

INTERNATIONAL CIVIL AVIATION ORGANIZATION



**REGIONAL PLANNING MEETING ON THE
INTEGRATION OF SUBREGIONAL AERONAUTICAL VSAT NETWORKS**

(Johannesburg, South Africa 31 March – 1 April 2004)

S U M M A R Y R E P O R T

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PREPARED BY THE WESTERN AND CENTRAL AFRICAN OFFICE

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History of the meeting

ii-1 Introduction

ii-1.1 The Regional Planning Meeting on the integration of sub-regional aeronautical VSAT networks was held in Johannesburg, South Africa, from 31 March to 1 April 2004. The meeting was hosted by ATNS, South Africa.

ii-1.2 The meeting was officially opened by Mr. Peter Charles Marais, Senior Official, ATNS, who welcomed the participants and wished them fruitful deliberations and a nice stay in Johannesburg. In his welcome address, he emphasized the importance of the Regional Planning Meeting recommended by the fourteenth meeting of the AFI Planning and Implementation Regional Group (APIRG), and whose objective was to permit VSAT network managers to further analyze with INTELSAT the feasibility of the consolidation project, and accordingly finalize a coordinated transition plan. Mr. Amadou Sene, Regional Officer CNS from ICAO, Nairobi Office also addressed the meeting.

ii-1.3 Mr. Prosper Zo'o-Minto'o, Regional Officer CNS from ICAO, Dakar Office was the Secretary of the meeting. He was assisted by Mr. Amadou Sene, Regional Officer CNS (ICAO, Nairobi Office) who also acted as moderator of the meeting.

ii-2 Attendance

ii-2.1 The meeting was attended by 21 participants from 5 contracting States (Ghana, Mauritius, Nigeria, Portugal and South Africa), 2 international organizations (the Agency for the Safety of Aerial Navigation in Africa and Madagascar (ASECNA) and Roberts FIR) and the Industry (Alcatel, Coris, Connection by Boeing and Intelsat).

ii-2.2 The List of participants is shown at **Appendix A**.

ii-3 Working languages

ii-3.1 The meeting was conducted in English and documentation was distributed in this language.

Agenda

The meeting adopted at its opening session the following agenda:

Agenda Item 1: Integration of sub-regional aeronautical VSAT networks – Project overview

Agenda Item 2: Migration considerations

2.1: Institutional issues

2.2: Technical issues

2.2.1 Ground segment

a) Pointing of ground stations antennas

b) Change of polarization

2.2.2 Space segment

a) Bandwidth requirements

b) Frequency planning

2.3: Operational issues

2.3.1 Aeronautical fixed services

2.3.2 Aeronautical mobile services

2.3.3 Aeronautical radio navigation service (GNSS trials)

2.3.4 Contingency planning

Agenda Item 3: Transition plan and timescales

Agenda Item 4: Transition management

4.1: Coordination

4.2: Aeronautical information

Agenda Item 5: Any other business

Agenda Item 1: Integration of sub-regional aeronautical VSAT networks – Project overview

Rationale for the integration of sub-regional VSAT networks

Development of aeronautical use of satellite technology in the Region

Fixed communications

1.1 The meeting recalled that use of satellite technology to support aeronautical communications in the AFI region dates back to the early 1990s, when the then AEROSATEL project (now AFISNET) was implemented in western and central African States, initially with 8 participating States and 15 earth stations. The network now spans from western Africa to southern Africa, including Indian Ocean and comprises 55 earth stations installed in 25 States. *Since then, two other networks have been implemented: SADC network (14 States) for southern African States and CAFSAT network (7 States) for South Atlantic FIRs. Another network, NAFISAT (16 States) is being planned for northern and eastern Africa. There also exist some national VSAT networks.*

1.2 The meeting recognized that the deployment of these networks is the result of valuable efforts made by air navigation provider States and organizations in order to meet ANP requirements for AFS, including exchange of OPMET data and surveillance data between ATS centres. It also noted that the existing infrastructure is also expected to support or at least to be part of the ATN ground-ground infrastructure, involving an extensive use of data communications and global connectivity as much as possible.

Mobile communications

1.3 Moreover, satellite technology has been instrumental for the extension of VHF radio coverage within FIRs to support the provision of area control along ATS routes (AFI/7 Rec. 5/21 refers), using remote VSAT/VHF stations.

Dissimilarities between networks characteristics

1.4 The meeting then observed that the existing networks (AFISNET, CAFSAT, SADC networks) characteristics present dissimilarities, some of which are illustrated in **Table 1** below.

1.5 In substance, these networks use four satellites, with different transponders, different access techniques, different topologies and different transmission and operating modes.

In such circumstances, it was agreed that interconnecting VSAT networks as recommended by APIRG/12 (through balanced integration) was tantamount to increasing bandwidth requirements, duplicating ground infrastructure, increasing propagation time for time-critical applications (e.g. ATS/DS communications) and complicating system operation and management, with additional costs (equipment, operation, maintenance, spare parts, personnel).

1.6 In this respect, the meeting analyzed simulation in **Table 2** below showing that, to achieve full AFTN and ATS/DS compliance with ANP requirements, a number of selected States, most of them managing main ATS/COM centres would virtually have to implement a total of 31 earth stations through *systematic balanced interconnection* between centres,

whereas only 13 earth stations (one per State) would be required for the same States with the integration of VSAT networks (*i.e.* 18 earth stations more than required).

Table 1

Network	Satellite	Access technique	Transponder/Coverage	Band	Topology	Transmission mode	Operations mode
AFISNET (25 States)	INTELSAT IS 903@ 325.5°E	FDMA	105/105 South-East zonal beam	C	Meshed	MCPC Multiple carrier	IBS
		FDMA	20/20 Hemispheric beam	C	Star- meshed	SCPC	FASTCOM (Proprietary)
	INTELSAT IS 707@ 359°E		86/86 Global beam	C	Star- meshed	SCPC	FASTCOM (Proprietary)
CAFSAT (7 States)	INTELSAT IS 801@ 328.5°E	FDMA	20/20 Hemispheric beam	C	Meshed	MCPC Single carrier	IBS
		FDMA	38/38 Global beam	C	Meshed	MCPC Single carrier	IBS
SADC (14 States)	INTELSAT IS 904 @ 60°E	FDMA	93/93 South-East zonal beam	C	Star- meshed	SCPC	DAMA (Proprietary)

Table 2

States	Networks								Total number of earth stations	
	AFISNET		CAFSAT		NAFISAT		SADC		Interco n.ec ^o approa ch	Integration approach
	I ¹	NI ²	I	NI	I	NI	I	NI		
Angola	0	1	0	1	0	0	1	0	3	1
Chad	1	0	0	0	0	1	0	0	2	1
Congo	1	0	0	0	0	1	1	0	3	1
D.R. Congo	0	1	0	0	0	0	1	0	2	1
Ethiopia	0	1	0	0	0	1	0	0	2	1
Kenya	0	1	0	0	0	1	0	1	3	1
Libya	0	1	0	0	0	1	0	0	2	1
Madaga scar	1	0	0	0	0	0	1	0	2	1
Maurita nia	1	0	0	1	0	0	0	0	2	1
Niger	1	0	0	0	0	1	0	0	2	1
Senegal	2	0	1	0	0	0	0	0	3	1
South Africa	1	0	1	0	0	0	1	0	3	1
Sudan	0	1	0	0	0	1	0	0	2	1
	8	6	2	2	0	7	5	1	31	13

¹ I: Implemented

² NI: Not implemented

1.7 In the same vein, the meeting also analyzed interconnection configurations implemented between AFISNET and SADC networks by ASECNA and ATNS, South Africa, and between AFISNET and CAFSAT by ASECNA and AENA, Canary Islands, as shown at **Appendix B** to this report.

GNSS

1.8 The meeting subsidiarily noted that integration of VSAT networks would contribute to optimizing the communication infrastructure to support the exchange of data between AFI GNSS operational RIMSs and EGNOS Central processing facility (CPF) located in Honefoss (Norway).to which AFISNET has been connected by means of an ASECNA VSAT station implemented in Toulouse (France) for the purpose of GNSS trials.

1.9 Based on the information provided by INTELSAT at its fourteenth meeting (APIRG/14, Yaounde, June 2003), APIRG accordingly adopted its conclusion 14/12 on the integration of aeronautical VSAT networks. Such a development was also supported by the first meeting of AFI ATS providers (Dakar, November 2002), the Twelfth meeting of AFISNET network management committee (Conakry, December 2002) and the Eleventh meeting on the improvement of air traffic services over the South Atlantic (SAT/11, Johannesburg, February 2003). However, the proposed integration required further consideration at regional/interregional level between network managers and INTELSAT, the space segment provider. Satellite IS 10-02 at 359 degrees East to be launched in 2004 was being considered in this respect.

Project overview

1.10 The meeting was presented with an overview of the consolidation project prepared INTELSAT. INTELSAT's presentation included the advantages associated with the consolidation of aeronautical VSAT networks to be achieved by transferring existing services on IS 903 @ 325.5°E, IS 707 @ 359°E, IS904 @ 60°E and IS 801 @ 328°E to transponder 20/20/EH/EH of the IS 10-02 @ 359°E such as:

- wide coverage including AFI, ASIA, EUR, MID and SAM regions (**Appendix C**),
- bandwidth optimization, more flexibility, one antenna per site,
- higher EIRP, and
- smaller antennas in future deployments.

1.11 The technical parameters of IS 10-02 were summarized as follows:

- Transponders: 70
- Global beam EIRP: 32.0 dBW at beam edge
- Hemi beam EIRP: 37.0 to 42.0 dBW
- Zone beam EIRP: 37.0 to 46.9 dBW
- Global beam G/T : -10.7 dB/K at beam edge
- Hemi beam G/T: -6.5 to -2.0 dB/K
- Zone beam G/T: -4.6 to +5.2 dB/K
- SFD at beam edge: -89.0 to -67.0 dBW/m²

1.12 INTELSAT indicated that though Transponder 20/20/EH/EH is the principal transponder for optimization, there is limitation of capacity thereon. Therefore, dual polarization will be required for some operators. Transponder 87/87 may be offered for operators limited in coverage and Transponder 104/104/SEZ/SEZ could be offered for future growth of ATS services.

1.13 Among questions raised by INTELSAT's presentation was system reliability to be considered further due to the *single point of failure* nature of the consolidation project. In this regard, the meeting was informed that the global availability of the Intelsat system was 99.997%.

