



INTERNATIONAL CIVIL AVIATION ORGANIZATION

Sixth Meeting of the APIRG Communications Sub-Group
(Nairobi, 24 - 26 September 2002)

Agenda Item 4: Aeronautical Fixed Service

Review of the Report of the first meeting of the ATN Planning Task Force
(Presented by the Secretariat)

SUMMARY
The Report of the first meeting of the ATN Planning Task Force (ATN/TF/1) is presented for review by the COM Sub-group.
Action required is at paragraph 3.
References: <ul style="list-style-type: none">• APIRG/13 Report• COM/SG/5 Report• ATN/TF/1 Report

1. Introduction

1.1 The first meeting of the Aeronautical Telecommunication Network Task Force (ATN/TF/1) of APIRG Communications Sub-group was held in Dakar, Senegal from 29 to 31 May 2002. It was attended by 21 participants from 7 States and 2 International Organizations.

1.2 The meeting adopted the following agenda:

- Agenda Item 1: Election of the Chairperson and the Vice-Chairperson of the Task Force
- Agenda Item 2 : Review of the ATN Planning Task Force terms of reference and work programme
- Agenda Item 3 : Critical analysis of the AFI current AFTN
- Agenda Item 4 : Description of the AFI ATN topology
- Agenda Item 5 : Future work programme and composition of the ATN Planning Task Force

2. Discussion

2.1 The meeting recorded its action in the form of draft Conclusions and draft Decisions, the list of which is attached as **Appendix 5A** to this paper. It opted not to elect a Chairperson.

Agenda Item 2 : Terms of reference, work programme and composition

2.2 The meeting noted its terms of reference, work programme and composition as defined by COM/SG/5 and endorsed by APIRG13. The Gambia expressed its intention to become a member of the ATN Task Force, which was supported by the meeting.

Agenda Item 3 : Critical analysis of the current AFTN

2.3 The Task Force undertook a critical analysis of the current AFI aeronautical fixed telecommunication network (AFTN) based on ICAO policy for the planning and implementation of AFTN as contained in ICAO Doc 8259, to assess the extent to which ICAO Standards and Recommended Practices (SARPs) on *Aeronautical Telecommunication (Annex 10)* and AFI Air Navigation Plan (AFI ANP) have been implemented, from the perspective of the migration to the aeronautical telecommunication network (ATN) ground-ground applications (air traffic services (ATS) message handling services (ATSMHS), inter-centre communications (ICC)). In substance, findings of the analysis are as follows:

Implementation and operational status of the AFI AFTN

2.4 The meeting analysed reported AFTN deficiencies as updated by the Secretariat, and concluded that the main deficiencies are :

- **Non-implementation of some circuits** : three (3) main circuits (Algiers/Niamey, Brazzaville/Johannesburg, Brazzaville/Nairobi) and one (1) entry/exit circuit (Johannesburg/SAM) are not yet implemented, as well as some tributary circuits.
- **Low availability of existing circuits:** the requirement of 97% minimum (AFI/7 Rec. 9/3 refers).
- **Low-speed circuits:** the requirement is 1200 baud minimum for main circuits (APIRG Conclusion 12/13 refers); no requirement has been specified for tributary circuits. Tributary circuits connected to the main centres of Brazzaville, Dakar, Johannesburg and Niamey had been upgraded to higher transmission speeds, while the outgoing main circuits operated still at 50 baud.
- **Very long transit times:** the requirement is 5 minutes maximum for high priority messages, and 10 minutes maximum for other messages.
- **Incompatible sub-regional satellite telecommunication networks:** existing VSAT networks (AFISNET, SADC and CAFSAT networks) utilize different space segments.
- **Use of analogue technology:** no error check capability and limited bandwidth.
- **Human factors:** inadequate staffing and lack of or insufficient training on aeronautical equipment and associated technologies .

2.5 It was pointed out that, as a result of these deficiencies, traffic has to be diverted through some alternative circuits (e.g. Dakar/Johannesburg, Brazzaville/Dakar, Johannesburg/Nairobi), thus increasing transit times and risk of congestion and/or message loss; and some States/Centres are completely cut off, with adverse effect on ATS coordination and flight safety.

2.6 The meeting noted with appreciation that RTT circuits were no longer in use in the AFI Region for AFTN purpose.

Proposed remedial actions

Note: Appendix 5A attached hereto contains the list of draft Conclusions and draft Decisions referred to in the following paragraphs.

