INTERNATIONAL CIVIL AVIATION ORGANIZATION

WESTERN AND CENTRAL AFRICA OFFICE

Fifth Meeting of the Central Atlantic FIR Satellite Network (CAFSAT) Management Committee (CNMC/5) (Abidjan, Côte d'Ivoire, 1-2 June 2015

Agenda Item 5: ICAO position for ITU WRC-15 and preparation on issues pertaining to VSATs Networks

Preparation of WRC-15: Stakeholders & challenges

(**Presented by the secretariat**)

SUMMARY

The purpose of this paper is to provide the meeting with the actions required to be undertaken by CNMC members in the framework of the preparation of ITU World Radiocommunication Conference 2015

Reference:

Reports on ACP WG/F Meetings
Final acts of WRC-12
ITU-R Studies 2109; 2199 on C Band sharing

Related ICAO Strategic Objectives: **A:** ***Safety*****; B:** ***Air Navigation Capacity and Efficiency***

Related ASBU Bloc 0 Modules, Performance Improvement Aerias and Applications: **B0-FRTO/PIA3-***PBN En Route Trajectories;* **B0-FICE/PIA2-***AIDC;* **B0-DATM/PIA2-***AIM;***B0-TBO/PIA4-***Datalink;* **B0-AMET/PIA2-***MET*

Action by the meeting see paragraph 3

1. Introduction

1.1 At World Radiocommunication Confrences (WRC), convened by International Telecommunication Union (ITU) about every three - four years, changes are made to the ITU Radio Regulations, including the Table of Frequency Allocations (Article 5 of the ITU Radio Regulations), on the basis of proposals made by States.

1.2 Therefore, the civil aviation community under the technical guidance of ICAO brings its needs through ICAO position, as developed by the Air Navigation Commission, reviewed by all ICAO States, and agreed by the ICAO Council.

1.3 The forthcoming WRC is scheduled to take place in Geneva from 2 to 27 November 2015 and the experience gained by some States/Organizations in the SAT community during the past conferences recommends that close preparation activities be conducted in order to support ICAO position that includes the concern raised by the Aeronautical VSAT networks managing bodies for a safe operation of the 3400-4200MHZ C-Band

2. Discussion

2.1 Some CNMC States are pioneers, since the 90s, in the usage of C-band VSAT technology for the implementation of satellite-based networks that support in this FSS band all aeronautical communications services including the extension of VHF aeronautical mobile, navigation, surveillance services and upcoming ATN components.

2.2 Therefore, they should actively participate in the actions aiming to ensure a suitable protection of the band which is subject to a greedy spectrum demand from the International Mobile Telecommunication (**IMT**).
The main stakes and challenges on the FSS band and the regional organizations dealing with spectrum matter are attached at **Appendix B** to this Paper.

2.3 The appropriate initiatives that can help overcoming the challenges for the forthcoming WRC-15 should amongst others be:

- Support by CNMC members of ICAO position for WRC-15;
- Strong link between ANSPs and CAAs to represent and defend the ICAO position at the national regulation level with the aim to obtaining a clear support from the regulator
- Active participation in the national sub regional and regional preparatory meetings organized by, ANSPs, Regional Frequency Management Group, ATU, CEPT, CITEL, ICAO.
- Participation when possible in ITU preparatory meetings such as CPMs;
- Participation in the Conference itself.

2.4 ICAO has included in its position for WRC-15 Agenda item 9.1.5 related to technical and regulatory actions to be considered by WRC-15 in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1(**Appendix A** refers).

2.5 In this regard ICAO participated in the studies of ITU Working Party 4A which developed a revised draft Resolution 154 (WRC-12).
This draft revised Resolution adopted by the conference Preparatory Meeting (CPM) is attached at **Appendix C** to this working Paper.