Agenda Item 2: Migration considerations

Institutional issues

2.1 The meeting considered the institutional and technical arrangements governing the existing and planned aeronautical sub-regional VSAT networks in the AFI Region, in order to determine the extent to which these networks can move to the proposed migration to INTELSAT Satellite IS10-02@359°East, as recommended by the AFI Planning and Implementation Regional Group (APIRG) (Conclusion 14/12 refers).

2.2 The following was noted concerning the ownership of AFISNET, SADC, CAFSAT and NAFISAT network stations:

VSAT Network	Civil aviation ownership	
	Earth station	Hub
AFISNET	Yes	Yes
CAFSAT	Yes	Yes
NAFISAT	Yes	Yes No hub planned in the NAFISAT. Two stations will act as master stations for monitoring.
SADC	Yes	No Current hub shared with non-aeronautical users. Next SADC (SADC/2) network will be autonomous and total ownership will be exercised by civil aviation.

2.3 Based on the above information, the meeting adopted the following conclusion:

Conclusion RPM IS 10-02 - 1	<p>PHASED APPROACH TO MIGRATION</p> <p>That, taking due account of networks institutional aspects, development plans and technical considerations:</p> <p>a) AFISNET network only should migrate to INTELSAT IS 10-02 @ 359° East in the first phase;</p> <p>b) NAFISAT, SADC/2 and MID VSAT networks should be established on the IS 10-02 satellite as soon as practicable at a later stage; and</p> <p>c) CAFSAT network's migration be considered further by the SAT Informal Group.</p>
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Technical issues

Ground segment

Pointing of ground stations antennas

2.4 The meeting was informed of the outcome of AFISNET preparatory meeting held in Dakar from 9 to 10 March 2004. It reviewed keys issues to be addressed by concerned Administrations and Organizations managing and operating VSAT nodes in preparation for the migration of sub-regional VSAT networks to INTELSAT Satellite IS10-02@359°East, based on the fact that the method of transition will be by point-over, the earth stations having at a specific time to *point-over* from current satellites to IS-10-02 at 359°E (because of the mesh nature of the networks), possibly change polarization and radiate and receive *new frequencies*.

2.5 The meeting invited managing administrations/organizations to assess possibilities and modalities of pointing over the new satellite (IS10-02@359°East) with or without major adjustments, depending upon factors such as equipment flexibility (standard), obstacle clearance, etc). In this respect, it reviewed examples of such assessments which have been anticipated for some AFISNET earth stations in Cote d'Ivoire, Ghana, Guinea, Mauritania, Nigeria and Senegal, showing that some stations will require construction of new pedestals or new locations due to obstacles, and recommended a detailed inventory of the implications of moving to IS 10-02 for each concerned station/antenna. The model check list used in Tables at **Appendix E** to this paper was proposed for that purpose.

2.6 The meeting agreed that SADC VSAT network being on a shared hub managed by Telkom, a private company, civil aviation users cannot be moved at this time to IS 10-02.

Change of polarization

2.7 The meeting agreed that States and Organizations concerned should timely address the issue of polarization change from B-Polarization (right hand transmit/left hand receive) to A-Polarization (left hand transmit/right hand receive) on 359°E (the preferred option) when required.

Space segment

New Frequency Plan/Bandwidth requirements

2.8 The meeting discussed the new frequency plan for the relocation of aeronautical services supported/to be supported by AFISNET, CAFSAT, SADC and NAFISAT project networks on satellite IS10-02, Transponder 20/20 EH/EH. **Appendix D** to this report shows the provisional new frequency plan, which is subject to further refinements in coordination with INTELSAT taking into consideration exhaustive bandwidth requirements (including existing and planned services). The following conclusions were adopted:

Conclusion RPM IS 10-02 - 2	MIGRATION CHECK LIST That States and organizations concerned should determine for each earth station the activities (such as re-pointing of antenna, frequency change, polarization change, etc.) involved with the migration to IS 10-02, using the check list model at Appendix E to this report.
Conclusion RPM IS 10-02 - 3	NEW FREQUENCY ASSIGNMENT PLAN That States and organizations concerned by the migration submit to INTELSAT their comments on the new frequency assignment plan shown at Appendix D to this report.
Conclusion RPM IS 10-02 - 4	BANDWIDTH EXPANSION REQUIREMENTS That, as a matter of urgency, States and organizations concerned provide INTELSAT with their bandwidth expansion requirements, including new services (e.g. expansion of existing networks, development of new networks (SADC/2, NAFISAT, MID VSAT) , extension of VHF radio coverage, etc.

Operational issues

2.9 The meeting recalled the important role of VSAT networks in the aeronautical telecommunication infrastructure in the AFI Region, and recognized that the migration to Intelsat satellite IS-10-02 might affect to some extent air navigation systems operation. ATS provider States and organizations were therefore urged to inventory and implement alternate communications facilities in the order to avoid significant disruption or degradation of air traffic services during the transition phase. The following facilities were identified as possible alternate means:

Aeronautical fixed services (AFS)

AFTN

2.10 The possible alternate facilities for the AFTN circuits are:

- a) Fax
- b) Electronic mail
- c) Satellite telephones (with data channels)
- d) Leased lines
- e) SITA where available
- f) Available VSAT

ATS/DS

2.11 The possible alternate facilities for air traffic services direct speech circuits are:

- a) Satellite telephones
- b) Leased lines
- c) HF frequencies
- d) Cellular telephones
- e) Available VSATs

Aeronautical mobile service (AMS)

2.12 The possible alternate facilities for VSAT-based extended VHF are:

- a) HF frequencies (mainly)
- b) In-flight procedures using air-to-air communications might also be considered among others.

GNSS trials

2.13 The meeting was reminded of GNSS trials underway in Central Africa, using reference stations (RIMS) connected to the Central Processing Facility located in Europe (Norway) through AFISNET. It concluded that though no operational impact was foreseen, coordination would be required between the concerned partners (ASECNA, ESA) during the migration phase, depending on the earth stations involved in these trials.

2.14 The meeting therefore adopted the following conclusion:

<p>Conclusion RPM IS 10-02 - 5</p>	<p>CONTINGENCY PLANNING</p> <p>That States and organizations concerned:</p> <ul style="list-style-type: none"> a) prepare a list of alternate means of communications (such as available VSAT, satellite telephone, PSTN, HF, Internet, SITA, etc) for use by their ATS/COM centres during the transition to IS 10-02@359°E; b) consider the appropriateness of implementing ATS contingency plans as required; and c) develop a comprehensive aeronautical information (AIC, NOTAM) on their established contingency measures for the timely information of air navigation users.
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Coordination

2.15 Close coordination will be maintained with INTELSAT and between stations for the planning and conduct of link set up trials, well in advance. Channels setting parameters will also have to be reviewed for all stations and adjusted accordingly.

Agenda Item 3: Transition plan and timescales

3.1 The meeting was informed that Satellite IS 10-02 @ 359 degrees East was scheduled to be launched by 15 June 2004 for availability by 15 August 2004, it being understood that ATS transition will occur only after IS 10-02 replaces IS 707. Requirements such as frequency agility, capability to operate both A and B polarizations, flexibility of up and down converters (72 MHz) and presence of earth station personnel during transition were emphasized.

3.2 The meeting therefore noted the following steps in transition as proposed by INTELSAT:

- At transition:
 - *Step 1: AFISNET monitors the 1.8 MHz lease services in Transponder 86/86 of 359°E satellite.* No frequency or polarization changes are required but adjustment to power levels of some carriers may be necessary.
- After IS 10-02 replaces IS 707:
 - *Step 2: AFISNET transfers 1.8 MHz lease services from Transponder 86/86 (B-polarization) to 20/20 (A-polarization) on the 359°E satellite.* Frequency and Polarization change required.

The steps below will be performed simultaneously

- *Step 3: AFISNET network in transponder 20/20 of 325.5E.* Re-point the antennas to IS-10-02 at 359°E and reestablish services in transponder 20/20 on the 10-02 satellite. No frequency or polarization change.
- *Step 4: The IBS network in transponder 105/105 of 325.5E satellite.* Re-point the antennas to IS-10-02 at 359°E and reestablish services in transponder 20/20 on the 10-02 satellite. Frequency and Polarization change required.

3.3 The meeting also analyzed proposals from ASECNA for a step – by - step approach for its managed FIRs: Antananarivo (including adjacent FIRs in Indian Ocean), Brazzaville, Dakar, N'djamena and Niamey, based on the following assumptions:

- routing capabilities of AFS traffic available at all centres;
- disruption of ATS services limited to three (3) hours;
- availability of main AFTN circuits, during the migration process
- close coordination maintained with a clear understanding of assigned responsibilities.

3.4 ASECNA proposals are summarized at **Appendix E** to this report. The meeting noted that these proposals were based on operational considerations and therefore supported the proposed step-by-step approach. Moreover, it recommended that coordination be carried out between FIR managers for the transition plan to be further refined by including Accra, Kano and Roberts FIRs.

3.5 The following conclusion was formulated:

Conclusion RPM IS 10-02 - 6	TRANSITION PLAN AND TIMESCALES That States/Organizations concerned: <ul style="list-style-type: none"> a) finalize a coordinated transition plan in close coordination with INTELSAT no later than 30 April 2004, based on ASECNA proposed step-by-step approach outlined at Appendix, and taking into consideration the key dates of 15 June 2004 (launch of IS 10-02) and 15 August 2004 (IS 10-02 start of service); and b) note that INTELSAT has confirmed that the maximum overlap time for the usage of two satellites during the transition is 30 days, following which no service will be provided in the previous satellites/capacity.
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3.6 It was mentioned that at the preparatory meeting held in Dakar from 9 to 10 March 2004, AFISNET Satellite Network Management Committee opted to resort to Industry's expertise for the migration of all AFISNET stations to INTELSAT satellite 10-02@359°East, through a limited call for tenders.