2.7 Based on the analysis it carried out, the meeting was of the view that improvements could be brought to the current AFI AFTN by resorting to the following solutions where and when applicable:

- **Upgrading of AFTN circuits** to a minimum modulation rate of 1200 baud and to bit-oriented circuit control protocols for data integrity, and monitoring of AFTN transit times. *Draft Conclusions 1/1 and 1/6 were formulated.*
- **AFTN implementation requirements:** the meeting defined criteria to be taken into account in implementing or assessing AFI rationalized AFTN circuits. These implementation requirements are contained in **Appendix 5B** to this paper. *Draft Conclusion 1/5 was formulated.*
- **Use of integrated service digital network (ISDN)/public data network (PDN) and X.25:** the Secretariat was tasked to conduct a survey on the availability and usage costs of such services in the Region so as to ascertain the appropriateness and cost-effectiveness of these solutions proposed to improve Addis Ababa/Nairobi, Algiers/Niamey, Bombay/Nairobi, Brazzaville/Nairobi, Cairo/Nairobi and Johannesburg/Nairobi. *Draft Conclusion 1/2 and draft Decision 1/3 were formulated.*
- **Inclusion of an existing well performing bilateral circuit in the AFTN configuration :** applicable to Cairo/Tripoli. *Draft Conclusion 1/4 was formulated.*
- **Expansion of existing VSAT networks,** notably expansion of CAFSAT network to Abidjan, Accra, Brazzaville and Luanda as proposed by IATA. *Draft Conclusion 1/7 was formulated.*
- **Interconnection of these VSAT networks** as called for by APIRG to cater for identified requirements, including those involving Abidjan, Accra, Brazzaville and Luanda.
- **Implementation of a by-pass circuit Algiers/Johannesburg:** this proposal was considered by COM/SG/5, and the two States concerned were recommended that, if they so wish, they establish the circuit on a bilateral basis. The Task Force proposed that the matter be reviewed by COM/SG/6.
- **use of SADIS** - satellite distribution system for air navigation - as a supplementary means: the meeting acknowledged the need to implement SADIS 2-way stations at suitable locations in the AFI Region (e.g. Cairo, Dakar, Johannesburg and Nairobi), in order to avoid transmission delays due to VSAT double hop links for the forwarding of OPMET data directly to WAFC London, and eventually AIS data to European data banks. Close co-ordination between COM, ATS, AIS and MET experts was therefore recommended to finalize the definition of the types of data to be exchanged through SADIS, and refine its configuration accordingly. *Draft Conclusion 1/8 was formulated.*
- **Implementation of human resource programmes** to ensure that a sufficient number of personnel is available and remain proficient in the skills necessary to operate and maintain facilities. *Draft Conclusion 1/9 was formulated.*
- **Commercial Internet** for non time-critical applications: States experiencing difficulties to implement and maintain their communication facilities should use the Internet (when available) for the exchange of non time-critical applications. The meeting did not adopt a proposal from a participant to use TCP/IP stack on a trial basis between air navigation services providers as an overlay to AFTN. *Draft Conclusion 1/10 was formulated.*

Agenda Item 4 : Description of the AFI ATN topology

Need for performance requirements for leased ATN services

2.8 The meeting acknowledged an increasing desirability of commercial provision of managed network services given unsustainability of ad hoc development by States – which includes concerns relating to interoperability of separate network segments, backwards compatibility, accommodation of differences, communications efficiency and flexibility and cost-benefit. Hence the need to define required network performance and quality of service (QoS) in a simple, realistic and achievable set of performance based specifications to be used by ATS providers and aircraft operators when leasing ATN services (at subnetwork or end-

to-end levels) from communications service providers. *Draft Conclusion 1/11 was formulated.*

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Draft of ATN routing architecture

2.8 The meeting reviewed a draft of an initial Plan for the ATN routing architecture within the AFI Region, based on a comprehensive paper prepared by the Secretariat.

2.9 The meeting then focussed on a proposed representation scheme for the ATN Ground Portion Plan, noting that such a plan is described in terms of formatted tables in the other Regions (e.g. ASIA/PAC and CAR/SAM). Attention was directed to the following basic rules:

Requirements for Plan description

2.10 *The meeting acknowledged the need to identify the purpose of the Plan document to provide an appropriate and accurate description of planned and implemented facilities, and a comprehensive view for management of the plan. It is also necessary to identify the entities to be described (ATN networking topology: domains to include routers (intermediate systems and end systems), routers to interconnect networks and interconnections; and ATN ground applications (AMHS, AIDC)) taking into account their different properties (relationship with peer entities).*

2.11 The meeting also noted the need to describe the acceptable entities and time order of implementation plan. For instance, at the time any interconnection installed, at both sides of interconnection, there has to be installed at least one router of compatible type; or prior to any ground application installation, there should be one router installed to route their message to other End System.

2.12 The meeting agreed that, though it is hard to capture all these basic rules, it is essential to provide an ATN Implementation Plan as an effective management tool to make the Plan well managed.

Routing architecture and description of the ATN ground-ground network

2.13 The meeting proposed an initial ATN routing architecture composed of a backbone network to concentrate ATN traffic at designated locations, and possibly support air-ground applications operating over the ATN, and ATN routing sub-regions around each backbone BIS connecting the routing domains to the backbone, these being subject to further refinements. The proposed ATN Backbone BIS and Circuits Implementation Table and the ATN BIS and Connections Implementation Table are shown at **Appendices 5C and 5D** to this paper, based upon the initial ATN architecture, and **Appendix 5E** to this paper shows a draft Chart of the complete ground-ground ATN network for the AFI region.

Transition Issues

2.14 The meeting agreed that the implementation of the ATN within the AFI Region may require considerable planning for the transition of the AFTN, and that this area needs further work, which will necessitate accurate information about plans of the States for ATN ground-ground applications (ATS Inter-facility Data Communications and ATS Messages Handling System).