3. Action by the meeting

The meeting is invited to:

a) Take note of the information given above

b) Encourage Sates/Organizations to participate in the preparatory activities for WRC-15;

c) Consider the attached stakes and challenges on the FSS band when conducting the re-engineering exercise of CAFSAT

d) Support/strength the draft revised Resolution 154 (WRC-12) and strategize accordingly with spectrum stakeholders.

e)

Appendix A

ITU Regions

Appendix B

Stakes and challenges on the future WRC-15

I- Overview on SAT stakeholders for the preparation of WRC

The preparation of WRC comprises various activities at national, sub / regional and international level.

At the national level the National Authority of Regulation of Telecommunication leads the process by capturing and arbitrating the needs from the spectrum users in line with ITU Radio Regulation provisions.

At this level the Civil Aviation Authority (CAA) should be the flag holder of the Civil Aviation community and will summarize the position of ICAO as well as the local concerns of aviation industry in terms of availability of spectrum, prevention and mitigation of harmful interferences.

The CAA, assisted by Air Navigation Service Providers (ANSPs), Airports Operators and Airlines must ensure the participation of civil aviation in the national coordination meetings convened by the Telecommunication Regulator.

At the sub regional level the regulators are usually organized as specialized associations of sub regional organizations for economic integration.

The appropriate stakeholders are presented in Appendix to this Working Paper

In particular for AFI CNMC members, ECOWAS/UEMOA telecommunication regulators have established the **W**est **A**frican **T**elecommunication **R**egulators' **A**ssociation (**WATRA**: http://www.watra.org) located in Abuja, Nigeria while the central area established the **C**entral **A**frica **T**elecommunication **R**egulators' **A**ssociation (**CATRA**: http://www.artac.cm) located in Yaoundé, Cameroon to harmonize their point of view in the framework of the policy agreed by their states.

The **S**outhern **A**frican **D**evelopment **C**ommunity (**SADC**) has established the **C**ommunication **R**egulators' **A**ssociation of **S**outhern **A**frica (**CRASA**: http://www.crasa.org) located in Gaborone, Botswana. The contact of some individual Telecommunications' Regulators of Western and Central Africa can also be downloaded at: http://www.cipaco.org/spip.php.

These associations should be provided with the ICAO position for WRC as well as with the common concerns encountered in the sub region in the operation of frequency spectrum for air navigation service provision.

At the interregional level, the **A**frican **T**elecommunication **U**nion (**ATU**: http://atu-uat.org/index.php?lang=en) located in Nairobi, Kenya, the Inter-American Telecommunication Commission (**CITEL**),the European Conference of Postal and Telecommunications Administrations (**CEPT**) are coordinating the actions within the concerned regions before, during and after the WRC meetings. In particular, the ATU preparatory meetings are aiming to defining a regional common position in each agenda item of the conference.
They are supposed to liaise with other regionals Telecommunication Unions:

- Asia-Pacific Telecommunity (**APT**);
- Arab Spectrum Management Group (**ASMG**);
- Regional Commonwealth in the Field of Communications (**RCC**)

The key role of CNMC CAAs will consist on providing ATU, CITEL and CEPT through their regulators with the concerns of the aviation community what suppose that the position of ICAO is captured understood and shared with stakeholders.

As an example, before each WRC, ATU organizes 03 to 04 coordinating meetings aiming to harmonizing the position of African States for the Conference.

At the international level, ITU regularly hosts the Conference Preparatory Meetings (**CPMs**) during which most of the agenda items are preliminarily discussed, based on the results of the studies undertaken by the specialized ITU-R Working Parties and Study Groups.

Although it may not be possible for each CNMC member to participate in these CPM meetings, the attention of CAAs must be reminded on the concerns of the SAT aviation community so that these concerns be taken into consideration by the national sub regional and regional coordination meetings to bring a clear support to aviation spectrum provision.
This coordination task is undertaken by the regional Frequency Management Groups that are specialized technical Group established by the Planning and Implementation Regional Group (**PIRGs**). As an example the AFI Frequency Management Group (AFI/FMG) has been very active during last WRC-12; this group is currently chaired by ASECNA, ICAO WACAF Office is servicing.