Agenda Item 4: Transition management**Coordination**

4.1 The meeting agreed that coordination will be of essence in the transition process between all parties concerned (INTELSAT, network managers) at both management and technical levels, and recommended that migration teams be established and focal points of contact be designated to monitor and to ensure that the necessary steps are timely and properly addressed during the transition process. The following conclusion was formulated:

Conclusion RPM IS 10-02 - 7	<p>COORDINATION OF THE MIGRATION TO IS 10-02</p> <p>That States/Organizations concerned and INTELSAT:</p> <p>a) Establish their migration teams and designate their focal points of contact for an efficient coordination of migration issues. The focal points of contact will particularly be responsible for monitoring and ensuring that the necessary steps, including training of earth station personnel are followed before and during the migration, for an efficient and smooth transition to IS 10-02;</p> <p>b) Exchange through ICAO Regional Office the following information concerning their administrations/organizations no later than 30 April 2004:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Management level</th> <th style="text-align: center;">Technical level (For each earth station)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1. Name of the Administration/Organization</td> <td style="text-align: center;">1. Name of the Administration/Organization</td> </tr> <tr> <td></td> <td style="text-align: center;">2. Name of the earth station</td> </tr> <tr> <td style="text-align: center;">2. Contact person full name</td> <td style="text-align: center;">3. Designated focal point full name</td> </tr> <tr> <td style="text-align: center;">3. Telephone numbers</td> <td style="text-align: center;">4. Telephone numbers : earths stations, office and mobile telephones</td> </tr> <tr> <td style="text-align: center;">4. Fax number</td> <td style="text-align: center;">5. Fax number</td> </tr> <tr> <td style="text-align: center;">5. Electronic mail address</td> <td style="text-align: center;">6. Electronic mail address</td> </tr> </tbody> </table> <p>Note: The contact list to be compiled by ICAO should include INTELSAT Operational Centres.</p>	Management level	Technical level (For each earth station)	1. Name of the Administration/Organization	1. Name of the Administration/Organization		2. Name of the earth station	2. Contact person full name	3. Designated focal point full name	3. Telephone numbers	4. Telephone numbers : earths stations, office and mobile telephones	4. Fax number	5. Fax number	5. Electronic mail address	6. Electronic mail address
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Aeronautical information

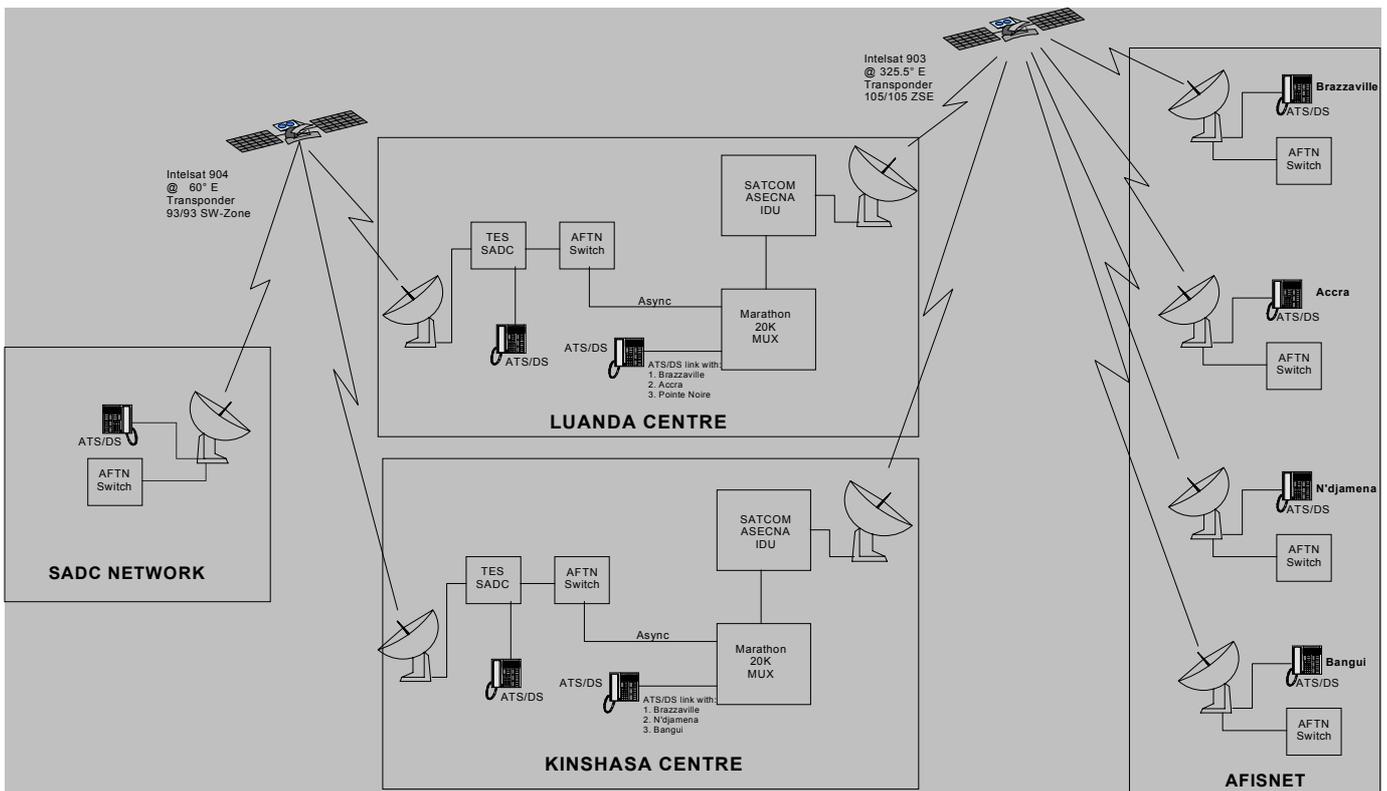
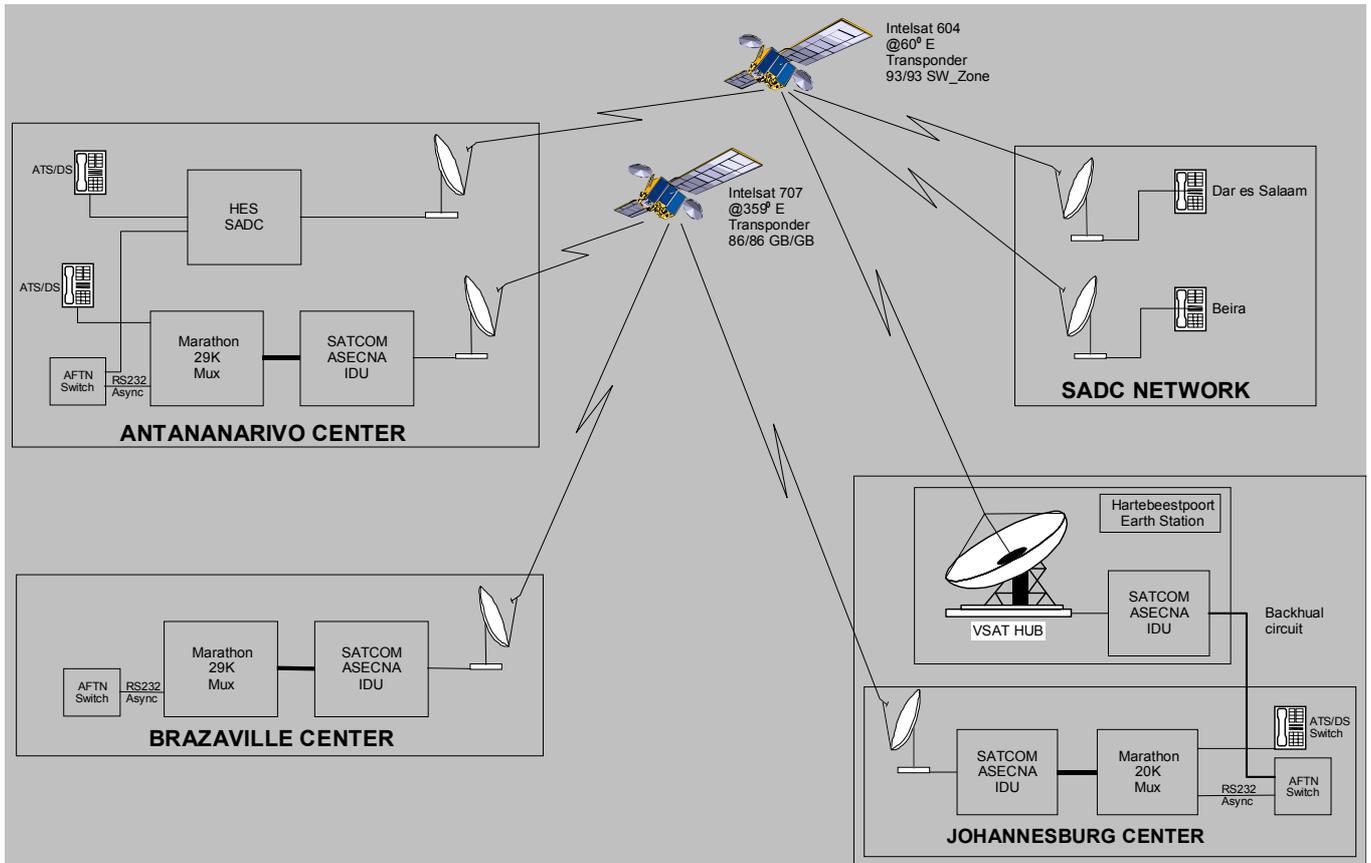
4.2 The meeting emphasized on the need for users to be adequately informed of the migration process and its foreseen impact on air navigation services and facilities.

