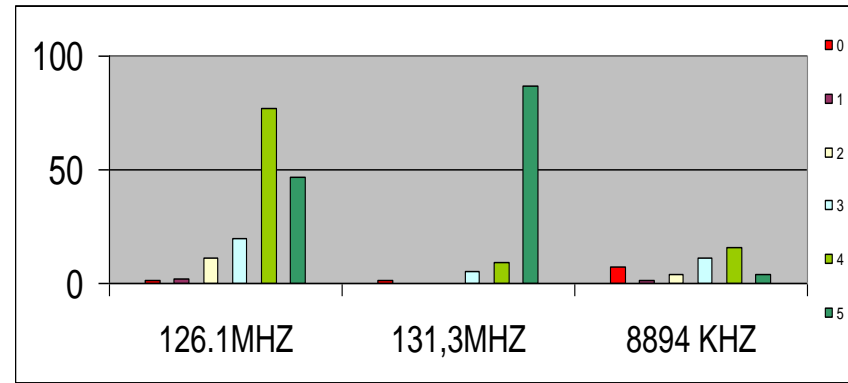
- take note of the information above and to encourage all COM centers to conduct surveys concerning the availability of VHF coverage;
- encourage states/organizations to conduct periodic technical and operational surveys concerning the availability of VHF coverage;
- recommend cooperation between the ANSP/States to improve VHF coverage notably by sharing VHF coverage at the boundaries of the FIRs;
- Encourage the airlines to equip to take advantage of the ADS-C CPDLC systems on going

