



INTERNATIONAL CIVIL AVIATION ORGANIZATION

SECOND MEETING OF THE APIRG COMMUNICATIONS, NAVIGATION AND SURVEILLANCE SUB-GROUP (CNS/SG/2)

(Dakar, 22-25 May 2007)

Agenda Item 4: Aeronautical Fixed Services

Review of performance and implementation of the aeronautical fixed telecommunication network (AFTN) in the AFI Region, and identification of deficiencies and remedial action for their elimination.

(Presented by the Secretariat)

SUMMARY

This paper reviews the implementation status of AFTN circuits and their performance, and identifies deficiencies and remedial solutions for their elimination.

Action by the meeting is at paragraph 3.

References :

- APIRG/15 – Report.
- CNS/SG/1 – Report.

1. Introduction

1.1 The First Meeting of APIRG Communications Sub-group (CNS/SG/1, Dakar, 7-8 April 2005) noted very low progress in the implementation of AFTN circuits since APIRG/14 meeting (Yaounde, Cameroon, 23-27 June 2003). This paper reviews the current implementation status and the performance of the AFTN in the AFI Region, and identifies deficiencies and remedial measures for their elimination.

2. Discussion

Review of AFTN performance

2.1 The critical analysis of the current AFTN performance carried out by CNS/SG/1 pointed out the following, which remains valid:

Circuit availability rates

2.2 The overall assessment is that the requirement of 97% minimum availability rate (AFI/7 Rec. 9/3 refers) is still far from being met by a large number of AFTN circuits. Information papers **IP/5** and **IP/6** of this meeting provide statistical data corroborating this statement of fact.

Modulation rates

2.3 The following AFTN main circuits do not meet the requirement for a minimum modulation rate of 1200 bauds:

- Addis-Ababa/Nairobi
- Addis Ababa/Niamey
- Cairo/Nairobi
- Cairo/Tunis
- Johannesburg/Nairobi

2.4 Addis-Ababa/Djeddah (AFI/MID) and Nairobi/Mumbai (AFI/ASI-APAC) interregional circuits also do not meet the minimum requirement of 1200 bauds.

2.5 The inter-regional circuit Johannesburg/Ezeiza has been implemented by South Africa and Argentina using CAFSAT network.

Transit time statistics

2.6 The requirements of 5 minutes maximum for high priority messages and 10 minutes maximum for other messages are being met progressively as circuits are being upgraded (see IP/11). However, in many cases, prohibitive transit times continue to affect the transmission of flight safety related messages (such as flight plans, NOTAMs, etc.)

Implementation status of AFTN circuits

2.7 **Appendix A** to this paper shows AFI AFTN current and planned features as prescribed by APIRG (Conclusion 14/8 refers).

Identification of deficiencies

2.8 The list of deficiencies affecting AFTN circuits has been updated by the Secretariat based on available data. The updated list of AFTN deficiencies is shown at **Appendix B** to this paper.

2.9 These deficiencies comprise AFI ANP unimplemented requirements and low performance circuits in terms of availability/stability and transmission speed (namely for main circuits).

Use of VSAT technology

2.10 A number of AFI States are considering the use of the implemented or emerging VSAT networks (AFISNET, SADC1/2, CAFSAT, and NAFISAT) to solve the current deficiencies. Table below shows that eight (8) AFTN circuits, of which two (2) main circuits, would be implemented through these networks by the end of 2007.

Networks	Links
AFISNET	1. Brazzaville/Sao Tome
NAFISAT	2. Addis Ababa/Asmara 3. Addis Ababa/Djibouti 4. Addis Ababa/Khartoum 5. Brazzaville/Nairobi 6. Addis Ababa/Niamey
SADC/2	7. Brazzaville/Luanda 8. Johannesburg/Nairobi

3. Action by the CNS Sub - group

3.1 The CNS Sub–group is invited to:

- a) Take note of the information provided in this paper;
- b) Review and update its **Appendices A and B**;
- c) Urge States involved with the AFTN deficiencies to endeavour to implement available remedial solutions as a matter of urgency; and
- d) Formulate any other conclusion aiming at improving AFTN efficiency in the AFI Region.