Draft Conclusions 1/11, 1/12 and 1/13 and draft Decision 1/14 were formulated.

Agenda Item 5 : Future work programme and composition

The meeting adopted the future work programme and composition of the ATN Planning Task Force as reflected in **Appendix 5F** to this paper. *Draft Decisions 1/15 and 1/16 were formulated.*

3. Action by the COM Sub-group

3.1 The COM/SG is invited to:

- a) note the Report of the first meeting of the ATN Planning Task Force as summarized in this paper; and
- b) review and adopt Draft Conclusions 1/1, 1/2, 1/4, 1/5, 1/6, 1/7, 1/8, 1/9, 1/10, 1/11, 1/12 and 1/13, and Draft Decisions 1/3, 1/14, 1/15 and 1/16 listed at **Appendix 5A** to this paper.

- E N D -

**FIRST MEETING OF THE COMMUNICATIONS SUB – GROUP
AERONAUTICAL TELECOMMUNICATION NETWORK PLANNING TASK FORCE
(ATN/TF/1)
(Dakar, Senegal 29 – 21 May 2002)**

LIST OF DRAFT CONCLUSIONS AND DRAFT DECISIONS

DRAFT CONCLUSION 1/1: UPGRADING OF AFTN MAIN CIRCUITS AND ENTRY/EXIT CIRCUITS

That, in view of the availability of improved tributary circuits, States concerned expedite the upgrading of AFTN main circuits and entry/exit circuits to a minimum modulation rate of 1200 bits/s and to bit-oriented circuit control protocols for data integrity.

DRAFT CONCLUSION 1/2: IMPLEMENTATION OF AFTN MAIN CIRCUITS

That States concerned implement/upgrade the following AFTN main circuits by using to the extent possible PDN, ISDN in the absence of dedicated circuits, and X25/1200 bps:

- | | | |
|----------------------------|---|---|
| - Addis Ababa/Niamey | : | X25 |
| - Addis Ababa/Nairobi | : | PDN |
| - Algiers/Niamey | : | PDN or dedicated X25 |
| - Bombay/Nairobi | : | PDN |
| - Brazzaville/Nairobi | : | PDN, via Dakar or Niamey |
| - Brazzaville/Johannesburg | : | PVC/X25 (<i>via Dakar, temporarily</i>) |
| - Cairo/Nairobi | : | PDN |
| - Casablanca/Dakar | : | CAFSAT |
| - Johannesburg/Nairobi | : | PDN or ISDN |

DRAFT DECISION 1/3: SURVEY OF AVAILABILITY AND USAGE COST OF PUBLIC DATA NETWORKS (PDNS) AND INTEGRATED SERVICE DIGITAL NETWORKS (ISDNs)

That the Secretariat conduct a survey on the availability and usage costs of public data networks and integrated service digital networks in the Region.

DRAFT CONCLUSION 1/4: ADDITION OF CAIRO/TRIPOLI CIRCUIT TO AFI AFTN PLAN

That the AFI AFTN Plan be amended to include the existing circuit between Cairo and Tripoli.

DRAFT CONCLUSION 1/5: IMPLEMENTATION OF AFTN REQUIREMENTS

That, in implementing their AFTN circuits in accordance with the AFI rationalized AFTN Plan, States take due account of requirements contained in Appendix 3B to this part of the Report.

DRAFT CONCLUSION 1/6: AFTN TRANSIT TIME STATISTICS

That in order to permit the assessment of AFTN performance on a regular basis, States establish quarterly transit time statistics for their AFTN centres, using the reporting format as per Appendix 3C to this part of the Report.

**DRAFT CONCLUSION 1/7: EXTENSION OF CAFSAT NETWORK TO ABIDJAN, ACCRA,
 BRAZZAVILLE AND LUANDA**

That the proposed extension of CAFSAT network to Abidjan, Accra, Brazzaville and Luanda be reviewed by the forthcoming coordination meeting (September 2002), along with other options reviewed by ATN/TF/1 (such as interconnection of ASECNA/SADC VSAT networks, or implementation of Brazzaville/Luanda link).

DRAFT CONCLUSION 1/8: AFTN/SADIS

That:

- **APIRG ATS/AIS/SAR and MET Sub-groups finalize feasibility studies on the use of SADIS for the distribution of information relating to air navigation, including operating procedures and interface issues (modalities of operation, message format, conversion procedures, etc.); and**
- **ATS, AIS and MET experts be invited to participate in the next ATN/TF meeting.**

**DRAFT CONCLUSION 1/9: COMMUNICATIONS HUMAN RESOURCES AND TRAINING –
 RELATED ISSUES**

That human resources and training issues relating to the Communications field be taken into account by an APIRG appropriate body, in order to ensure that a sufficient number of personnel is available and remain proficient in the skills necessary to operate and maintain facilities.

DRAFT CONCLUSION 1/10: USE OF THE INTERNET

That States having difficulties to implement or maintain facilities required in the AFI AFTN Plan consider the use of the Internet when available, particularly for the exchange of non time-critical applications (e.g. flight regularity, administrative, etc.).

