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OUTCOME OF THE SPACE FREQUENCY COORDINATION GROUP (SFCG)

The document contains the report of the SFCG-28 meeting which took place from 16 to 26 September 2008 in Quebec (Canada). The main results related to the Meteorological Satellite Service and the Earth Exploration Satellite Service relevant to CGMS are included.

OUTCOME OF THE SPACE FREQUENCY COORDINATION GROUP

1 INTRODUCTION AND BACKGROUND

The annual meeting of the Space Frequency Coordination Group (SFCG-28) took place in Quebec (Canada) from 16 to 26 September 2007. The meeting was attended by 60 delegates from Space Agencies and observers from international organizations.

In accordance with a decision of CGMS-35, the WMO and CGMS were represented by Mr Robert Wolf.

2 MAIN MEETING RESULTS

The main meeting results related to the Meteorological Satellite Service (MetSat) and Earth Exploration Satellite Service (EESS) are listed below.

2.1 PREPARATION FOR THE WORLD RADIO CONFERENCE 2011

The next World Radio Conference is scheduled for 2011 (WRC 2011). After this it is planned to conduct a further WRC in 2019. The WMO position with respect to these future conferences was presented to SFCG. The various positions to agenda items of the WRC were discussed.

It can be concluded that SFCG supports all space-related WMO positions and that SFCG members will support these WMO positions during the WRC.

SFCG has generated a new resolution (Resolution 28-1) "SFCG Objectives for World Radio Conferences". This document gives guidelines and technical background information to be used at WRC 2011 but also includes positions for future WRCs. A copy of the SFCG Resolution is attached as Appendix 1.

The items of main interest to CGMS in this resolution are:

Agenda items 1.6; 1.8; 1.20; 1.22; 1.24; 8.1; 8.2 and all of Annex 2 to Resolution 28-1.

2.2 EXTENSION OF THE METSAT ALLOCATION AT 7750 - 7900 MHz

EUMETSAT provided background information on the future polar-orbiting MetSat system Post-EPS, including an estimation of the data rates and corresponding spectrum requirements in the 7750 - 7900 MHz band as well as an outlook on the sharing issues with the fixed and mobile service. It was highlighted that when considering the different concepts for using this band by current polar-orbiting MetSat systems, such as FY-3, NPOESS and Metop and the potential to interfere with each other, a coordinated approach for planning the long term use of the 7750 - 7900 MHz band would be essential.

In order to ensure the long term efficient and coordinated approach for using the 7750 - 7900 MHz band by MetSat systems having different concepts for using this band (broadcasting vs. stored data dump), information on future non-geostationary MetSat systems planning to use the 7750 - 7850 and 7850 -7900 MHz bands need to be gathered.

CGMS members are invited to provide corresponding information.

2.3 EXPANSION OF THE 18 GHz MetSat ALLOCATION

Considering the extension of the MetSat allocation from 200 MHz to 300 MHz at WRC-07, SFCG activities on this subject are completed and the corresponding SFCG resolution was deleted.

2.4 COORDINATION OF FUTURE USE OF THE 401 - 403 MHz BAND

ARGOS plans for future systems operating in the 401 - 403 MHz band were announced by CNES. Five so-called ARGOS beams are foreseen in this band. Some beams overlap with present and planned DCS of CGMS members. In particular beam 2 would overlap with the IDCS and regional DCS of CGMS members.

SFCG expressed concerns and pointed out that it is necessary to urgently develop a coordinated approach for the usage and possible segmenting of the 401 - 403 MHz band in order to ensure an interference-free utilization of the band, as it was done in the past where different parts of the band were designated to different Data Collection Systems (DCSs) and corresponding satellites. An overview of the current usage situation and future plans was provided and first elements were proposed for a coordinated future use.

Unfortunately, space agencies using or planning to use the 401 - 403 MHz band were not all present at the SFCG meeting as required to progress the proposed coordinated approach.

In a Liaison Statement to CGMS, the urgent need for coordination of the future use of the 401 – 403 MHz band is highlighted and CGMS is invited to consider the discussed elements for a coordinated use and to provide SFCG with their view on the issue. In particular CGMS members not having participated at SFCG-28 are invited to provide their views and information on their future plans for the 401 – 403 MHz band. A copy of the liaison statement is attached to this document in Appendix 2. This attachment also includes a diagram showing potential problems.