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APPENDIX A

AFI RATIONALIZED AFTN – IMPLEMENTATION SPECIFICATIONS/RSFTA RATIONALISE – SPECIFICATIONS DE
MISE EN OEUVRE

Explanation of the table/Explication du tableau

Col. No.	Explanations
1	Terminal I and Terminal II. Each circuit appears once in the Table./ <i>Terminal I et Terminal II. Chaque circuit n'apparaît qu'une fois dans le Tableau</i>
2	Category of circuit/ <i>Catégorie de circuit</i> : M - main circuit/ <i>circuit principal</i> T - tributary circuit/ <i>circuit tributaire</i> S - AFTN station circuit/ <i>circuit de station RSFTA</i>
3 and 8	Circuit type/ <i>Type de circuit</i> : NIL - not implemented/ <i>Non mis en oeuvre</i> LTT/A - landline teletypewriter, analogue (eg cable, microwave/ <i>circuit télétype terrestre, analogue (i.e. câble, faisceau hertzien)</i>) LTT/D - landline teletypewriter, digital (e.g. cable, microwave/ <i>circuit télétype terrestre, numérique (i.e. câble, faisceau hertzien)</i>) LDD/A - landline data circuit, analogue (e.g. cable, microwave/ <i>circuit de données terrestre, analogue (i.e. câble, faisceau hertzien)</i>) LDD/D - landline data circuit, digital (e.g. cable, microwave/ <i>circuit de données terrestre, numérique (i.e. câble, faisceau hertzien)</i>) RTT - radio teletype circuit (HF)/ <i>circuit radiotélétype (HF)</i> SAT/A/D - satellite circuit /a digital or/d digital/ <i>circuit par satellite /a analogue ou /d numérique</i>
4 and 9	Circuit signalling speed/ <i>Rapidité de modulation du circuit</i>
5 and 10	Circuit protocol / <i>Protocol de circuit</i> NONE: No protocol/ <i>Aucun protocol</i> X.25: ITU X.25 protocol/ <i>Protocol X.25 de l'UIT</i>
6 and 11	Data transfer code (syntax)/ <i>Code alphabétique</i> ITA-2: International Telegraph Alphabet No.2/ <i>Alphabet international No.2</i> IA-5: International Alphabet No.5/ <i>Alphabet international No.5</i>
7 and 12	Aeronautical network served (AFTN or ATN)/ <i>Réseau aéronautique desservi (RSFTA ou ATN)</i>
13	Implementation target date/ <i>Date cible pour la mise en oeuvre</i>
14	Remarks/ <i>Observations</i>

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implem.entation/ Date cible de mise en oeuvre	Remarks/ Observations
		Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau	Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
EUR (Bordeaux)	M	SAT/A	1200		ITA-2	AFTN	SAT/D	1200	X.25	IA-5	AFTN		
BRAZZAVILLE													
Bangui	T	SAT/D	1200	X.25	ITA-2	AFTN	SAT/D	1200	X.25	ITA-2	AFTN		
Dakar	M	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X-25	IA-5	AFTN		
Douala	T	SAT/D	1200	X.25	ITA-2	AFTN	SAT/D	1200	X.25	ITA-2	AFTN		
Kinshasa	T	MW/V	50	TTY	ITA-2	AFTN	LTT/D	50	TTY	ITA-2	AFTN		
Johannesburg	M	SAT/D	1200	TTY	ITA-2	AFTN	SAT/D	1200	X.25	IA-5	AFTN		
Libreville	T	SAT/D	2400	X25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Luanda	T	NIL					SAT/D	1200	X.25	ITA-2	AFTN		
Nairobi	M	NIL					SAT/D	1200	X.25	IA-5	AFTN		AFISNET/ NAFISAT
N'Djamena	T	SAT/D	2400	X25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Niamey	M	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Sao Tome	T	NIL				AFTN	SAT/D	1200	X.25	ITA-2	AFTN		