# VHF/HF survey result

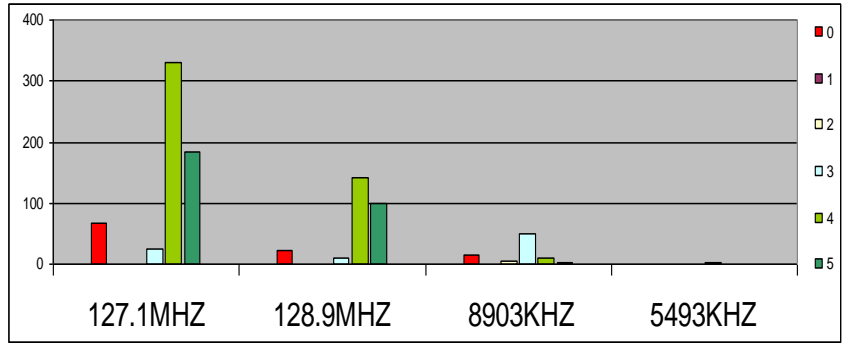
NDJAMENA



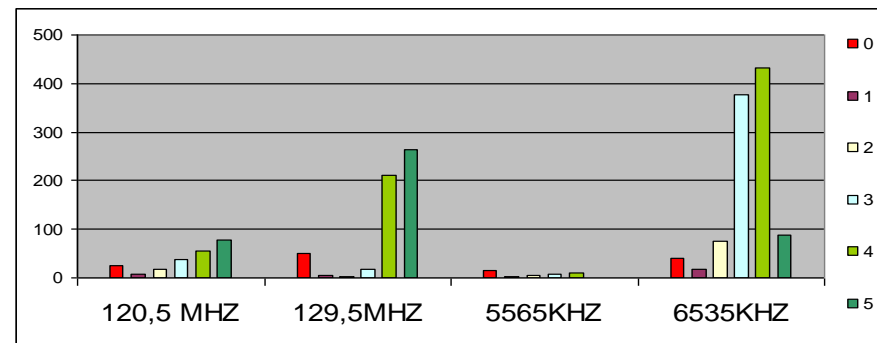
NIAMEY



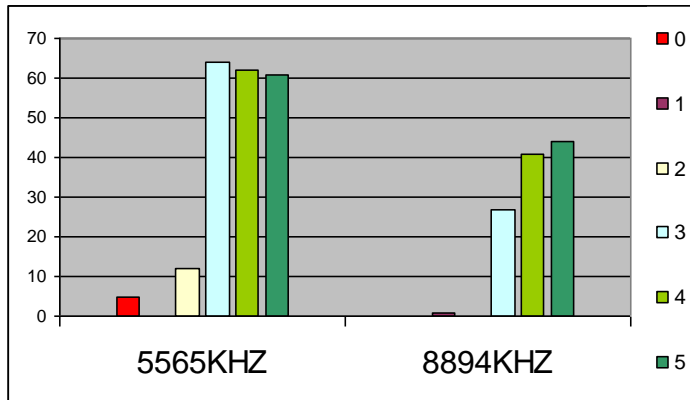
BRAZZAVILLE



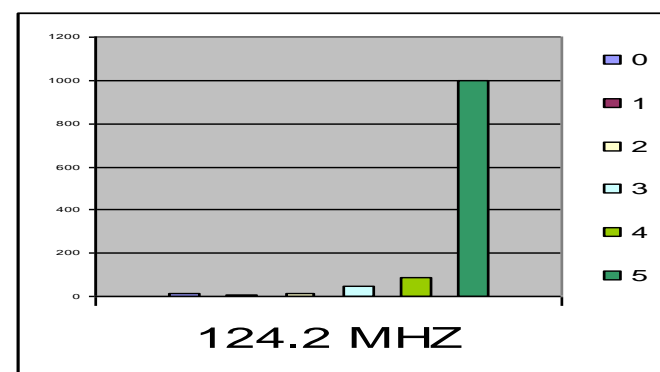
DAKAR



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### Extended VHF implementation Table

FIR	CCR	States	Location	ICAO Indicator	Geographic Location	Frequencies	Covered Routes
<b>BRAZZAVILLE</b>	<b>Brazzaville</b>	<b>Centrafrique</b>	Bouar	FEFO	05°57'10" N 015°38'20" E	127,1 MHz	UA403, UG624, UM731, UM998, UA609
			Bria	FEFR	06°32'00 N 021°59'00 E	127,1 MHz	UM214, UM215, UA410
			Bangui	FEFF		127,1 MHz	UA410, UA607, UG624, UA609, UG625, UA610
		<b>Gabon</b>	Makokou	FOOK	00°34'00 N 012°51'00 E	128,9 MHz	UG625, UR986, UA604, UG727
		<b>Congo</b>	Brazzaville	FCBB	04 °15' 00" S 015°15' 00" E	128,9 MHz	UA604, UG727, UG856, UA403, UA410
			Ouessou	FCOU	01°36'40 N 016°03'30 E	127,1 MHz	UM998, UA410, UA403, UA610, UG625, UG627
			Pointe Noire	FCPP	04°48'33,75"S 011°52'56,32"E	128,9 MHz	UR987, UR988, UR526, UG861
		<b>Cameroun</b>	Ngaoundéré	FKKN		128,9 MHz	UG727, UH455G, UM998, UG624
			Yaoundé	FKYS		128,9 MHz	UH455, UR984, UA610, UR986, UG857
		<b>Sao Tomé</b>	Sao tomé	FPST	00°22'31,46"N 006°42'41,29"E	128,9 MHz	UA400, UR979, UR603, UG857,
		<b>DAKAR</b>	<b>Dakar</b>	<b>Mauritanie</b>	Atar	GQPA	20°31'00" N 013°03'00" W
Bir Mogrhein	GQPT				25°13'00" N 011°36'00"W	129,5 MHz /124,2MHz	UR975
Nema	GQNI				16°37'19,5"N 007°18'52,1"W	129,5 MHz /124,2MHz	UR977G, UM122, UM108, UB735F
El Mreti						129,5 MHz /124,2MHz	UA854, UM122, UR977, UM725, UR866G
Tidjkja	GQND					129,5 MHz /124,2MHz	UR722, UM372, UG851, UM725
Nouadhibou	GQPP				20°56'00"N 017°02'00"W	129,5 MHz /124,2MHz	UA600F, UB600, UG853, UB601
<b>Sénégal</b>	Tambacounda			GQTT	13°44'00 N 013°39'00 W	129,5 MHz	UA601, UB728, UM974, UR720