**DRAFT CONCLUSION 1/11: PERFORMANCE CRITERIA FOR USE BY ATS PROVIDERS AND AIRCRAFT
 OPERATORS WHEN LEASING ATN SERVICES FROM COMMUNICATION SERVICE
 PROVIDERS**

That ICAO develop performance criteria to be taken into consideration by air traffic services and aircraft operators when leasing ATN services (at subnetwork or end-to-end levels) from communication service providers.

DRAFT CONCLUSION 1/12: TIMESCALE FOR THE IMPLEMENTATION OF AIDC

That the APIRG ATS/AIS/SAR Sub-group be requested to provide necessary information on the timescale of implementation of ATS Inter-facility Data Communications (AIDC).

**DRAFT CONCLUSION 1/13: INFORMATION ON STATES' PLANS FOR THE IMPLEMENTATION OF
 AMHS**

That the Secretariat conduct a survey on States plans for the implementation of the AMHS application to be supported by the ATN.

DRAFT DECISION 1/14: DRAFT AFI ATN ROUTING ARCHITECTURE

That the draft AFI ATN routing architecture as described at Appendices 4B, 4C and 4D be refined by the ATN Planning Task Force.

DRAFT DECISION 1/15:**MEMBERSHIP IN THE ATN PLANNING TASK FORCE**

That The Gambia be included in the composition of the ATN Planning Task Force.

DRAFT DECISION 1/16:**FUTURE WORK PROGRAMME AND COMPOSITION OF
THE ATN PLANNING TASK FORCE**

That the future work programme and composition of the ATN Planning Task Force be as defined at Appendix 5A to this part of the Report.

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

Explanation of the table
Explication du tableau

Col. N° 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 (eg cable, microwave/ <i>circuit télétype terrestre, numérique (i.e. câble, faisceau hertzien)</i>) LDD/A - landline data circuit, analogue (eg cable, microwave/ <i>circuit de données terrestre, analogue (i.e. câble, faisceau hertzien)</i>) LDD/D - landline data circuit, digital (eg 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 N°2/ <i>Alphabet international N°2</i> IA-5: International Alphabet N°5/ <i>Alphabet international N°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>

AFI AFTN RATIONALIZED PLAN - IMPLEMENTATION REQUIREMENTS

Terminal I/ Terminal II	Circ. Cat./ Caté. de circ.	Current/Existant					Planned/Prévu					Target Implem. date / Date 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	Minimum Modulation rate/ Rapidité de modulation bps	Prot.	Code	Network/ Réseau		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
ADDIS ABABA													Addis centre can accommodate X25
Asmara	T	NIL					SAT	1200	X25	ITA2	AFTN		NAFISAT
Djibouti	T	RTT	50	NONE	ITA-2	AFTN	SAT	1200	X25	ITA-2	AFTN		NAFISAT
Khartoum	T	NIL					SAT/D	1200	X25	ITA-2	AFTN		NAFISAT
Nairobi	M	SAT/A/	50	NONE	ITA-2	AFTN	SAT/D	1200	X25	IA-5	AFTN		ISDN to explore
Niamey	M	SAT/A	50	TTY	ITA-2	AFTN	SAT/D	1200	X25	IA-5	AFTN		
MID(Jeddah)	M	SAT/A	50	A	ITA-2	AFTN	SAT/A	1200	X.25	IA-5	AFTN		ISDN to explore
ALGER													
Casablanca	M	SAT/A	50	NONE	ITA-2	AFTN	LTT/A	1200	X.25	IA-5	AFTN		
Niamey	M	NIL				AFTN	LTT	1200	X.25	IA-5	AFTN		
Tunis	M	SAT/A	1200	A	ITA-2	AFTN	SAT/D	1200	X.25	IA-5	AFTN		
EUR (Bordeaux)	M	SAT/A	1200	A	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	X25	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	V.24	ITA-2	AFTN	LTT/D	50	TTY	ITA-2	AFTN		
Johannesburg	M	NIL					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	ITA-2	AFTN		Nairobi/Dakar/brazzaville
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		

CAIRO													
Khartoum	T	SAT/A	50	TTY	ITA-2	AFTN	SAT/D	300	TTY	ITA-2	AFTN		To coordinate with Khartoum
Nairobi	M	SAT SAT/A	50	TTY	ITA-2	AFTN	SAT/D	1200	X.25	IA-5 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		CIDIN
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													
Dakar	M	LTT/A	2X75		ITA-2	AFTN	SAT/D	2400	V24/FR	IA-5	AFTN		
Las Palmas	T	LTT/A	50		ITA-2	AFTN	LTT/A	50	CIDIN	IA-5	AFTN		
EUR(Madrid)	M	SAT/A	50+1X200		IA-5	AFTN	SAT/A	9000	CIDIN	IA-5	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	NIL					SAT/D	2400	X-25	ITA-2	AFTN		
Johannesburg	M	LTT	2400	V-24	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	2400	V-24	IA-5	AFTN	SAT/D	2400	V24	IA-5	AFTN		
Sal	T	SAT/D	2400	V.24	IA-5	AFTN	SAT/D	2400	X-25	IA-5	AFTN		
SAM(RIO)	M	SAT	2400	V24	IA-5	AFTN	SAT/D	2400	V.24	IA-5	AFTN		
JOHANNES- BURG													X25 planned/ IA-5 capable
Antananarivo	T	NIL				AFTN	SAT/D	1200	V.24	IA-5	AFTN		
Beira	T	SAT/D	1200	TTY	ITA-2	AFTN	SAT/D	1200	TTY	ITA-2	AFTN		
Bujumbura	T	NIL					SAT/D	1200	TTY	ITA-2	AFTN		VSAT planned
Gaborone	T	SAT/D	1200	TTY	ITA-2	AFTN	SAT/D	1200	TTY A	ITA-2	AFTN		