II- Stakes and challenges on the future WRC-15 and their impact on the safe operation of CAFSAT Frequency band

During the two last conferences WRC 2007 and WRC 2012, it was recognized through Recommendation 724 (WRC-07) and Resolution 154 (WRC 12), the importance of the use of VSAT technology for the needs for the international civil aviation especially in developing countries and therefore the need for technical and regulatory measure to ensure a safe operation of the Fixed Satellite Service 3400-4200 C-band supporting satellite based aeronautical VSAT networks (**See WP 06A**). These results are important steps toward a suitable protection of the band that is a corner angle for the provision of a robust telecommunication infrastructure for the SAT region although subject to candidature by IMT 200, WIMAX and other emerging broadband mobile telecommunication.

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, subject to regulatory and technical restrictions (**No. 5.430A**). The deployment of mobile service systems in the vicinity of airports has led to an increased number of cases of interference from the mobile service stations to the FSS receivers. Consequently, some additional measures may need to be adopted to improve the protection of the FSS links supporting aeronautical communications and ITU-R and States were called upon by Resolution 154-WRC-12 to conduct studies in this matter that will be addressed under **Agenda item 9.1 sub-item 5 of WRC-15.**

It may be noted that Resolution 154-WRC-12 applies with the limitation **to "<u>some countries</u> in Region 1".** ITU region map shows that although they are operating C-band based VSAT networks (CAFSAT, REDDIG and MEVA) for the provision of aeronautical communication, the CAR/SAM region is not in ITU region 1, so is APAC.

ICAO supports ITU-R studies on the appropriate regulatory and/or technical measures that Administrations in the SAT region should apply to facilitate protection of VSATs used for the transmission of aeronautical and meteorological information in the 3.4 to 4.2 GHz frequency band from other services operating in the band. This will ensure the continued growth of air traffic while maintaining the required level of safety in this region.

APPENDIX C

AGENDA ITEM 9.1

9 to consider and approve the Report of the Director of the Radiocommunication Bureau, in accordance with Article 7 of the Convention:

9.1 on the activities of the Radiocommunication Sector since WRC-12;

NOTE: Eight issues have been identified by CPM15-1 under this agenda item.

…

5/9.1.5 Resolution 154 (WRC-12)

Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1

(**WP 4A** (technical and regulatory aspects), **SC** (regulatory and procedural aspects) / **-**)

5/9.1.5/1 Executive summary

Resolution **154 (WRC-12)** invites the ITU-R to study possible technical and regulatory measures in some countries in Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz frequency band used for satellite communications related to safe operations of aircraft and reliable distribution of meteorological information, considering that where an adequate terrestrial communication infrastructure is not available, FSS earth stations are the only viable option to augment the communication infrastructure in order to satisfy the overall communications infrastructure requirement of the International Civil Aviation Organization (ICAO) and to ensure distribution of meteorological information under the auspices of the World Meteorological Organization (WMO).

5/9.1.5/2 Background

The efficient provision of air navigation services requires the implementation and operation of ground communications infrastructure with high availability, reliability and integrity. In some countries in Africa, the difficulty of fulfilling these requirements, given the extent of the airspace and weakness in terrestrial communication infrastructure, has led to the extensive deployment of an aeronautical communication infrastructure based on very small aperture terminal (VSAT) systems operating in the FSS. The frequency band of operation is 3 400-4 200 MHz (with the standard C-band frequency range being 3 700-4 200 MHz and the extended C-band frequency range being 3 400-3 700 MHz), which, due to more pronounced rain attenuation at higher frequency bands, is the most viable option for satellite links with high availability in tropical regions. This infrastructure currently spans the entire region and is crucial to ensure the continued growth of traffic while maintaining safe operation of aircraft. The same frequency band is also used for the distribution of meteorological data via satellites under the auspices of the WMO.