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implem.entation/ Date cible de mise en oeuvre	Remarks/ Observations
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1	2	3	4	5	6	7	8	9	10	11	12	13	14
CAIRO (CIDIN Centre)													
Khartoum	T	SAT/A	50	TTY	ITA-2	AFTN	SAT/D	1200	TTY	ITA-2	AFTN		NAFISAT
Nairobi	M	SAT/A	50	TTY	ITA-2	AFTN	SAT/D	1200	X.25	IA-5	AFTN		9600 bps proposed by Egypt
Tunis	M	SAT/A	100	NONE	ITA-2	AFTN	SAT/D	1200	X.25	IA-5	AFTN		
EUR(Athens)	M	SAT/D	9600	CIDIN	IA-5	AFTN	SAT/D	9600	CIDIN	IA-5	AFTN		
MID(Beirut)	M	SAT/D	9600	CIDIN	IA-5	AFTN	SAT/D	9600	CIDIN	IA-5	AFTN		
MID(Jeddah)	M	SAT/D	9600	CIDIN	IA-5	AFTN	SAT/D	9600	CIDIN	IA-5	AFTN		
CASABLANCA (CIDIN Centre)													
Dakar	M	LTT/A	9600		ITA-2	AFTN	SAT/D	9600	TTY/FR	IA-5	AFTN		
Las Palmas	T	LTT/A	9600		ITA-2	AFTN	LTT/A	9600	X25	IA-5	AFTN		
EUR(Madrid)	M	SAT/A	4800	CIDIN/	IA-5	AFTN	SAT/D	4800	CIDIN	IA-5	AFTN		

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implem.entation/ Date cible de mise en oeuvre	Remarks/ Observations
		Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau	Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
				AFTN									
DAKAR													
Abidjan	T	SAT/D	2400	X-25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Bamako	T	SAT/D	2400	X-25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Banjul	T	LLT	75	TTY	ITA-2	AFTN	LTT/D	2400	X.25	ITA-2	AFTN		
Bissau	T	SAT/D					SAT/D	2400	X-25	ITA-2	AFTN		
Johannesburg	M	LTT	2400	TTY	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Niamey	M	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Nouakchott	T	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Conakry (Robertsfield)	T	SAT/D	2400	TTY	IA-5	AFTN	SAT/D	2400	TTY	IA-5	AFTN		
Sal	T	SAT/D	9600	TTY	IA-5	AFTN	SAT/D	9600	X-25	IA-5	AFTN		
SAM(RIO)	M	SAT	9600	TTY	IA-5	AFTN	SAT/D	9600	TTY	IA-5	AFTN		

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implem.entation/ Date cible de mise en oeuvre	Remarks/ Observations
		Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau	Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
JOHANNES-BURG													X25 planned/ IA-5 capable
Antananarivo	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	IA-5	AFTN		
Beira	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Bujumbura	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Gaborone	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Harare	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Kigali	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Lilongwe	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Lusaka	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Maputo	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Maseru	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implementation/ Date cible de mise en oeuvre	Remarks/ Observations
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1	2	3	4	5	6	7	8	9	10	11	12	13	14
Manzini	T	LTT/A	2400	TTY	ITA-2	AFTN	SAT/D	9600	TTY	ITA-2	AFTN		
Nairobi	M	LTT/A	50	TTY	ITA-2	AFTN	SAT/D	9600	X.25	ITA-2	AFTN		NAFISAT
Windhoek	T	SAT/D	2400	TTY	ITA-2	AFTN	SAT/D	9600	NONE	ITA-2	AFTN		
ASIA/PAC (Brisbane)	M	SAT/D	64 kbps		IA-5	AFTN	SAT/D	64 kbps		IA-5	AFTN		
SAM (Buenos Aires)	M	SAT/D	9600 bps	FR	IA-5	AFTN	SAT/D	9600 bps	FR	IA-5	AFTN		
NAIROBI													
Dar es Salaam	T	LTT/A	50	NONE	ITA-2	AFTN	LTT/A	9600	X.25	ITA-2	AFTN		NAFISAT
Entebbe	T	LTT/A	50	“	ITA-2	AFTN	LTT/A	9600	X.25	ITA-2	AFTN		NAFISAT
Mauritius	T	SAT/A	50	“	ITA-2	AFTN	SAT/A	9600	X.25	ITA-2	AFTN		SADC2 NAFISAT
Mogadishu FIC	T	LTT/A	50	NONE	ITA-2	AFTN	SAT/A	9600	X.25	ITA-2	AFTN		
Seychelles	T	SAT/A	50	“	ITA-2	AFTN	SAT/A	9600	X..25	ITA-2	AFTN		
ASIA (Mumbai)	M	LTT/A	50	“	ITA-2	AFTN	LTT/A	1200	X.25	ITA-2	AFTN		