Harare	T	SAT/D	1200	TTY A	ITA-2	AFTN	SAT/D	1200	A	ITA-2	AFTN		
Kigali	T	NIL					SAT/D	1200	TTY	ITA-2	AFTN		
Lilongwe	T	SAT/D	1200	TTY A	ITA-2	AFTN	SAT/D	1200	TTY A	ITA-2	AFTN		
Lusaka	T	SAT/D	1200	TTY A	ITA-2	AFTN	SAT/D	1200	TTY A	ITA-2	AFTN		
Maputo	T	SAT/D	1200	TTY A	ITA-2	AFTN	SAT/D	1200	TTY A	ITA-2	AFTN		
Maseru	T	SAT/D	1200	TTY	ITA-2	AFTN	SAT/D	1200	TTY	ITA-2	AFTN		
Manzini	T	LTT/A	1200	TTY	ITA-2	AFTN	SAT/D	1200	TTY A	ITA-2	AFTN		
Nairobi	M	LTT/A	50	TTY A	ITA-2	AFTN	SAT/D	1200	X.25	ITA-2	AFTN		
Windhoek	T	SAT/D	1200	TTY	ITA-2	AFTN	SAT/D	1200	NONE	ITA-2	AFTN		
ASIA/PAC (Brisbane)	M	NIL					SAT/D	1200	X.25 A	IA-5	AFTN		
SAM (Buenos Aires)	M	NIL					SAT/D	1200	X.25	IA-5	AFTN		

NAIROBI													
Dar es Salaam	T	LTT/A	50	NONE	ITA-2	AFTN	LTT/A	50	NONE	ITA-2	AFTN		
Entebbe	T	LTT/A	50	A	ITA-2	AFTN	LTT/A	50	A	ITA-2	AFTN		
Mauritius	T	SAT/A	50	A	ITA-2	AFTN	SAT/A	50	A	ITA-2	AFTN		
Mogadishu	T	NIL		A		AFTN	SAT/A	50	A	ITA-2	AFTN		SITA
Seychelles	T	SAT/A	50	A	ITA-2	AFTN	SAT/A	50	NONE	ITA-2	AFTN		
ASIA (Mumbai)	M	LTT/A	50	A	ITA-2	AFTN	LTT/A	1200	X.25	ITA-2	AFTN		
NIAMEY													
Accra	T	SAT/A	50	TTY	ITA-2	AFTN	SAT/D	2400	X.25	IA-5	AFTN		ACCRA X25 TBC
Kano	T	SAT/D	50	A	ITA-2	AFTN	SAT/D	2400	X25	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	NONE	ITA-2	AFTN	LTT/A	50	NONE	ITA-2	AFTN		TBC with TUNIS
EUR(Rome)	M	SAT/A	1200	X-25		AFTN	SAT/A	1200	X.25	ITA-2	AFTN		

ACCRA													
Cotonou	S	LTT/A	50	NONE	ITA-2	AFTN	LTT/A	2400	X25	IA-5	AFTN		
Lome	S	LTT/A	50	A	ITA-2	AFTN	LTT/A	2400	X25	IA-5	AFTN		
ANTANA-NARIVO													
Dzaoudzi	S	SAT/D	2400	V24	IA-5	AFTN	SAT/D	2400	X.25	IA-5	AFTN		
Mauritius	T	SAT/D	2400	V24	IA-5	AFTN	SAT/D	2400	V24	IA-5	AFTN		
Moroni	S	SAT/D	2400	V.24	IA-5	AFTN	SAT/D	2400	V24	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	50	NONE	ITA-2	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	V24	IA-5	AFTN	SAT/A	2400	V24	IA-5	AFTN		
ASIA/PAC (Brisbane)	T	SAT/A	50	A	ITA-2	AFTN							To maintain until operation of J'Burg /ASIA/PAC
Johannesburg	T	SAT/D	1200	TTY	ITA-2	AFTN	SAT/D	1200	X.25	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 5C