WRC-07 allocated the frequency band 3 400-3 600 MHz to the MS, except aeronautical mobile, on a primary basis in 81 countries in Region 1, subject to regulatory and technical restrictions (see RR No. **5.430A**). The deployment of MS systems in the vicinity of airports has led to an increased number of cases of interference into FSS (VSAT) receivers. Consequently, some additional measures are needed to improve the protection of the FSS links supporting aeronautical and meteorological communications. Depending on whether the interference cases are between two stations in the same country (domestic case) or between two stations in neighbouring countries (cross-border case), the consideration of such measures is either a national spectrum-regulatory matter, or an issue of international spectrum regulation between countries.

WRC-12 adopted Resolution **154 (WRC-12)**, and invited the ITU-R to study possible technical and regulatory measures in some countries in Region 1 to support the existing and future FSS earth stations in the 3 400-4 200 MHz frequency band used for satellite communications related to safe operations of aircraft and reliable distribution of meteorological information referred to in *considering c)*.

Regional coordination was carried out between African Civil Aviation Authorities, 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 recommended ATU Member States to "reinforce their support to the existing and future FSS earth stations in the 3 400-4 200 MHz frequency 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)."

5/9.1.5/3 Summary of technical and operational studies, including a list of relevant ITU-R Recommendations

Report ITU-R M.2109 contains sharing studies between IMT-Advanced systems and geostationary-satellite orbit (GSO) networks in the FSS in the 3 400-4 200 and 4 500-4 800 MHz frequency bands.

Report ITU-R S.2199 contains studies on compatibility of broadband wireless access systems and FSS networks in the 3 400-4 200 MHz frequency band.

Recommendation ITU-R SF.1486 contains a sharing methodology between fixed wireless access systems in the FS and VSATs in the FSS in the 3 400-3 700 MHz frequency band.

Recommendation ITU-R S.1856 contains methodologies for determining whether an IMT station at a given location operating in the frequency band 3 400-3 600 MHz would transmit without exceeding the power flux-density limits in RR Nos. **5.430A**, **5.432A**, **5.432B** and **5.433A**.

These studies show a potential for interference from IMT and broadband wireless access stations into FSS earth stations at distances of up to several hundred kilometers. Such large separation distances would impose substantial constraints on deployments of both mobile and earth stations. The studies also show that interference can occur when IMT systems are operated in the adjacent frequency band.

5/9.1.5/4 Regulatory and procedural considerations

Resolution **154 (WRC-12)** could be modified, calling for relevant administrations in Region 1 to use special care in the coordination, assignment, and management of

frequencies taking into consideration the potential impact on the FSS earth stations used for satellite communications related to safe operation of aircraft and reliable distribution of meteorological information in the frequency band 3 400-4 200 MHz.

In parallel to the modification of Resolution **154 (WRC-12)**, consideration may be given to modifying RR No. **5.430A** to include a reference to the modified Resolution.

An example of modification of Resolution **154 (WRC-12)** follows.

MOD

RESOLUTION 154 (REV.WRC-15)

Consideration of technical and regulatory actions in order to support existing and future operation of fixed-satellite service earth stations within the band 3 400-4 200 MHz, as an aid to the safe operation of aircraft and reliable distribution of meteorological information in some countries in Region 1

The World Radiocommunication Conference (Geneva,2015),

considering

a) that the band 3 400-4 200 MHz is allocated worldwide to the fixed-satellite service (FSS) in the space-to-Earth direction and to the fixed service on a primary basis;

b) that the band 3 400-3 600 MHz is allocated on a primary basis to the mobile, except aeronautical mobile, service in the countries in Region 1 specified in No. **5.430A** and identified for International Mobile Telecommunications (IMT) in those countries;

c) that in Region 1 the allocation to the mobile, except aeronautical mobile, service in the band 3 400-3 600 MHz is subject to the technical and regulatory conditions listed in No. **5.430A**, aimed at ensuring compatibility with co-primary services of neighbouring countries;

