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WORKING PAPER

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ASSEMBLY — 38TH SESSION

TECHNICAL COMMISSION

Agenda Item 34: Air Navigation — Monitoring and Analysis

SUSTAINABLE FREQUENCY SPECTRUM AVAILABILITY FOR THE OPERATION OF FIXED SATELLITE SERVICE BASED AERONAUTICAL VSAT NETWORKS IN SUPPORT OF THE GLOBAL ATM CONCEPT

(Presented by Presented by AFCAC on behalf of the 54 African States[2])

EXECUTIVE SUMMARY

This working paper presents the challenge of the C-band spectrum (3400-4200 MHz) availability for the aeronautical Very Small Aperture Terminal (VSAT) and the need for its technical and regulatory protection for the safe operation of the air navigation services in the framework of the implementation of the ICAO Aviation Systems Block Upgrades (ASBU) modules contained in the Global Air Navigation Plan (GANP, Doc 9750, 4th Edition**)**.

Action: The Assembly is invited to:

a) urge the ICAO Contracting States to support that issue during the forthcoming ITU World Radio communication Conference, as included in ICAO position on the agenda items of particular interest to civil aviation; and

b) request ICAO, in cooperation with the relevant stakeholders, to continue addressing the issue related to a suitable solution for the protection of the C-band operated by aeronautical VSAT Networks.

Strategic Objectives:	This working paper relates to all Strategic Objectives.
Financial implications:	The activities referred to herein will be undertaken through the resources available in 2014 – 2016 Regular programme budget and/or from extra budgetary contributions.

[1] English and French versions provided by AFCAC.

[2] Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Ivory Coast, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Swaziland, Togo, Tunisia, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

References:	Doc 9958, Assembly Resolution A36-25, Support of the ICAO policy on radio frequency spectrum matters Annex 10 to the Convention on International Civil Aviation 12th Air Navigation Conference, Recommendation 1/12 – Long-term very small aperture terminal spectrum availability and protection (Doc 10007); AFI RAN/6, Arusha, 1979, Recommendation 16/30- Implementation of ATS/DS circuits LIM AFI, Lome, 1988, Recommendation 8/10 –- Satellite utilization AFI RAN/7, Abuja, 1997 Recommendation 9/2 – Use of VSAT Technology SP AFI RAN/08 Recommendation 6/21 – Frequency Spectrum APIRG 17, Conclusion 17/34 – ICAO position for the ITU WRC-2012 APIRG 18, Conclusion 18/30 – Implementation of the Resolution COM6/24 (154) (WRC-12) Doc 9750, *Global Air Navigation Plan*, 4th Edition Doc 9882, *Manual on ATM Systems Requirements* Doc 9883, *Manual on global performance of Air Navigation Systems*

1. INTRODUCTION

1.1 The efficient provision of air navigation services requires the implementation and operation of communications infrastructure with high availability, reliability and integrity in order to fulfil aviation performance requirements. In the Africa and Indian Ocean region, the difficulty of fulfilling these requirements, given the extent of the airspace and weakness in communication infrastructure, led the APIRG to approve the use of fixed satellite technology) to support aeronautical communications services in the frequency band 3.4 – 4.2 GHz in accordance with LIM AFI Recommendation 10/8 and AFI RAN/7 Recommendation 9/2.

1.2 Since the 1990s, States and/or organizations in the AFI Region have developed and implemented aeronautical networks with satellite-based very small aperture terminal (VSAT) systems in this fixed satellite service (FSS) band. These VSAT networks support all aeronautical communications services including the extension of very high frequency (VHF) aeronautical air ground communication, navigation and surveillance services. In tropical regions, due to more pronounced rain attenuation at higher frequency bands, the FSS C-band (3400 – 4200 MHz) remains the only viable option for satellite links with high availability.

1.3 Today, these VSAT systems constitute a real infrastructure spanning the entire African continent and beyond and the availability of the entire 3.4 – 4.2 GHz FSS frequency band is crucial for the AFI Region to ensure the continued growth of traffic while maintaining the required level of safety in this region.