AFI ATN BACKBONE BIS AND CIRCUITS IMPLEMENTATION

State/Locations	ATN Backbone connection		Target Date of Implementation		Trunk Type	Comments
	Speed	Protocol	Circuit	BBIS		
1	2	3	4	5	6	7
Algeria						
Algiers						
Casablanca	64 Kbps				Intra-regional	Upgrade circuit
Dakar	64 Kbps				Intra-regional	New circuit
Niamey	64 Kbps				Intra-regional	Upgrade circuit
Tunis	64 Kbps				Intra-regional	Upgrade circuit
EUR	64 Kbps				Inter-regional	Upgrade circuit
Chad						
N'djamena						
Brazzaville	64 Kbps				Intra-regional	Upgrade circuit
Khartoum	64 Kbps				Intra-regional	New circuit
Kinshasa	64 Kbps				Intra-regional	New circuit
Niamey	64 Kbps				Intra-regional	Upgrade circuit
Congo						
Brazzaville						
Dakar	64 Kbps				Intra-regional	Upgrade circuit
Kinshasa	64 Kbps				Intra-regional	Upgrade circuit
N'djamena	64 Kbps				Intra-regional	Upgrade circuit
Niamey	64 Kbps				Intra-regional	Upgrade circuit
Dem. Republic of the Congo						
Kinshasa						
Brazzaville	64 Kbps				Intra-regional	Upgrade circuit
Dar es Salaam	64 Kbps				Intra-regional	New circuit
Johannesburg	64 Kbps				Intra-regional	Upgrade circuit
N'djamena	64 Kbps				Intra-regional	New circuit
Egypt						
Cairo						
Khartoum	64 Kbps				Intra-regional	Upgrade circuit
Tunis	64 Kbps				Intra-regional	Upgrade circuit
EUR	64 Kbps				Inter-regional	Upgrade circuit
MID	64 Kbps				Inter-regional	Upgrade circuit
Ethiopia						
Addis Ababa						
Khartoum	64 Kbps				Intra-regional	Upgrade circuit
Nairobi	64 Kbps				Intra-regional	Upgrade circuit
MID	19.2 Kbps				Inter-regional	Upgrade circuit
Kenya						
Nairobi						
Addis Ababa	64 Kbps				Intra-regional	Upgrade circuit
Dar es Salaam	64 Kbps				Intra-regional	Upgrade circuit
Khartoum	64 Kbps				Intra-regional	New circuit
Mauritius	64 Kbps				Intra-regional	Upgrade circuit
ASIA/PAC ¹	19.2 Kbps				Inter-regional	Upgrade circuit

¹ In ASIA/PAC ATN Plan, this circuit is to be upgraded by 2005 to 19.2 Kbps, X.25 protocol and the India BBIS implemented by 2005

State/Locations	ATN Backbone connection		Target Date of Implementation		Trunk Type	Comments
	Speed	Protocol	Circuit	BBIS		
1	2	3	4	5	6	7
Madagascar						
Antananarivo						
Johannesburg	64 Kbps				Intra-regional	Upgrade circuit
Mauritius	64 Kbps				Intra-regional	Upgrade circuit
Mauritius						
Mauritius						
Antananarivo	64 Kbps				Intra-regional	Upgrade circuit
Johannesburg	64 Kbps				Intra-regional	Upgrade circuit
Nairobi	64 Kbps				Intra-regional	Upgrade circuit
Niger						
Niamey						
Algiers	64 Kbps				Intra-regional	Upgrade circuit
Brazzaville	64 Kbps				Intra-regional	Upgrade circuit
Dakar	64 Kbps				Intra-regional	Upgrade circuit
N'djamena	64 Kbps				Intra-regional	Upgrade circuit
Morocco						
Casablanca						
Algiers	64 Kbps				Intra-regional	Upgrade circuit
Dakar	64 Kbps				Intra-regional	Upgrade circuit
EUR	64 Kbps				Inter-regional	Upgrade circuit
Senegal						
Dakar						
Algiers	64 Kbps				Intra-regional	New circuit
Brazzaville	64 Kbps				Intra-regional	Upgrade circuit
Casablanca	64 Kbps				Intra-regional	Upgrade circuit
Johannesburg	64 Kbps				Intra-regional	Upgrade circuit
Niamey	64 Kbps				Intra-regional	Upgrade circuit
SAM	19.2 Kbps				Inter-regional	Upgrade circuit
South Africa						
Johannesburg						
Antananarivo	64 Kbps				Intra-regional	Upgrade circuit
Dakar	64 Kbps				Intra-regional	Upgrade circuit
Dar es Salaam	64 Kbps				Intra-regional	Upgrade circuit
Kinshasa	64 Kbps				Intra-regional	Upgrade circuit
Mauritius	64 Kbps				Intra-regional	Upgrade circuit
ASIA/PAC ²	19.2 Kbps				Inter-regional	Upgrade circuit
SAM	19.2 Kbps				Inter-regional	Upgrade circuit
Sudan						
Khartoum						
Addis Ababa	64 Kbps				Intra-regional	Upgrade circuit
Cairo	64 Kbps				Intra-regional	Upgrade circuit
Nairobi	64 Kbps				Intra-regional	New circuit
N'djamena	64 Kbps				Intra-regional	New circuit
Tanzania						
Dar es Salaam						
Kinshasa	64 Kbps				Intra-regional	New circuit
Johannesburg	64 Kbps				Intra-regional	Upgrade circuit
Nairobi	64 Kbps				Intra-regional	Upgrade circuit
Tunisia						