LIST OF PARTICIPANTS

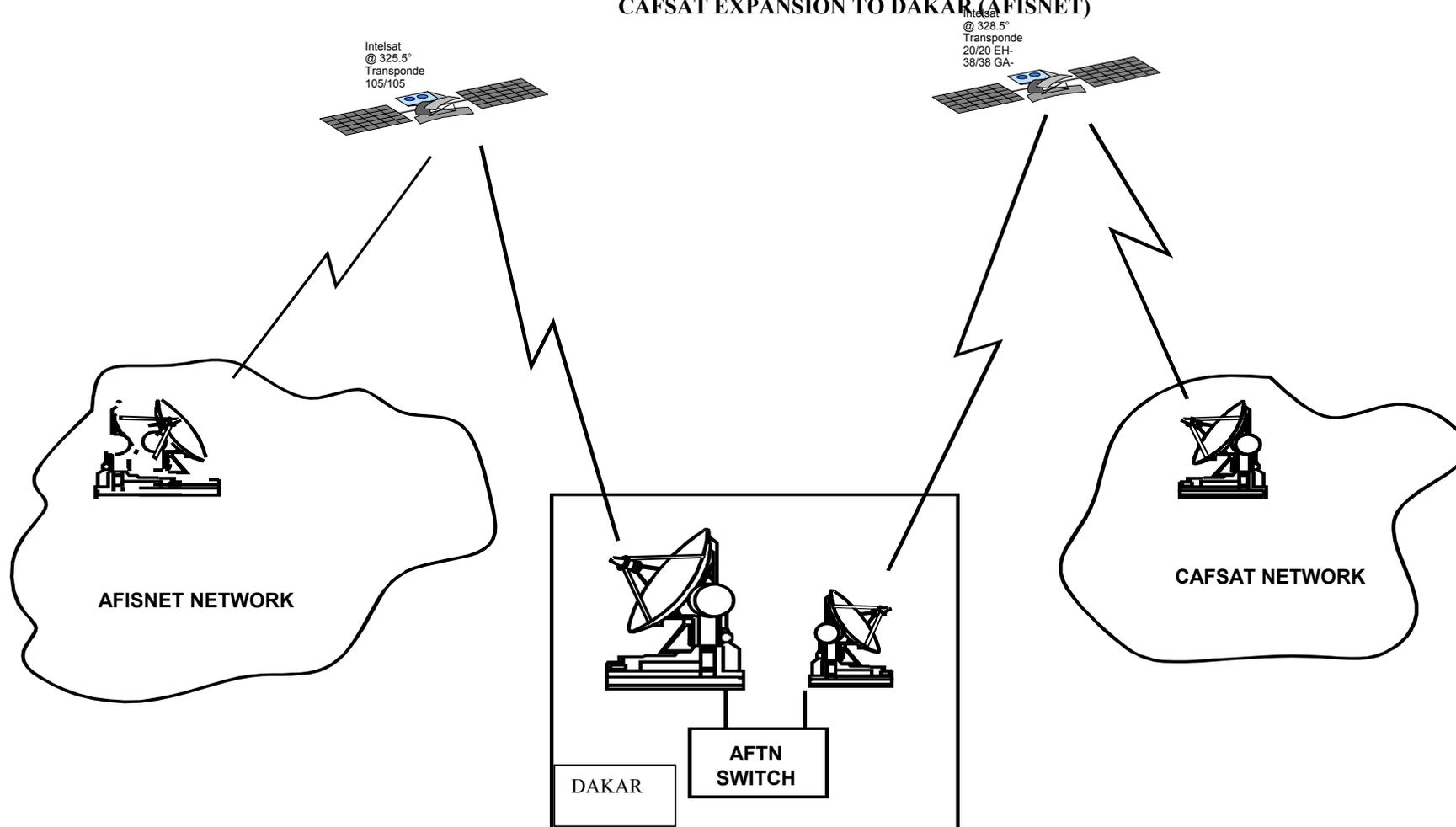
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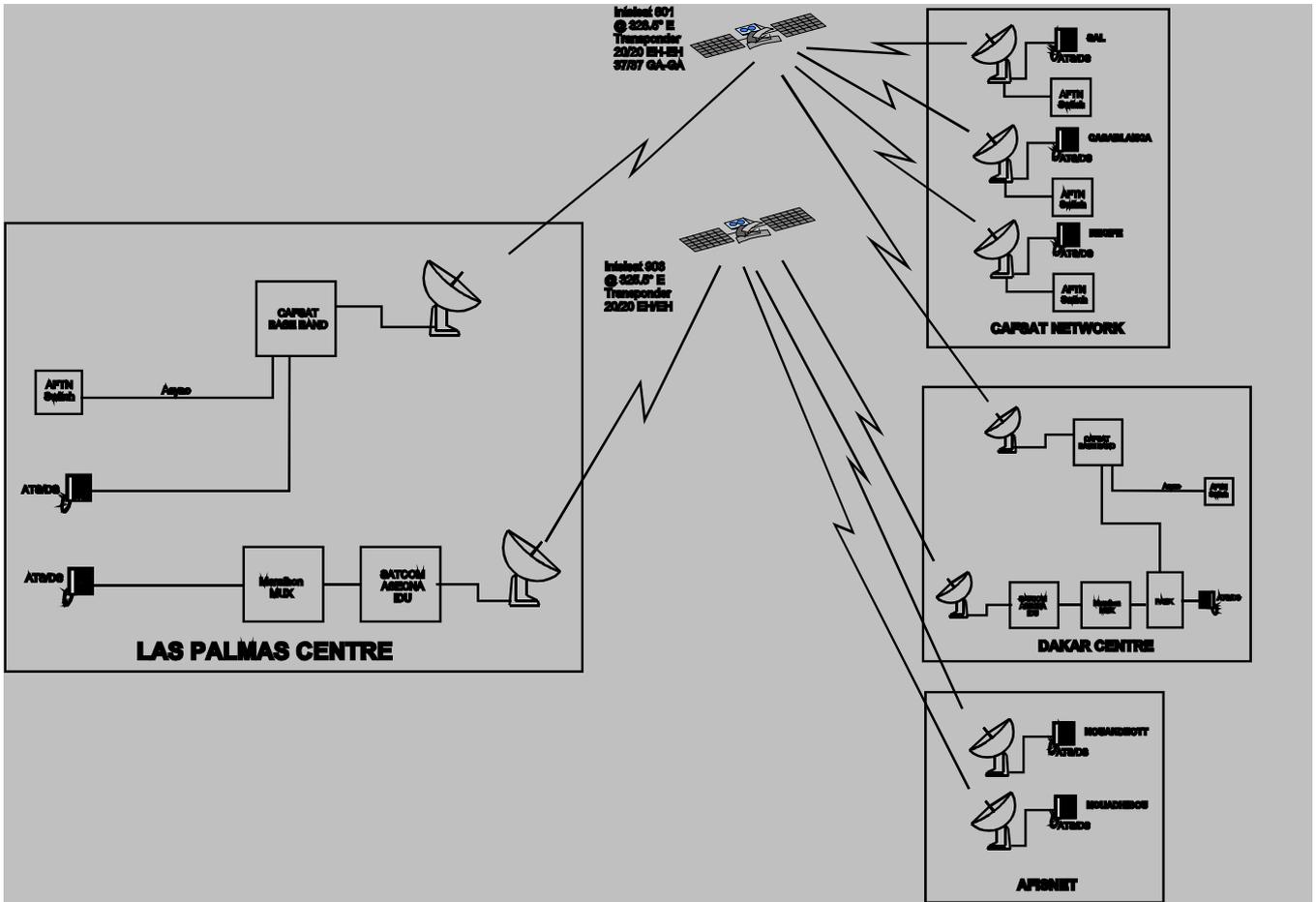
AFISNET/SADC INTERCONNECTION IN INDIAN OCEAN AND CENTRAL AFRICA



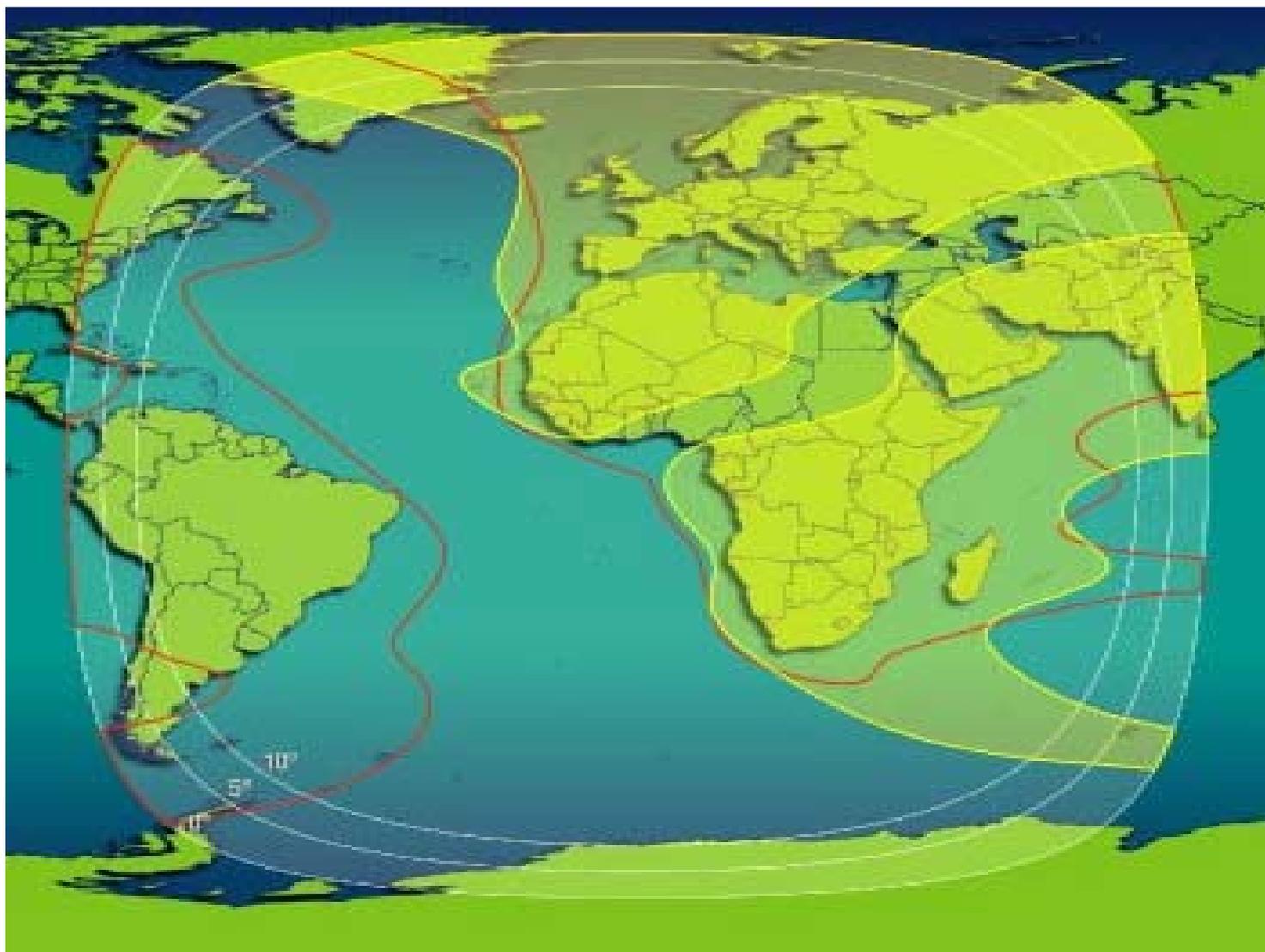
CAFSAT EXPANSION TO DAKAR (AFISNET)



AFISNET/CAFSAT FULL INTERCONNECTION



IS 10-02 @ 359 ° EAST : COVERAGE MAP



FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS [10-02@359](#) DEGREES EAST**AFISNET IBS Services**

The IBS currently allocated in transponder 105/105/SE/SE of 325.5°E will relocate to transponder 20/20/EHA/EHA of 10-02 satellite.