2.5 PASSIVE SENSING REQUIREMENTS ABOVE 275 GHz

ESA presented a global table of frequency bands needed for various passive sensing applications in the range 275-1000 GHz on the basis of the WP 7C output and some additional inputs by ESA. In this document an attempt was made to classify the various bands into categories of measurements, verify the consistency with the atmospheric absorption graph, building a global table including all measurements and identified elements that require further consolidation.

NASA reported about the results of a survey among remote sensing experts from NASA and academia derived in an attempt to define the passive remote sensing requirements on the basis of existing and planned uses of spectrum between 275 and 3000 GHz. As a result of this survey a significant, if not substantial, portion of the 275 GHz to 1000 GHz band has been identified as needed by the passive services. In the range 1 – 3 THz no bands have been formally identified as needed by the passive sensing community.

JAXA proposed a list of frequency bands to be included in a consolidated frequency table for the range 275 - 3000 GHz. Furthermore, the passive services and the frequency band requirements are classified into EESS (passive), Space Research (passive), Radio Astronomy and ground and balloon based passive sensing.

CNES reported some basic scientific elements provided by the scientific community and by potential users (16th International TOVS Study Conference held last May 2008).

The information provided by the SFCG member agencies was used to develop a report with consolidated tables of requirements for passive remote sensing between 275 and 1000 GHz, taking into account requirements for meteorology/climatology and atmospheric chemistry, subdivided into two measurement classes. In addition, the requirements for “non-traditional” passive sensors such as ground-based and balloon-based sensors are provided in a separate table as well as some preliminary information concerning missions under the Space-Research (passive) service.

This document represents the current status of work within SFCG toward Agenda Item 1.6 (WRC-11) and is expected to provide a relevant basis for the work within ITU-R in preparation of this agenda item. The compiled information from different space agencies were consistent to a high extent, however, it is recognized that further refinement may be necessary, if additional information becomes available in the course of preparation of this agenda item.

CGMS members are invited to actively contribute to the completion of the document by supplying information on planned use of the 275 – 3000 GHz band.

2.6 PASSIVE SENSING REQUIREMENTS BELOW 275 GHz

NOAA provided an update of Table 1 “Performance criteria for satellite passive remote sensing” in SFCG Resolution 21-2R2 on the basis of information from inputs to the three passive microwave workshops sponsored by NOAA as well as from recent ITU WP7C documents.

Considering the ongoing activity to consolidate the passive sensing requirements for frequency bands above 275 GHz in the framework of WRC-11 Agenda Item 1.6, SFCG considered it appropriate to modify the resolution accordingly. The resolution is contained in the SFCG handbook which can be accessed online on webpage www.sfcgonline.org.

GRSS introduced a document providing information on the status of the coexistence issues for passive sensing in the 57 - 64 GHz band. Interference assessments with indoor “personal network” systems planned under 802.15.3 conclude that an impact

on AMSU is unlikely due to the EIRP limit of 42dBm, expected directed antennas and primary indoor operation. The issue and potential impact of planned systems of the Wireless Communication Association International (WCAI) using an EIRP of 82dBm for outdoor applications is still unclear. Currently there is not sufficient information available on such potential systems that would allow pursuing interference analysis. SFCG offered its support studying the potential interference issue when reliable information on such systems would be available.

2.7 STATUS OF THE UWB IMPLEMENTATION AT 24 – 26 GHz

JAXA informed SFCG on the progress of UWB implementation in Japan. Two options are discussed: the study at 24 GHz covering the purely passive 23.6-24 GHz band and the study at 26 GHz the bandwidth of which starts at 24 GHz excluding the passive band SRR for permanent use will be discussed after the study of 24 GHz band SRR. JAXA indicated that the basic hypotheses for the calculations are the same as within the ITU-R report of TG1-8. It is expected that the automotive industry of Japan will develop a system to be operated in the band around 79 GHz and will not pursue developments in the 23 GHz area.