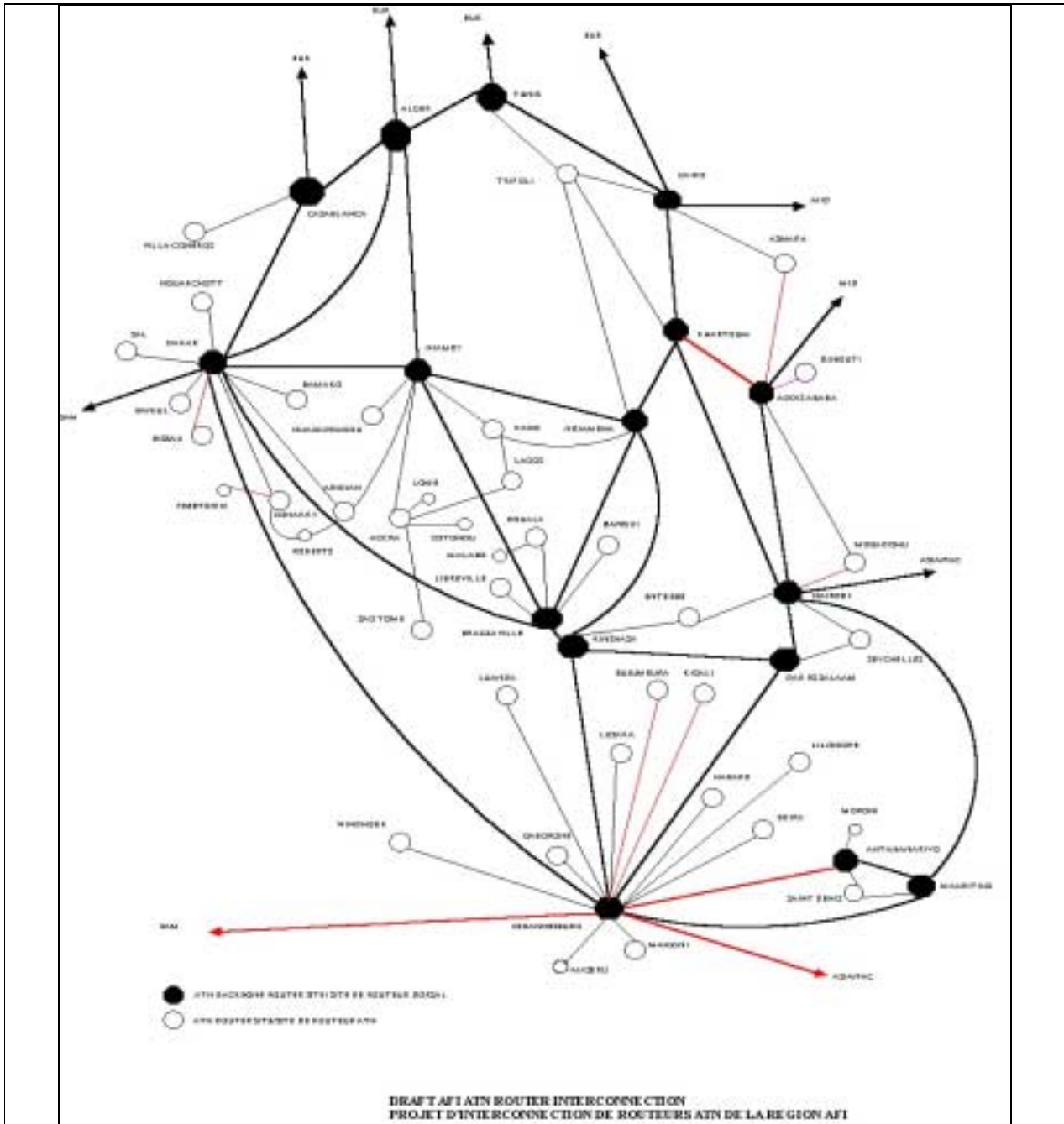
² In ASIA/PAC ATN Plan, this circuit is to be upgraded by 2003 to 19.2 Kbps, X.25 protocol and the Australia BBIS implemented by 2003.
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State/Locations	ATN Backbone connection		Target Date of Implementation		Trunk Type	Comments
	Speed	Protocol	Circuit	BBIS		
1	2	3	4	5	6	7
Tunis						
Algiers	64 Kbps				Intra-regional	Upgrade circuit
Cairo	64 Kbps				Intra-regional	Upgrade circuit
EUR	64 Kbps				Inter-regional	Upgrade circuit