TX E/S	CXR	RX E/S	FROM 325.5°E	TX. FREQ	RX. FREQ.	TO: 1002	TX FREQ.	RX. FREQ.
LNG-01F1	0,064	CNK-03F1	105/105/SE/SE	6274,42	4049,42	20/20/EH/EH	5875,06	3650,06
CNK-03F1	0,064	LNG-01F1	105/105/SE/SE	6274,533	4049,533	20/20/EH/EH	5875,1725	3650,1725
CNK-03F1	0,064	RFI-01F1	105/105/SE/SE	6274,645	4049,645	20/20/EH/EH	5875,285	3650,285
RFI-01F1	0,064	CNK-03F1	105/105/SE/SE	6274,758	4049,758	20/20/EH/EH	5875,3975	3650,3975
AIJ-05F2	0,064	CNK-03F1	105/105/SE/SE	6274,87	4049,87	20/20/EH/EH	5875,51	3650,51
DKR-01B	0,064	CNK-03F1	105/105/SE/SE	6274,983	4049,983	20/20/EH/EH	5875,6225	3650,6225
DKR-01B	0,064	NDJ-01F2 + BRZ-01F2	105/105/SE/SE	6275,073	4050,073	20/20/EH/EH	5875,7125	3650,7125
DKR-01B	0,064	AIJ-05F2	105/105/SE/SE	6275,14	4050,14	20/20/EH/EH	5875,78	3650,78
DKR-01B	0,064	NIA-02F2 + LIB-02F2	105/105/SE/SE	6275,208	4050,208	20/20/EH/EH	5875,8475	3650,8475
BAN-01F2	0,064	NIA-02F2 + BRZ-01F2	105/105/SE/SE	6275,275	4050,275	20/20/EH/EH	5875,915	3650,915
DAL-02F2	0,064	LIB-02F2 +NDJ-01F2	105/105/SE/SE	6275,343	4050,343	20/20/EH/EH	5875,9825	3650,9825
NDJ-01F2	0,064	NIA-02F2 + DAL-02F2	105/105/SE/SE	6275,41	4050,41	20/20/EH/EH	5876,05	3651,05
NIA-02F2	0,064	NDJ-01F2 + BAN-01F2	105/105/SE/SE	6275,478	4050,478	20/20/EH/EH	5876,1175	3651,1175
KAN-02B	0,064	BRZ-01F2 + LIB-02F2	105/105/SE/SE	6275,545	4050,545	20/20/EH/EH	5876,185	3651,185
KAN-02B	0,064	DAL-02F2 +NDJ-01F2	105/105/SE/SE	6275,613	4050,613	20/20/EH/EH	5876,2525	3651,2525
KAN-02B	0,064	NIA-04F2 + ACA-02F2	105/105/SE/SE	6275,68	4050,68	20/20/EH/EH	5876,32	3651,32
KAN-02B	0,064	ABJ-03F2	105/105/SE/SE	6275,748	4050,748	20/20/EH/EH	5876,3875	3651,3875
KAN-02B	0,064	JOS-02F3	105/105/SE/SE	6275,815	4050,815	20/20/EH/EH	5876,455	3651,455
KAN-02B	0,064	MDG-02F2	105/105/SE/SE	6275,883	4050,883	20/20/EH/EH	5876,5225	3651,5225
LAG-02B	0,064	LIB-02F2 + ACA-02F2	105/105/SE/SE	6276,018	4051,018	20/20/EH/EH	5876,6575	3651,6575
LAG-02B	0,064	DAL-02F2	105/105/SE/SE	6276,085	4051,085	20/20/EH/EH	5876,725	3651,725
LAG-02B	0,064	ADJ-01F1	105/105/SE/SE	6276,153	4051,153	20/20/EH/EH	5876,7925	3651,7925
LAG-02B	0,064	ILO-02F2	105/105/SE/SE	6276,22	4051,22	20/20/EH/EH	5876,86	3651,86
LAG-02B	0,064	PHC-02F2	105/105/SE/SE	6276,288	4051,288	20/20/EH/EH	5876,9275	3651,9275
ACA-02F2	0,064	LIB-02F2 + NIA-04F1	105/105/SE/SE	6276,355	4051,355	20/20/EH/EH	5876,995	3651,995
DAL-02F2	0,064	NDJ-01F2 + LIB-02F2	105/105/SE/SE	6276,423	4051,423	20/20/EH/EH	5877,0625	3652,0625
DAL-02F2	0,064	BRZ-01F2 + LIB-02F2	105/105/SE/SE	6276,49	4051,49	20/20/EH/EH	5877,13	3652,13
LIB-02F2	0,064	BRZ-01F2 + ACA-02F2	105/105/SE/SE	6276,558	4051,558	20/20/EH/EH	5877,1975	3652,1975
LIB-02F2	0,064	DAL-02F2 + LIB-02F2	105/105/SE/SE	6276,625	4051,625	20/20/EH/EH	5877,265	3652,265

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS [10-02@359](#) DEGREES EAST

CAFSAT IBS Services

From 328°E Satellite, 20/20

TX E/S	CXR	RX E/S	FROM 328°E	TX. FREQ	RX. FREQ.	TO: 1002	TX FREQ.	RX. FREQ.
EPG-01F1	0,064	CAF-01F1	20/20/EH/EH	5925,325	3700,325	86/86/GB/GB	6322,07	4097,07
DKR-04F1	0,128	CAF-01F1	20/20/EH/EH	5925,685	3700,685	86/86/GB/GB	6322,43	4097,43
CAF-01F1	0,128	EPG-01F1	20/20/EH/EH	5926,09	3701,09	86/86/GB/GB	6322,6325	4097,6325
SMI-03F1	0,128	CAF-01F1	20/20/EH/EH	5925,1	3700,1	86/86/GB/GB	6321,9125	4096,9125
NLV-02F1	0,128	CAF-01F1	20/20/EH/EH	5924,8975	3699,8975	86/86/GB/GB	6321,71	4096,71
RAB-04F1	0,128	CAF-01F1	20/20/EH/EH	5925,4825	3700,4825	86/86/GB/GB	6322,2275	4097,2275

From 328°E Satellite, 37/37

TX E/S	CXR	RX E/S	FROM 328°E	TX. FREQ	RX. FREQ.	TO: 1002	TX FREQ.	RX. FREQ.
JHN-05F1	0,192	CAF-01F1 + DKR-04F1	37/37/GA/GA	6377,505	4152,505	86/86/GB/GB	6322,9025	4097,9025
DKR-04F1	0,064	JHN-05F1+CAF-01F1	37/37/GA/GA	6377,7075	4152,7075	86/86/GB/GB	6323,105	4098,105
CAF-01F1	0,064	JHN-05F1+DKR-04F1	37/37/GA/GA	6377,82	4152,82	86/86/GB/GB	6323,2175	4098,2175
RCF-01F1	0,064	JHN-05F1+ DKR-04F1 +CAF-01F1	37/37/GA/GA	6377,9325	4152,9325	86/86/GB/GB	6323,33	4098,33

AFISNET 1.8MHz Lease-6942

The service will move from transponder 86/86/GB/GB of 707 to transponder 20/20/EHA/EHA of 10-02 satellite.

TX E/S	CXR	RX E/S	FROM 359°E	TX. FREQ	RX. FREQ.	TO: 1002	TX FREQ.	RX. FREQ.
ANV-03B	0,019	6942-003	86/86/GB/GB	6321,64	4096,64	20/20/EH/EH	5872,04	3647,04
BRZ-01F2	0,019	ANV-03B	86/86/GB/GB	6321,68	4096,68	20/20/EH/EH	5872,08	3647,08
6942-005	0,019	ANV-03B	86/86/GB/GB	6321,72	4096,72	20/20/EH/EH	5872,12	3647,12
ANV-03B	0,019	6942-004	86/86/GB/GB	6321,75	4096,76	20/20/EH/EH	5872,16	3647,16
DKR-02F1	0,064	ANV-03B	86/86/GB/GB	6321,85	4096,85	20/20/EH/EH	5872,25	3647,25
ANV-03B	0,064	DKR-02F1	86/86/GB/GB	6321,95	4096,95	20/20/EH/EH	5872,35	3647,35
ANV-03B	0,019	6942-001	86/86/GB/GB	6322,06	4097,06	20/20/EH/EH	5872,46	3647,46
ANV-03B	0,019	6942-002	86/86/GB/GB	6322,1	4097,1	20/20/EH/EH	5872,5	3647,5
BRZ-01F2	0,019	JHN-04F1	86/86/GB/GB	6322,14	4097,14	20/20/EH/EH	5872,54	3647,54
JHN-04F1	0,019	BRZ-01F2	86/86/GB/GB	6322,18	4097,18	20/20/EH/EH	5872,58	3647,58
ANV-03B	0,019	6942-005	86/86/GB/GB	6322,22	4097,22	20/20/EH/EH	5872,62	3647,62
6943-005	0,019	ANV-03B	86/86/GB/GB	6322,26	4097,26	20/20/EH/EH	5872,66	3647,66