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implem.entation/ Date cible de mise en oeuvre	Remarks/ Observations
		Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau	Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
NIAMEY													
Accra	T	SAT/A	2400	X.25	ITA-2	AFTN	SAT/D	2400	FR	IA-5	AFTN		
Kano	T	SAT/D	2400	X.25	ITA-2	AFTN	SAT/D	2400	FR	IA-5	AFTN		
N'Djamena	T	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Ouagadougou	T	SAT/D	2400	X25	IA-5	AFTN	SAT/D	2400	X25	IA-5	AFTN		
TUNIS													
Tripoli	T	LTT/A	50	TTY	ITA-2	AFTN	LTT/A	1200	V.24	IA-5	AFTN		
EUR(Rome)	M	SAT/A	1200	V.24		AFTN	SAT/A	1200	X.25	IA-5	AFTN		
ACCRA													
Cotonou	S	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X25	IA-5	AFTN		
Lome	S	SAT/D	2400	X.25	IA-5	AFTN	SAT/D	2400	X25	IA-5	AFTN		
ANTANANARIVO													
Dzaoudzi	S	SAT/D	2400	FR	IA-5	AFTN	SAT/D	2400	FR	IA-5	AFTN		
Mauritius	T	SAT/D	2400	FR	IA-5	AFTN	SAT/D	2400	FR	IA-5	AFTN		

Terminal I/ Terminal II	Circuit category/ Catégorie de circuit	Current/Existant					Planned/Prévu					Target date of implem.entation/ Date cible de mise en oeuvre	Remarks/ Observations
		Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau	Circuit type/ Type de circuit	Modulation rate/ Rapidité de modulation (bps)	Prot.	Code	Network / Réseau		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Moroni	S	SAT/D	2400	FR	IA-5	AFTN	SAT/D	2400	FR	IA-5	AFTN		
DOUALA													
Malabo	S	SAT/D	1200	X25	IA-5	AFTN	SAT/D	1200	X.25	IA-5	AFTN		
KANO													
Lagos	S	SAT/A	1200	FR	IA-5	AFTN	SAT/D	2400	X25	IA-5	AFTN		
LAGOS													
Cotonou	S	LTT/A	50	NONE	ITA-2	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
MAURITIUS													
Saint Denis	S	SAT/D	2400	FR	IA-5	AFTN	SAT/A	2400	FR	IA-5	AFTN		
Johannesburg	T	SAT/D	2400	FR	ITA-2	AFTN	SAT/D	9600	FR	IA-5	AFTN		
CONAKRY													
Robertsfield	S	SAT/D	1200	X25	IA-5	AFTN	SAT/D	1200	X25	IA-5	AFTN		
Freetown	S	SAT/D	1200	X25	IA-5	AFTN	SAT/D	1200	X25	IA-5	AFTN		