AFI ATN BIS AND CONNECTIONS IMPLEMENTATION

Backbone BIS site/Locations	ATN connection		Target Date of Implementation		Connection Type	Comments
	Speed	Protocol	Circuit	BIS		
1	2	3	4	5	6	7
Chad						
N'djamena						
Kano	9600 bps				Intra-regional	New circuit
Tripoli	9600 bps				Intra-regional	New circuit
Congo						
Brazzaville						
Bangui	9600 bps				Intra-regional	Upgrade circuit
Douala	9600 bps				Intra-regional	Upgrade circuit
Libreville	9600 bps				Intra-regional	Upgrade circuit
Dem. Rep. of Congo						
Kinshasa						
Entebbe	9600 bps				Intra-regional	Upgrade circuit
Egypt						
Cairo						
Asmara	9600 bps				Intra-regional	Upgrade circuit
Tripoli	9600 bps				Intra-regional	Upgrade circuit
Ethiopia						
Addis Ababa						
Asmara	9600 bps				Intra-regional	Upgrade circuit
Djibouti	9600 bps				Intra-regional	Upgrade circuit
Mogadishu	9600 bps				Inter-regional	New circuit
Kenya						
Nairobi						
Entebbe	9600 bps				Intra-regional	Upgrade circuit
Mogadishu	9600 bps				Intra-regional	Upgrade circuit
Seychelles	9600 bps				Intra-regional	Upgrade circuit
Madagascar						
Antananarivo						
Moroni	9600 bps				Intra-regional	Upgrade circuit
Saint Denis	9600 bps				Intra-regional	New circuit
Mauritius						
Mauritius						
Saint Denis	9600 bps				Intra-regional	Upgrade circuit
Niger						
Niamey						
Abidjan	9600 bps				Intra-regional	Upgrade circuit
Accra	9600 bps				Intra-regional	Upgrade circuit
Kano	9600 bps				Intra-regional	Upgrade circuit
Ouagadougou	9600 bps				Intra-regional	Upgrade circuit
Morocco						
Casablanca						
Villa Cisneros	9600 bps				Intra-regional	Upgrade circuit
Senegal						
Dakar						
Abidjan	9600 bps				Intra-regional	Upgrade circuit

Backbone BIS site/Locations	ATN connection		Target Date of Implementation		Connection Type	Comments
	Speed	Protocol	Circuit	BIS		
1	2	3	4	5	6	7
Bamako	9600 bps				Intra-regional	Upgrade circuit
Banjul	9600 bps				Intra-regional	Upgrade circuit
Bissau	9600 bps				Intra-regional	Upgrade circuit
Conakry	9600 bps				Intra-regional	Upgrade circuit
Nouakchott	9600 bps				Intra-regional	Upgrade circuit
Sal	9600 bps					
South Africa						
Johannesburg						
Beira	9600 bps				Intra-regional	Upgrade circuit
Bujumbura	9600 bps				Intra-regional	Upgrade circuit
Gaborone	9600 bps				Intra-regional	Upgrade circuit
Harare	9600 bps				Intra-regional	Upgrade circuit
Kigali	9600 bps				Intra-regional	Upgrade circuit
Lilongwe	9600 bps				Intra-regional	Upgrade circuit
Luanda	9600 bps				Intra-regional	Upgrade circuit
Lusaka	9600 bps				Intra-regional	Upgrade circuit
Manzini	9600 bps				Intra-regional	Upgrade circuit
Maseru	9600 bps				Intra-regional	Upgrade circuit
Windhoek	9600 bps				Intra-regional	Upgrade circuit
Sudan						
Khartoum						
Tripoli	9600 bps				Intra-regional	New circuit
Tanzania						
Dar es Salaam						
Seychelles	9600 bps				Intra-regional	New circuit
Tunisia						
Tunis						
Tripoli	9600 bps				Intra-regional	Upgrade circuit
TRANSIT BISs						
Cameroon						
Douala						
Malabo	9600 bps				Intra-regional	Upgrade circuit
Côte d'Ivoire						
Abidjan						
Robertsfield	9600 bps				Intra-regional	New circuit
Ghana						
Accra						
Cotonou	9600 bps				Intra-regional	Upgrade circuit
Lagos	9600 bps				Intra-regional	New circuit
Lome	9600 bps				Intra-regional	Upgrade circuit
Sao Tome	9600 bps				Intra-regional	New circuit
Guinea						
Conakry						
Freetown	9600 bps				Intra-regional	Upgrade circuit
Robertsfield	9600 bps				Intra-regional	Upgrade circuit
Nigeria						
Kano						
Lagos	9600 bps				Intra-regional	Upgrade circuit



TERMS OF REFERENCE AND WORK PROGRAMME OF THE AFI AERONAUTICAL TELECOMMUNICATION NETWORK PLANNING TASK FORCE (ATN/TF)		
TERMS OF REFERENCE		
To plan for the implementation of the aeronautical telecommunication network (ATN) in the AFI Region in order to meet CNS/ATM system performance requirements and capacity.		
WORK PROGRAMME		
TASK No.	SUBJECT	TARGET DATE
1	Refinement of the ATN routing architecture	APIRG/15
2	Description of the ATN ground-ground applications (AMHS, AIDC)	APIRG/15
3	Preparation of an ATN addressing plan	APIRG/15
4	Preparation of an AMHS naming and addressing plan	APIRG/15
5	Preparation of guidance material to assist States, as necessary	APIRG/15
6	Update of the guidelines on ATN in the CNS/ATM Implementation Plan (Doc 003)	APIRG/15
7	Formulation of proposals to achieve the interoperability of existing VSAT networks	APIRG/15
COMPOSITION		
<i>Algeria, Angola, Burundi, Egypt, Ethiopia, Guinea, Kenya, Malawi, Niger, Nigeria, Senegal, South Africa, Tunisia, ASECNA and IATA.</i>		