1.4 The operation of aeronautical VSAT on this frequency band (3.4 – 4.2 GHz) has been under a growing threat from emerging communication technologies competing for this spectrum. In particular, the broadband International Mobile Telecommunication (IMT) service has been identified through studies conducted by ITU Radiocommunication Bureau in this band, to be a serious cause of harmful interferences to the satellite downlink, and therefore to the provision of a stable integrated backbone Communication, Navigation and Surveillance (CNS) infrastructure to support viable air traffic management (ATM) provision in tropical regions.

2. DISCUSSION

2.1 The concerns about the challenges facing the VSAT C-band were brought to the attention of the ITU World Radio communication Conferences of 2007 (WRC-07) and 2012 with the strong support of the African Telecommunication Union (ATU) with a view to obtaining appropriate technical and regulatory measures in order to suitably ensure the protection of this band.

2.2 WRC-07 adopted Recommendation 724 recognizing that satellite communication systems operating in the fixed satellite service may be the only medium to support the requirements of the ICAO communication, navigation, surveillance and air traffic management systems, where an adequate terrestrial communication infrastructure is not available.

2.3 However, WRC-07 allocated the frequency band 3.4 – 3.6 GHz to the mobile, except aeronautical mobile, service on a primary basis in some countries, including ITU Region 1 (AFI and EUR Regions), subject to regulatory and technical restrictions (ITU Radio Regulation Footnotes No. 5.430A). The deployment of (non-aeronautical terrestrial) mobile service systems in vicinity of airports has led to an increased number of cases of interference into the FSS (VSAT) receivers.

2.4 WRC-12 adopted Resolution 154 inviting ITU-R to provide, after studies, a set of possible technical and regulatory measures in some countries in (ITU) Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information.

2.5 Furthermore, in line with Assembly Resolution A36-25, the 12th Air Navigation Conference (Doc 10007) adopted Recommendation 1/12 requesting ICAO and Contracting States not to support additional international mobile telecommunications spectrum allocations in the fixed satellite service C-band spectrum at the expense of the current or future aeronautical VSAT networks; and to pursue this matter in the International Telecommunication Union Radio Communication Sector (ITU-R) and during the next World Radio communication Conference (WRC-15), to prevent any international mobile telecommunications spectrum allocation that compromises the availability of the aeronautical VSAT networks.

2.6 Regional coordination was carried out between AFI CAAs, air navigation service providers (ANSPs) and the African Telecommunication Union (ATU) in preparation for WRC-15. As a result, the first ATU preparatory meeting to ITU WRC 15 held in Dakar Senegal, from 18 to 20 March 2013 recognized the necessity to find a suitable solution for the protection of the C-band.

2.7 In this regard, the meeting recommended ATU member States to reinforce their support to the existing and future FSS earth stations in the 3 400 - 4 200 MHz band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information by participating in the studies for possible technical and regulatory measures called upon by ITU Resolution 154 (WRC-12).

2.8 AFCAC supports ITU-R studies on the appropriate regulatory and/or technical measures that Telecommunication Regulatory Authorities in the AFI region should apply to guarantee protection of the existing and future FSS earth stations in the 3 400-4 200 MHz band used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information”.

3. CONCLUSION

3.1 The provision of communication in support to air navigation service within the AFI region, the interoperability of ATM systems between AFI and its neighbouring Regions (MID, EUR, SAM, APAC) are based on regional and inter regional satellite C-Band VSAT Networks.

3.2 The threat on the C-Band encountered in the AFI Region may be experienced in other Regions leading to an adverse effect on the implementation of Aviation System Block Upgrade (ASBU) Modules within and across Regions.

3.3 AFCAC recognizes the efforts undertaken by ICAO to ensure frequency spectrum availability for the provision of aeronautical-related safety service and strongly supports the ICAO position for the ITU World Radiocommunication Conference.

3.4 In light of the above, the Assembly is invited to take note of the need for the appropriate protection of the FSS C-Band 3400-4200 MHz, required for the sustainable frequency spectrum availability for the operation of fixed satellite service based aeronautical VSAT networks in support to the implementation of aeronautical safety service in accordance with the Global ATM concept.

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