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS 10-02@359 DEGREES EAST								
AFISNET 9.4 MHz Lease-6943								
<i>The services will move from transponder 20/20 of 325.5°E to transponder 20/20/EHA/EHA</i>								
<i>TX E/S</i>	<i>CXR</i>	<i>RX E/S</i>	<i>FROM 325.5°E</i>	<i>TX. FREQ</i>	<i>RX. FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ.</i>	<i>RX. FREQ.</i>
DKR-01B	0,019	6943-010	20/20/EH/EH	5884,0169	3659,0169	20/20/EH/EH	5884,0169	3659,0169
DKR-01B	0,019	6943-021	20/20/EH/EH	5884,0507	3659,0507	20/20/EH/EH	5884,0507	3659,0507
DKR-01B	0,019	6943-004	20/20/EH/EH	5884,0845	3659,0845	20/20/EH/EH	5884,0845	3659,0845
DKR-01B	0,019	6943-005	20/20/EH/EH	5884,1183	3659,1183	20/20/EH/EH	5884,1183	3659,1183
DKR-01B	0,019	6943-010	20/20/EH/EH	5884,1521	3659,1521	20/20/EH/EH	5884,1521	3659,1521
DKR-01B	0,019	6943-023	20/20/EH/EH	5884,1859	3659,1859	20/20/EH/EH	5884,1859	3659,1859
DKR-01B	0,019	6943-008	20/20/EH/EH	5884,2197	3659,2197	20/20/EH/EH	5884,2197	3659,2197
DKR-01B	0,019	6943-009	20/20/EH/EH	5884,2535	3659,2535	20/20/EH/EH	5884,2535	3659,2535
DKR-01B	0,019	TAC-01F1	20/20/EH/EH	5884,2873	3659,2873	20/20/EH/EH	5884,2873	3659,2873
DKR-01B	0,019	6943-011	20/20/EH/EH	5884,3211	3659,3211	20/20/EH/EH	5884,3211	3659,3211
6943-010	0,019	DKR-01B	20/20/EH/EH	5884,3549	3659,3549	20/20/EH/EH	5884,3549	3659,3549
6943-021	0,019	DKR-01B	20/20/EH/EH	5884,3887	3659,3887	20/20/EH/EH	5884,3887	3659,3887
6943-004	0,019	DKR-01B	20/20/EH/EH	5884,4225	3659,4225	20/20/EH/EH	5884,4225	3659,4225
6943-005	0,019	DKR-01B	20/20/EH/EH	5884,4563	3659,4563	20/20/EH/EH	5884,4563	3659,4563
6943-006	0,019	DKR-01B	20/20/EH/EH	5884,4901	3659,4901	20/20/EH/EH	5884,4901	3659,4901
6943-023	0,019	DKR-01B	20/20/EH/EH	5884,5239	3659,5239	20/20/EH/EH	5884,5239	3659,5239
6943-008	0,019	DKR-01B	20/20/EH/EH	5884,5577	3659,5577	20/20/EH/EH	5884,5577	3659,5577
6943-009	0,019	DKR-01B	20/20/EH/EH	5884,5915	3659,5915	20/20/EH/EH	5884,5915	3659,5915
TAC-01F1	0,019	DKR-01B	20/20/EH/EH	5884,6253	3659,6253	20/20/EH/EH	5884,6253	3659,6253
6943-011	0,019	DKR-01B	20/20/EH/EH	5884,6591	3659,6591	20/20/EH/EH	5884,6591	3659,6591
DKR-01B	0,016	TAC-01F1	20/20/EH/EH	5884,6907	3659,6907	20/20/EH/EH	5884,6907	3659,6907
DKR-01B	0,016	6943-003	20/20/EH/EH	5884,72	3659,72	20/20/EH/EH	5884,72	3659,72
DKR-01B	0,016	6943-004	20/20/EH/EH	5884,7493	3659,7493	20/20/EH/EH	5884,7493	3659,7493
DKR-01B	0,016	6943-008	20/20/EH/EH	5884,7786	3659,7786	20/20/EH/EH	5884,7786	3659,7786
DKR-01B	0,016	6943-006	20/20/EH/EH	5884,8079	3659,8079	20/20/EH/EH	5884,8079	3659,8079
6943-008	0,016	6943-022	20/20/EH/EH	5884,8372	3659,8372	20/20/EH/EH	5884,8372	3659,8372
6943-003	0,016	6943-005	20/20/EH/EH	5884,8665	3659,8665	20/20/EH/EH	5884,8665	3659,8665
TAC-01F1	0,016	DKR-01B	20/20/EH/EH	5884,8958	3659,8958	20/20/EH/EH	5884,8958	3659,8958
6943-003	0,016	DKR-01B	20/20/EH/EH	5884,9251	3659,9251	20/20/EH/EH	5884,9251	3659,9251

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS 10-02@359 DEGREES EAST								
<i>TX E/S</i>	<i>CXR</i>	<i>RX E/S</i>	<i>FROM 325.5°E</i>	<i>TX. FREQ</i>	<i>RX. FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ.</i>	<i>RX. FREQ.</i>
6943-004	0,016	DKR-01B	20/20/EH/EH	5884,9544	3659,9544	20/20/EH/EH	5884,9544	3659,9544
6943-008	0,016	DKR-01B	20/20/EH/EH	5884,9837	3659,9837	20/20/EH/EH	5884,9837	3659,9837
6943-006	0,016	DKR-01B	20/20/EH/EH	5885,013	3660,013	20/20/EH/EH	5885,013	3660,013
6943-010	0,016	DKR-01B	20/20/EH/EH	5885,0423	3660,0423	20/20/EH/EH	5885,0423	3660,0423
6943-005	0,016	6943-003	20/20/EH/EH	5885,0716	3660,0716	20/20/EH/EH	5885,0716	3660,0716
BRZ-01F2	0,019	6943-001	20/20/EH/EH	5885,1031	3660,1031	20/20/EH/EH	5885,1031	3660,1031
BRZ-01F2	0,019	6943-002	20/20/EH/EH	5885,1369	3660,1369	20/20/EH/EH	5885,1369	3660,1369
NDJ-01F2	0,019	6943-012	20/20/EH/EH	5885,1707	3660,1707	20/20/EH/EH	5885,1707	3660,1707
NDJ-01F2	0,019	6943-013	20/20/EH/EH	5885,2045	3660,2045	20/20/EH/EH	5885,2045	3660,2045
6943-001	0,019	BRZ-01F2	20/20/EH/EH	5885,2383	3660,2383	20/20/EH/EH	5885,2383	3660,2383
6943-024	0,019	NDJ-01F2	20/20/EH/EH	5885,268	3660,268	20/20/EH/EH	5885,268	3660,268
6943-002	0,019	BRZ-01F2	20/20/EH/EH	5885,2721	3660,2721	20/20/EH/EH	5885,2721	3660,2721
6943-012	0,019	NDJ-01F2	20/20/EH/EH	5885,3059	3660,3059	20/20/EH/EH	5885,3059	3660,3059
6943-013	0,019	NDJ-01F2	20/20/EH/EH	5885,3397	3660,3397	20/20/EH/EH	5885,3397	3660,3397
BRZ-01F2	0,016	6943-001	20/20/EH/EH	5885,3713	3660,3713	20/20/EH/EH	5885,3713	3660,3713
BRZ-01F2	0,016	6943-002	20/20/EH/EH	5885,4006	3660,4006	20/20/EH/EH	5885,4006	3660,4006
NDJ-01F2	0,016	6943-012	20/20/EH/EH	5885,4299	3660,4299	20/20/EH/EH	5885,4299	3660,4299
NDJ-01F2	0,016	6943-013	20/20/EH/EH	5885,4592	3660,4592	20/20/EH/EH	5885,4592	3660,4592
6943-001	0,016	BRZ-01F2	20/20/EH/EH	5885,4885	3660,4885	20/20/EH/EH	5885,4885	3660,4885
6943-002	0,016	BRZ-01F2	20/20/EH/EH	5885,5178	3660,5178	20/20/EH/EH	5885,5178	3660,5178
6943-012	0,016	NDJ-01F2	20/20/EH/EH	5885,5471	3660,5471	20/20/EH/EH	5885,5471	3660,5471
6943-013	0,016	NDJ-01F2	20/20/EH/EH	5885,5764	3660,5764	20/20/EH/EH	5885,5764	3660,5764
NIA-02F2	0,019	6943-008	20/20/EH/EH	5885,6079	3660,6079	20/20/EH/EH	5885,6079	3660,6079
NIA-02F2	0,019	6943-006	20/20/EH/EH	5885,6417	3660,6417	20/20/EH/EH	5885,6417	3660,6417
NIA-02F2	0,019	6943-009	20/20/EH/EH	5885,6755	3660,6755	20/20/EH/EH	5885,6755	3660,6755
NIA-02F2	0,019	6943-011	20/20/EH/EH	5885,7093	3660,7093	20/20/EH/EH	5885,7093	3660,7093
NIA-02F2	0,019	6943-007	20/20/EH/EH	5885,7431	3660,7431	20/20/EH/EH	5885,7431	3660,7431
6943-008	0,019	NIA-02F2	20/20/EH/EH	5885,7769	3660,7769	20/20/EH/EH	5885,7769	3660,7769
6943-006	0,019	NIA-02F2	20/20/EH/EH	5885,8107	3660,8107	20/20/EH/EH	5885,8107	3660,8107
6943-009	0,019	NIA-02F2	20/20/EH/EH	5885,8445	3660,8445	20/20/EH/EH	5885,8445	3660,8445
6943-011	0,019	NIA-02F2	20/20/EH/EH	5885,8783	3660,8783	20/20/EH/EH	5885,8783	3660,8783
6943-007	0,019	NIA-02F2	20/20/EH/EH	5885,9121	3660,9121	20/20/EH/EH	5885,9121	3660,9121