Appendix B

StateName	Requirements	Facilities or Services	Description of Deficiency	Date first reported	Comments on Deficiency	Description of Corrective action	Executing Body	Target date for implementation	Priority
1. Angola									
	1. AFTN Plan, AFI Rec. 9/7	Luanda AFTN centre	Circuit Luanda/Brazzaville	1998	Not implemented	AFISNET/SADC2	Angola, ASECNA		U
2. Burundi									
	2. AFTN Plan, AFI Rec. 9/7	Bujumbura AFTN Centre	Circuit Bujumbura/Johannesburg	2002	Not implemented	VSAT under consideration	Burundi, South Africa		U
3. Congo									
	3. AFTN Plan, AFI Rec. 9/7	Brazzaville AFTN centre	Circuit Brazzaville/Luanda	1998	Not implemented	AFISNET/SADC2	ASECNA, Angola		A
	4. AFTN Plan, AFI Rec. 9/7	Brazzaville AFTN centre	Main circuit Brazzaville/Nairobi	1998	VSAT circuit and 50-baud leased circuit being discussed.	AFISNET/NAFISAT	ASECNA, Kenya		U
	5. AFTN Plan, AFI Rec. 9/7	Brazzaville AFTN centre	Circuit Brazzaville/Sao Tome	1998	VSAT planned	To implement the circuit	ASECNA, Sao Tome & Principe		U
4. Djibouti									
	6. AFTN Plan, AFI Rec. 9/7	Djibouti AFTN centre	Circuit Djibouti/Addis Ababa	2002	Unserviceable	NAFISAT	Djibouti, Ethiopia		U
5. Equatorial Guinea									
	7. AFTN Plan, AFI Rec. 9/7	Malabo AFTN centre	Circuit Malabo/Bata	2001	Bata has no AFTN connection	To implement circuit	ASECNA	2003	U
6. Eritrea									
	8. AFTN Plan, AFI Rec. 9/7	Asmara AFTN centre	Circuit Asmara/Addis Ababa	1998	The circuit has been disconnected	To be restored	Eritrea, Ethiopia		U
7. Ethiopia									
	9. AFTN Plan, AFI Rec. 9/7	Addis Ababa AFTN centre	Circuit Addis Ababa/Djibouti	2002	Unserviceable	To repair and upgrade. Modem available in Djibouti as well as new automatic switching centre	Ethiopia, Djibouti		U
	10. AFTN Plan, AFI Rec. 9/7	Addis Ababa AFTN centre	Circuit Addis Ababa/Asmara	1998	This circuit has been disconnected	To be restored	Ethiopia, Eritrea		U

<i>StateName</i>	<i>Requirements</i>	<i>Facilities or Services</i>	<i>Description of Deficiency</i>	<i>Date first reported</i>	<i>Comments on Deficiency</i>	<i>Description of Corrective action</i>	<i>Executing Body</i>	<i>Target date for implementation</i>	<i>Priority</i>
	11. AFTN Plan, AFI Rec. 9/7	Addis Ababa AFTN centre	Circuit Addis Ababa/Khartoum	1996	Not implemented	NAFISAT	Ethiopia, Sudan	2007	A
8. Kenya									
	12. AFTN Plan, AFI Rec. 9/7	Nairobi AFTN centre	Main circuit Nairobi/Brazzaville	1998	VSAT circuit and 50-baud leased circuit being discussed.	AFISNET/NAFISAT	Kenya, ASECNA	2007	U
9. Niger									
	13. AFTN Plan, AFI Rec. 9/7	Niamey AFTN centre	Main circuit Niamey/Addis Ababa	1998	To improve circuit	AFISNET/NAFISAT	ASECNA, Ethiopia	2007	U
10. Rwanda									
	14. AFTN Plan, AFI Rec. 9/7	Kigali AFTN centre	Circuit Kigali/Johannesburg	2002	Not implemented	VSAT circuit in project	Rwanda, South Africa		U
11. Sao Tome & Principe									
	15. AFTN Plan, AFI Rec. 9/7	Sao Tome AFTN centre	Circuit Sao Tome/Brazzaville	1998	VSAT planned	Implement the circuit	Sao Tome & Principe, ASECNA		U
12. South Africa									
	16. AFTN Plan, AFI Rec. 9/7	Johannesburg AFTN centre	Circuit Johannesburg/Bujumbura	2002	Not implemented	VSAT under consideration	South Africa, Burundi		U
	17. AFTN Plan, AFI Rec. 9/7	Johannesburg AFTN centre	Circuit Johannesburg/Kigali	2002	Not implemented	VSAT circuit in project	South Africa, Rwanda		U
13. Sudan									
	18. AFTN Plan, AFI Rec. 9/7	Khartoum AFTN centre	Circuit Khartoum/Addis Ababa	1996	Not implemented	NAFISAT	Ethiopia, Sudan	2007	A