d) that a number of developing countries rely, to a great extent, on FSS systems using very small aperture terminals (VSAT) in the band 3 400-4 200 MHz for provision of communications as an aid to safe operation of aircraft and reliable distribution of meteorological information;

e) that, in some cases where an adequate terrestrial communication infrastructure is not available, VSAT networks referred to in *considering d)* above are the only viable option to augment the communication infrastructure in order to satisfy the overall communications infrastructure requirements of the International Civil Aviation Organization (ICAO) and to ensure distribution of meteorological information under the auspices of the World Meteorological Organization (WMO);

f) that the relevant ITU-R studies showed a potential for interference from fixed wireless access and IMT stations into FSS receiving earth stations at distances from less than one kilometre up to hundreds of kilometres, depending on the parameters and deployment of stations of these services;

g) that WRC-12, taking into account the studies mentioned in *considering f)* above decided to study technical and regulatory measures to support the FSS earth stations referred to in *considering e)* above,

noting

a) that by the date of WRC-15 several cases of harmful interference to the FSS VSATs used for aeronautical safety communications from fixed wireless access or IMT stations of the same administration were reported;

b) that these reported cases of interference revealed some national difficulties in the coordination of frequencies between the respective national telecommunication regulators responsible for licensing fixed wireless access or IMT systems and national aviation authorities responsible for the management of frequencies for aeronautical purposes, including assignments for VSATs;

c) that in many countries FSS VSAT earth stations are not subject to individual licencing and not registered as specific stations in national frequency databases and in the ITU Master International Frequency Register (MIFR) due to considerable administrative work;

d) that the knowledge of the location and operational frequencies of VSAT stations used for communications to aid the safe operation of aircraft and/or distribution of meteorological information is critically important for ensuring compatibility with applications of other services,

recognizing

a) that ITU-R conducted comprehensive studies of compatibility between the FSS on the one hand and the fixed wireless access systems and IMT applications on the other hand in the band 3 400-4 200 MHz and summarized the results of the studies in Recommendation ITU-R SF.1486 as well as Reports ITU-R S.2199, ITU-R M.2109 and draft new Report ITU-R [FSS-IMT C-BAND DOWNLINK];

Editor's note: Report number to be inserted by the BR after approval of the Report at the SG 4 meeting on 26 June 2015.

b) that the Recommendation and Reports identified in *recognizing a)* offer a set of mitigation techniques that could be employed for international coordination and at a national level and to facilitate coexistence of FSS, fixed service and mobile service systems;

c) that Recommendation ITU-R S.1856 contains methodologies for verification of the power flux-density (pfd) limit set forth in No. **5.430A,**

resolves

1 that administrations listed in No. **5.430A** shall ensure the compliance of the IMT stations with the pfd limit set forth therein and apply the relevant coordination procedures before bringing these applications into use;

2 to urge administrations, when planning and licensing fixed point-to-point, fixed wireless access, and IMT systems in bands referred to in *considering b)* above, to take into account the protection needs of existing and planned FSS VSAT earth stations by coordinating the deployment of the systems mentioned above with the respective aviation and meteorological authorities at a national level;

3 to invite administrations, taking into account the number of earth stations involved for this particular type of usage, to consider the possibility of licensing the FSS VSAT earth stations used for communications as an aid to the safe operation of aircraft and/or distribution of meteorological information on an individual basis and registering them in the MIFR as specific earth stations;

4 to encourage administrations to employ the appropriate mitigation techniques described in the ITU-R publications referred to in *recognizing a)* above;

5 to invite administrations to ensure that the application of these technical and regulatory measures to the FSS and mobile service does not limit the use of the band 3 400-4 200 MHz by other existing and planned systems and services in other countries,

instructs the Secretary-General

to bring this Resolution to the attention of ICAO and WMO.

Conference Preparatory Meeting for WRC-15
Geneva, 23 March - 2 April 2015

INTERNATIONAL TELECOMMUNICATION UNION

PLENARY MEETING

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Working Group 5

PROPOSED MODIFICATIONS TO THE DRAFT CPM REPORT

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