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS 10-02@359 DEGREES EAST								
<i>TX E/S</i>	<i>CXR</i>	<i>RX E/S</i>	<i>FROM 325.5°E</i>	<i>TX. FREQ</i>	<i>RX. FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ.</i>	<i>RX. FREQ.</i>
NIA-02F2	0,016	6943-008	20/20/EH/EH	5885,9437	3660,9437	20/20/EH/EH	5885,9437	3660,9437
NIA-02F2	0,016	6943-006	20/20/EH/EH	5885,973	3660,973	20/20/EH/EH	5885,973	3660,973
NIA-02F2	0,016	6943-017	20/20/EH/EH	5886,0023	3661,0023	20/20/EH/EH	5886,0023	3661,0023
DKR-01B	0,016	6943-010	20/20/EH/EH	5886,0316	3661,0316	20/20/EH/EH	5886,0316	3661,0316
6943-007	0,016	6943-003	20/20/EH/EH	5886,0609	3661,0609	20/20/EH/EH	5886,0609	3661,0609
6943-008	0,016	NIA-02F2	20/20/EH/EH	5886,0902	3661,0902	20/20/EH/EH	5886,0902	3661,0902
6943-018	0,016	NIA-02F2	20/20/EH/EH	5886,1195	3661,1195	20/20/EH/EH	5886,1195	3661,1195
DKR-01B	0,019	DAL-02F2	20/20/EH/EH	5886,1567	3661,1567	20/20/EH/EH	5886,1567	3661,1567
DAL-02F2	0,019	DKR-01B	20/20/EH/EH	5886,1905	3661,1905	20/20/EH/EH	5886,1905	3661,1905
6943-014	0,019	NDJ-01F2	20/20/EH/EH	5886,2243	3661,2243	20/20/EH/EH	5886,2243	3661,2243
NDJ-01F2	0,019	6943-014	20/20/EH/EH	5886,2581	3661,2581	20/20/EH/EH	5886,2581	3661,2581
6943-007	0,016	NDJ-01F2	20/20/EH/EH	5886,2897	3661,2897	20/20/EH/EH	5886,2897	3661,2897
NDJ-01F2	0,016	6943-007	20/20/EH/EH	5886,319	3661,319	20/20/EH/EH	5886,319	3661,319
6943-015	0,019	BRZ-01F2	20/20/EH/EH	5886,3505	3661,3505	20/20/EH/EH	5886,3505	3661,3505
BRZ-01F2	0,019	6943-015	20/20/EH/EH	5886,3843	3661,3843	20/20/EH/EH	5886,3843	3661,3843
6943-015	0,016	BRZ-01F2	20/20/EH/EH	5886,4159	3661,4159	20/20/EH/EH	5886,4159	3661,4159
BRZ-01F2	0,016	6943-015	20/20/EH/EH	5886,4452	3661,4452	20/20/EH/EH	5886,4452	3661,4452
DKR-01B	0,019	6943-001	20/20/EH/EH	5886,4767	3661,4767	20/20/EH/EH	5886,4767	3661,4767
6943-001	0,019	DKR-01B	20/20/EH/EH	5886,5105	3661,5105	20/20/EH/EH	5886,5105	3661,5105
DKR-01B	0,016	6943-001	20/20/EH/EH	5886,5421	3661,5421	20/20/EH/EH	5886,5421	3661,5421
6943-001	0,016	DKR-01B	20/20/EH/EH	5886,5714	3661,5714	20/20/EH/EH	5886,5714	3661,5714
NIA-02F2	0,016	6943-017	20/20/EH/EH	5886,6007	3661,6007	20/20/EH/EH	5886,6007	3661,6007
NIA-02F2	0,016	6943-019	20/20/EH/EH	5886,63	3661,63	20/20/EH/EH	5886,63	3661,63
NIA-02F2	0,016	6943-017	20/20/EH/EH	5886,6593	3661,6593	20/20/EH/EH	5886,6593	3661,6593
6943-017	0,016	NIA-02F2	20/20/EH/EH	5886,6886	3661,6886	20/20/EH/EH	5886,6886	3661,6886
6943-019	0,016	NIA-02F2	20/20/EH/EH	5886,7179	3661,7179	20/20/EH/EH	5886,7179	3661,7179
6943-017	0,016	NIA-02F2	20/20/EH/EH	5886,7472	3661,7472	20/20/EH/EH	5886,7472	3661,7472
NDJ-01F2	0,016	6943-019	20/20/EH/EH	5886,7765	3661,7765	20/20/EH/EH	5886,7765	3661,7765
NDJ-01F2	0,016	6943-020	20/20/EH/EH	5886,8058	3661,8058	20/20/EH/EH	5886,8058	3661,8058
6943-019	0,016	NDJ-01F2	20/20/EH/EH	5886,8351	3661,8351	20/20/EH/EH	5886,8351	3661,8351
6943-020	0,016	NDJ-01F2	20/20/EH/EH	5886,8644	3661,8644	20/20/EH/EH	5886,8644	3661,8644
NIA-02F2	0,019	6943-016	20/20/EH/EH	5886,8959	3661,8959	20/20/EH/EH	5886,8959	3661,8959

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS 10-02@359 DEGREES EAST								
TX E/S	CXR	RX E/S	FROM 325.5°E	TX. FREQ	RX. FREQ.	TO: 1002	TX FREQ.	RX. FREQ.
NIA-02F2	0,019	6943-019	20/20/EH/EH	5886,9297	3661,9297	20/20/EH/EH	5886,9297	3661,9297
NIA-02F2	0,019	6943-017	20/20/EH/EH	5886,9635	3661,9635	20/20/EH/EH	5886,9635	3661,9635
6943-016	0,019	NIA-02F2	20/20/EH/EH	5886,9973	3661,9973	20/20/EH/EH	5886,9973	3661,9973
6943-019	0,019	NIA-02F2	20/20/EH/EH	5887,0311	3662,0311	20/20/EH/EH	5887,0311	3662,0311
6943-017	0,019	NIA-02F2	20/20/EH/EH	5887,0649	3662,0649	20/20/EH/EH	5887,0649	3662,0649
NDJ-01F2	0,019	6943-019	20/20/EH/EH	5887,0987	3662,0987	20/20/EH/EH	5887,0987	3662,0987
NDJ-01F2	0,019	6943-020	20/20/EH/EH	5887,1325	3662,1325	20/20/EH/EH	5887,1325	3662,1325
6943-019	0,019	NDJ-01F2	20/20/EH/EH	5887,1663	3662,1663	20/20/EH/EH	5887,1663	3662,1663
6943-020	0,019	NDJ-01F2	20/20/EH/EH	5887,2001	3662,2001	20/20/EH/EH	5887,2001	3662,2001
6943-023	0,019	DKR-01B	20/20/EH/EH	5887,2355	3662,2355	20/20/EH/EH	5887,2355	3662,2355
6943-021	0,019	DKR-01B	20/20/EH/EH	5887,2709	3662,2709	20/20/EH/EH	5887,2709	3662,2709
6943-021	0,019	DKR-01B	20/20/EH/EH	5887,3063	3662,3063	20/20/EH/EH	5887,3063	3662,3063
6943-005	0,016	DKR-01B	20/20/EH/EH	5887,3405	3662,3405	20/20/EH/EH	5887,3405	3662,3405
6943-003	0,064	DKR-01B	20/20/EH/EH	5887,407	3662,407	20/20/EH/EH	5887,407	3662,407
6943-014	0,064	NDJ-01F2	20/20/EH/EH	5887,507	3662,507	20/20/EH/EH	5887,507	3662,507
DKR-01B	0,064	6943-003	20/20/EH/EH	5887,607	3662,607	20/20/EH/EH	5887,607	3662,607
NDJ-01F2	0,064	6943-014	20/20/EH/EH	5887,707	3662,707	20/20/EH/EH	5887,707	3662,707
DKR-01B	0,019	6943-023	20/20/EH/EH	5887,7748	3662,7748	20/20/EH/EH	5887,7748	3662,7748
DKR-01B	0,019	6943-021	20/20/EH/EH	5887,8102	3662,8102	20/20/EH/EH	5887,8102	3662,8102
DKR-01B	0,019	6943-021	20/20/EH/EH	5887,8456	3662,8456	20/20/EH/EH	5887,8456	3662,8456
6943-003	0,019	6943-021	20/20/EH/EH	5887,881	3662,881	20/20/EH/EH	5887,881	3662,881
6943-003	0,01	6943-021	20/20/EH/EH	5887,9164	3662,9164	20/20/EH/EH	5887,9164	3662,9164
6943-021	0,019	6943-003	20/20/EH/EH	5887,9518	3662,9518	20/20/EH/EH	5887,9518	3662,9518
6943-021	0,019	6943-003	20/20/EH/EH	5887,9872	3662,9872	20/20/EH/EH	5887,9872	3662,9872
6943-005	0,019	6943-003	20/20/EH/EH	5888,0226	3663,0226	20/20/EH/EH	5888,0226	3663,0226
6943-003	0,019	6943-005	20/20/EH/EH	5888,058	3663,058	20/20/EH/EH	5888,058	3663,058
DKR-01B	0,016	6943-005	20/20/EH/EH	5888,0922	3663,0922	20/20/EH/EH	5888,0922	3663,0922
6943-011	0,019	6943-024	20/20/EH/EH	5888,1264	3663,1264	20/20/EH/EH	5888,1264	3663,1264
NDJ-01F2	0,019	6943-024	20/20/EH/EH	5888,1618	3663,1618	20/20/EH/EH	5888,1618	3663,1618
DAL-02F2	0,019	6943-024	20/20/EH/EH	5888,1972	3663,1972	20/20/EH/EH	5888,1972	3663,1972
6943-024	0,019	6943-011	20/20/EH/EH	5888,2326	3663,2326	20/20/EH/EH	5888,2326	3663,2326
6943-024	0,019	NDJ-01F2	20/20/EH/EH	5888,268	3663,268	20/20/EH/EH	5888,268	3663,268

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS 10-02@359 DEGREES EAST								
<i>TX E/S</i>	<i>CXR</i>	<i>RX E/S</i>	<i>FROM 325.5°E</i>	<i>TX. FREQ</i>	<i>RX. FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ.</i>	<i>RX. FREQ.</i>
6943-024	0,019	DAL-02F2	20/20/EH/EH	5888,3034	3663,3034	20/20/EH/EH	5888,3034	3663,3034
DKR-01B	0,064	6943-024	20/20/EH/EH	5888,3734	3663,3734	20/20/EH/EH	5888,3734	3663,3734
NIA-02F2	0,064	6943-024	20/20/EH/EH	5888,4734	3663,4734	20/20/EH/EH	5888,4734	3663,4734
BRZ-01F2	0,064	6943-024	20/20/EH/EH	5888,5734	3663,5734	20/20/EH/EH	5888,5734	3663,5734
6943-024	0,064	DKR-01B	20/20/EH/EH	5888,6734	3663,6734	20/20/EH/EH	5888,6734	3663,6734
6943-024	0,064	NIA-02F2	20/20/EH/EH	5888,7734	3663,7734	20/20/EH/EH	5888,7734	3663,7734
6943-024	0,064	BRZ-01F2	20/20/EH/EH	5888,8734	3663,8734	20/20/EH/EH	5888,8734	3663,8734
SADC 21MHz Lease-2863								
<i>The serfvices will move from transponder 93/93/SW/SW of 60°E satellite to transponder 20/20/EH/EH of the 10-02 satellite</i>								
<i>TX E/S</i>	<i>CXR</i>	<i>RX E/S</i>	<i>FROM 60°E</i>	<i>TX. FREQ</i>	<i>RX. FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ.</i>	<i>RX. FREQ.</i>
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6148	3923	20/20/EH/EH	5857	3632
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6148,4	3923,4	20/20/EH/EH	5857,4	3632,4
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6148,8	3923,8	20/20/EH/EH	5857,8	3632,8
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6149,2	3924,2	20/20/EH/EH	5858,2	3633,2
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6149,6	3924,6	20/20/EH/EH	5858,6	3633,6
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6150	3925	20/20/EH/EH	5859	3634
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6150,4	3925,4	20/20/EH/EH	5859,4	3634,4
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6150,8	3925,8	20/20/EH/EH	5859,8	3634,8
2863-003	2863-003	93/93/SW/SW	0,02986	6154,605	3929,605	20/20/EH/EH	5863,605	3638,605
2863-003	2863-003	93/93/SW/SW	0,02986	6154,635	3929,635	20/20/EH/EH	5863,635	3638,635
2863-003	2863-003	93/93/SW/SW	0,02986	6154,665	3929,665	20/20/EH/EH	5863,665	3638,665
2863-003	2863-003	93/93/SW/SW	0,02986	6154,695	3929,695	20/20/EH/EH	5863,695	3638,695
2863-003	2863-003	93/93/SW/SW	0,02986	6154,725	3929,725	20/20/EH/EH	5863,725	3638,725
2863-003	2863-003	93/93/SW/SW	0,02986	6154,755	3929,755	20/20/EH/EH	5863,755	3638,755
2863-003	2863-003	93/93/SW/SW	0,02986	6154,785	3929,785	20/20/EH/EH	5863,785	3638,785
2863-003	2863-003	93/93/SW/SW	0,02986	6154,815	3929,815	20/20/EH/EH	5863,815	3638,815
2863-003	2863-003	93/93/SW/SW	0,02986	6154,845	3929,845	20/20/EH/EH	5863,845	3638,845
2863-003	2863-003	93/93/SW/SW	0,02986	6154,875	3929,875	20/20/EH/EH	5863,875	3638,875
2863-003	2863-003	93/93/SW/SW	0,02986	6154,905	3929,905	20/20/EH/EH	5863,905	3638,905
2863-003	2863-003	93/93/SW/SW	0,02986	6154,935	3929,935	20/20/EH/EH	5863,935	3638,935