<b>DAKAR</b>	<b>Abidjan</b>	Burkina	Bobo Dioulasso	DFOO		129,1 MHz	UG854, UA601
		Côte d'Ivoire	Bouaké	DIBK		129,1 MHz	UG851, UR979, UB729, UA614
			Touba	DITM		129,1 MHz	UG851, UG854, UR979
			San Pedro	DISP		129,1 MHz	UB600, UB729, UG853
<b>NDJAMENA</b>	<b>Ndjamena</b>	Tchad	Abéché	FTTC	13°50'38,03 N 020°51'04,22" E	120,5 MHz	UG655, UG660, UM215,UM214
			Am-Timan	FTTN	11°02'22"N 20°16'39"E	120,5 MHz	UM214,UM215, UG862, UW605
			Diré		15°50'22"N 14°49'58"E	128,1 MHz	UG862, UA403, UR778
			Bardai	FTTZ		120,5 MHz	UG655, UR778
			Sarh	FTTA		120,5 MHz	UB736, UA607
			Faya	FTTY	17°56'00 N 019°07'00E	120,5 MHz	UG655, UM214, UM215
		Niger	Dirkou	DRZD	19°10'00 N 012°54'00 E	128,1 MHz	UG862, UG727, UA607, UB720
		Centrafrique	Bria	FEFR	06°31'36,5 N 021°59'24,2 E	120,5 MHz	UM214, UM215, UA410
		Cameroun	Ngaoundéré	FKKN		128,1 MHz	UG727, UH455G, UM998, UG624
			Garoua	FKKR	09°19'50" N 013°22'28" E	128,1 MHz	UB736, UG727, UW605, UG857, UH455G
<b>NIAMEY</b>	<b>Niamey</b>	Mali	Kidal	GAKL		126,1 MHz	UG859, UM608
			Gao	GAGO	16°18'00" N 000°08'00" W	126,1 MHz	UR981, UG859, UA612, UA603
			Mopti	GAMB	14°30'30,9 N 004°05'03,1 W	126,1 MHz	UM974, UA612, UG615, UB727
			Tessalit	GATS	20°16'00 N 001°00'00 E	126,1 MHz	UB727, UG859
			Tombouctou	GATB	16°44'02,3 N 002°59'54,6 W	126,1 MHz	UB727, UR866G, UA614

<b>NIAMEY</b>	<b>Niamey</b>	<b>Niger</b>	Agadez	DRZA	17°00'00 N 007°00'00 E	126,1 MHz	UA604, UR978, UB731
			Tahoua	DRRT		126,1 MHz	UB731, UG854
			Dirkou	DRZD		126,1 MHz	UG862, UG727, UA607, UB720
			Zinder	DRZR	13°50'00"N 009°00'00"E	126,1 MHz	UA604, UG858, UG622
<b>ANTANANARIVO</b>	<b>Antananarivo</b>	<b>Comores</b>	Moroni	FMCH	11°32'11,5 S 043°16'16,8 E	128,9 MHz	UA401F, UB790G, UR782G, UG661
		<b>Madagascar</b>	Antsiranana	FMNA	12°30'31" S 049°11'25" E	128,9 MHz	UA609, UG465, UR780, UB459
			Mahajanga	FMNM	15°40'08"S 046°20'56"E	128,9 MHz	UA401, UR775
			Maintirano	FMMO		128,9 MHz	UA400G
			Antalaha	FMNH		128,9 MHz	UG661, UB459, UA609G
			Mananjary	FMSM		128,9 MHz	UG653G
			Taolagnaro	FMSD	25°02'09"N 046°57'22"E	128,9 MHz	UA402G, UG652F
			Toamasina	FMMT	18 °07' 00" N 049°24' 00" E	128,9 MHz	UR348, UB790G
			Toliary	FMST	23°23'20 S 043°43'22 E	128,9 MHz	UG652, UG653, UG654

**Figure 2: Extended VHF implementation status**