FERQUENCY ASSIGNMENT PLAN FOR THE RELOCATION OF SERVICES ON SATELLITE IS 10-02@359 DEGREES EAST								
<i>TX E/S</i>	<i>CXR</i>	<i>RX E/S</i>	<i>FROM 325.5°E</i>	<i>TX. FREQ</i>	<i>RX. FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ.</i>	<i>RX. FREQ.</i>
2863-003	2863-003	93/93/SW/SW	0,02986	6154,965	3929,965	20/20/EH/EH	5863,965	3638,965
2863-003	2863-003	93/93/SW/SW	0,02986	6154,995	3929,995	20/20/EH/EH	5863,995	3638,995
2863-003	2863-003	93/93/SW/SW	0,02986	6155,025	3930,025	20/20/EH/EH	5864,025	3639,025
2863-003	2863-003	93/93/SW/SW	0,02986	6155,055	3930,055	20/20/EH/EH	5864,055	3639,055
2863-003	2863-003	93/93/SW/SW	0,02986	6155,085	3930,085	20/20/EH/EH	5864,085	3639,085
2863-003	2863-003	93/93/SW/SW	0,02986	6155,115	3930,115	20/20/EH/EH	5864,115	3639,115
2863-003	2863-003	93/93/SW/SW	0,02986	6155,145	3930,145	20/20/EH/EH	5864,145	3639,145
2863-003	2863-003	93/93/SW/SW	0,02986	6155,175	3930,175	20/20/EH/EH	5864,175	3639,175
2863-003	2863-003	93/93/SW/SW	0,02986	6155,205	3930,205	20/20/EH/EH	5864,205	3639,205
2863-003	2863-003	93/93/SW/SW	0,02986	6155,235	3930,235	20/20/EH/EH	5864,235	3639,235
2863-003	2863-003	93/93/SW/SW	0,02986	6155,265	3930,265	20/20/EH/EH	5864,265	3639,265
2863-003	2863-003	93/93/SW/SW	0,02986	6155,295	3930,295	20/20/EH/EH	5864,295	3639,295
PRE-05A	KRUG01G	93/93/SW/SW	1,4336	6160,0006	3935,0006	20/20/EH/EH	5869	3644
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6161,6	3936,6	20/20/EH/EH	5870,6	3645,6
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6162	3937	20/20/EH/EH	5871	3646
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6162,4	3937,4	20/20/EH/EH	5871,4	3646,4
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6162,8	3937,8	20/20/EH/EH	5871,8	3646,8
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6163,2	3938,2	20/20/EH/EH	5872,2	3647,2
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6163,6	3938,6	20/20/EH/EH	5872,6	3647,6
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6164	3939	20/20/EH/EH	5873	3648
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6164,4	3939,4	20/20/EH/EH	5873,4	3648,4
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6164,8	3939,8	20/20/EH/EH	5873,8	3648,8
TVRO-1	PRE-05A	93/93/SW/SW	0,3584	6165,2	3940,2	20/20/EH/EH	5874,2	3649,2

AFISNET (Nigeria)						
<i>RX E/S</i>	<i>FROM 325.50E</i>	<i>TX FREQ</i>	<i>RX FREQ.</i>	<i>TO: 1002</i>	<i>TX FREQ</i>	<i>RX FREQ</i>
BRZ-01F2+LIB-02F2	105/105/SE/SE	6275,545	4050,545	20/20/EH/EH	5875,06	3650,06
DAL-02F2+NDJ-01F2	105/105/SE/SE	6275,613	4050,613	20/20/EH/EH	5875,0825	3650,0825
NIA-04F2+ACA-02F2	105/105/SE/SE	6275,68	4050,68	20/20/EH/EH	5875,15	3650,15
ABJ-03F2	105/105/SE/SE	6275,748	4050,748	20/20/EH/EH	5875,2175	3650,2175
JOS-02F2	105/105/SE/SE	6275,815	4050,815	20/20/EH/EH	5875,285	3650,285
MDG-02F2	105/105/SE/SE	6275,883	4050,883	20/20/EH/EH	5875,3525	3650,3525
SOK-02F2	105/105/SE/SE	6275,95	4050,95	20/20/EH/EH	5875,42	3650,42
LAG-02B	105/105/SE/SE	6281,9575	4056,9575	20/20/EH/EH	5875,4875	3650,4875
LIB-02F2+ACA-02F2	105/105/SE/SE	6276,018	4051,018	20/20/EH/EH	5875,555	3650,555
DAL-02F2+NIA-02F2	105/105/SE/SE	6276,085	4051,085	20/20/EH/EH	5875,6225	3650,6225
ABJ-03F2	105/105/SE/SE	6276,153	4051,153	20/20/EH/EH	5875,69	3650,69
ILO-02F2	105/105/SE/SE	6276,22	4051,22	20/20/EH/EH	5875,7575	3650,7575
PHC-02F2	105/105/SE/SE	6276,288	4051,288	20/20/EH/EH	5875,825	3650,825
KAN-02B	105/105/SE/SE	6281,89	4056,89	20/20/EH/EH	5875,8925	3650,8925
LAG-02B	105/105/SE/SE	6281,485	4056,485	20/20/EH/EH	5875,96	3650,96
KAN-02B	105/105/SE/SE	6281,553	4056,553	20/20/EH/EH	5876,0275	3651,0275
KAN-02B	105/105/SE/SE	6281,62	4056,62	20/20/EH/EH	5876,095	3651,095
NDJ-01F2+SPARE	105/105/SE/SE	6278,02	4053,02	20/20/EH/EH	5876,1625	3651,1625
KAN-02B	105/105/SE/SE	6281,688	4056,688	20/20/EH/EH	5876,23	3651,23
LAG-02B	105/105/SE/SE	6281,755	4056,755	20/20/EH/EH	5876,2975	3651,2975
KAN-02B	105/105/SE/SE	6281,823	4056,823	20/20/EH/EH	5876,365	3651,365
LAG-02B	105/105/SE/SE	6281,4175	4056,4175	20/20/EH/EH	5876,4325	3651,4325

**ANTANANARIVO FIR
(INDIAN OCEAN)**

The first step of AFISNET migration will start on (TBD) with the transfer of services from transponder 86/86 in global to transponder 20/20 in hemispheric beam at 359°East according to Table E1 below:

Table E1

Stations	Current Satellite	Current Transponder	Current Polarisation	New satellite/ transponder	New Polarisation	Antenna re-pointing	Change of polarisation	Change of Frequency
Antananarivo Plaisance, Saint Denis, Dakar,Moroni Johannes- burg, Dzaoudzi, Brazzaville, Majunga, Toamasina, Antsiranana, Toliara	IS 707 at 359° East	86/86 in Global beam	B	IS at 359°E 20EH/20H	A	No	Yes	Yes

DAKAR FIR

Migration of AFISNET at 325.5°East will start at Dakar centre according to Table E2 below. Before the starting day of (TBD), the existing antenna (of 3.7m diameter) which is already pointed to 10-02 @359°East, will be turned to IS 903@325.5°East (Transponder 20 EHA /20 EHA).

Table E2

Affected stations	Current Satellite	Current Transponder	Current Polarisation	New satellite/transponder	New Polarisation	Antenna re-pointing	Change of polarisation	Change of Frequency
Abidjan, Accra Conakry, Dakar	IS 903 at 325.5°East	105/105 South East Zone beam	B	IS 10-0 2 at 359°E 20EH/20H	A	Yes	Yes	Yes
Dakar Nouadhibou, Nouakchott Bamako		20/20 East Hemispheric beam	A	IS 10-02 at 359°E 20EH/20H	A	Yes	No	No

BRAZZAVILLE FIR

Before the starting day of (TBD), the existing antenna (3.7m diameter) which already pointed to 10-02 @359°East, will be turned to INTELSAT satellite IS 903@325.5°East (transponder 20 EHA /20 EHA). The migration process will be carried out according to Table E3 below:

Table E3

Stations	Current Satellite	Current Transponder	Current Polarisation	New satellite/transponder	New Polarisation	Antenna re-pointing	Change of polarisation	Change of Frequency
N'Djamena, Douala, Libreville, Bangui, Toulouse, Lome	IS 903 at 325.5°East	105/105 South East Zone beam	B	IS 10-0 2 at 359°E 20EH/20H	A	Yes	Yes	Yes
Malabo, Bouar, Ouessou, Pointe-Noire		20/20 East Hemispheric beam	A	IS 10-02 at 359°E 20EH/20H	A	Yes	No	No

NIAMEY FIR

Before the starting day of (TBD) 2004, the existing antenna at EAMAC training centre (4.6 m diameter) already on AFISNET @325.5°East, will be used in dual polarisation (transponders 20/20 and 105/105). The migration process will be carried out according to Table E4 below:

Table E4

Stations	Current Satellite	Current Transponder	Current Polarisation	New satellite/transponder	New Polarisation	Antenna re-pointing	Change of polarisation	Change of Frequency
Niamey	IS 903 at 325.5° East	105/105 South East Zone beam	B	IS 10-0 2 at 359°East 20/20 EH	A	Yes	Yes	Yes
Niamey, Tessalit, Gao Agades, Zinder		20/20 East Hemispheric beam	A	IS 10-02 at 359°East 20/20 EH	A	Yes	No	No