The SARA (Strategic Automotive Radar Frequency Allocation) Group supplied information which indicated that the expected penetration rate will be well below the maximum rate of 7% at the sunset date of 2013 considering the application of the decision in Europe about the use of the 23.6-24 GHz. Therefore, SARA explained that the alternative solution starting at 24 GHz up to 29 GHz will have the capability to avoid the passive band. However, the meeting recalled that this proposal from SARA to get a permanent band used from 24 to 29 GHz is not accepted at all and is under discussion within the RSCOM (Radio Spectrum Communication) of the EU (European Union). In addition to that, it is important to note that the permanent band which has been designated is around 79 GHz.

Concerning this issue, the meeting agrees not to put an action item since, due to its very high importance, this issue is monitored by space and meteorological agencies.

3 CONCLUSIONS

CGMS Members are invited to take note of the listed SFCG activities and provide support in the form of technical data if required.

The SFCG liaison statement concerning the future use of the 401 - 402 MHz band is of highest importance. CGMS members are invited to help coordination between their members.

Coordination of the 7750 – 7900 MHz band requires input data on plans for future systems of CGMS members.

Furthermore input on future instruments operating in bands above 275 GHz are required to support the new allocations.

The next annual SFCG meeting will take place in June 2009 in Moscow (Russian Federation) by invitation from the Russian Space Academia (RSA)

APPENDIX 1

SFCG RESOLUTION 28-1

**SFCG OBJECTIVES FOR
WORLD RADIOCOMMUNICATION CONFERENCE
2011 (WRC-11)**

The SFCG,

CONSIDERING

- a) that its member agencies are vitally interested in achieving changes to the ITU Radio Regulations (RR) in order to enhance future systems operations of the space science services;
- b) that it is critical to ensure the availability and protection of the frequency bands necessary for spaceborne Earth observation applications and in particular:
 - disaster prediction, detection and mitigation;
 - global warming and climate change monitoring;
- c) that several SFCG member agencies are interested in human and robotic exploration of the Moon and Mars and are actively planning for such missions;
- d) that changes to the RR can only be accomplished at World Radiocommunication Conferences (WRCs);
- e) that on the agendas of these WRCs, items of interest to SFCG member agencies may be included;
- f) that the draft of the complete agenda for WRC-2011 is given in Resolution **805 (WRC-07)**;
- g) that it is essential for SFCG member agencies to coordinate their Conference preparations and to provide the necessary rationale for their requirements in order to achieve the desired results at WRCs;

NOTING

that consideration of the frequency allocations required to implement space systems to be used in disaster prediction, detection, mitigation and environmental (including weather and climate) monitoring is critical for Public Safety and Property Protection;

RESOLVES

1. that consideration of SFCG WRC Objectives identified in Annex 1, for the next and subsequent competent World Radiocommunication Conferences is vital for member agencies;



2. that, in preparation for WRC-11, Annexes 1 and 2 shall be regularly updated in the light of the Conference agendas, evolving Objectives, and changing status of studies;
3. that Annex 2 shall list items of interest to SFCG members for consideration at a future conference, but not yet sufficiently mature for inclusion in Annex 1.
4. that member agencies will urge their Administrations to make proposals to competent WRCs which satisfy these Objectives.

Annex 1 to SFCG Resolution 28-1

SFCG WRC-11 OBJECTIVES

Introduction

This Annex presents the objectives of SFCG members relative to the space science services on the agenda of the 2011 World Radiocommunication Conference (WRC-11). The contents may be used by SFCG members to inform their Administrations, and to facilitate conference preparation and WRC consideration.

The presentation is organized to align with the draft Agenda for the WRC-11 as presented in Resolution **805 (WRC-07)**. Not all of the items in that Agenda are of interest to the SFCG and therefore only those specific agenda items, relating to SFCG issues, are discussed herein.

SFCG promotes the use of space-based passive sensors to provide vital ecological and environmental data that is unobtainable by any other means. Such passive sensors depend for their successful operation on frequency bands that are defined by the physical laws.

SFCG also promotes spectrum efficiency and recognizes the need for and the value of sharing frequency bands between more than one radio service, in cases where mutually agreed sharing and protection criteria have been established based upon the results of ITU-R studies.

However, in frequency bands allocated to the space science services, and where sharing has been shown to be infeasible, the SFCG holds the view that such sharing should not be implemented, and would support any review by Administrations that might lead to a reduction in the number of such infeasible sharing situations in the Table of Frequency Allocations contained in the ITU Radio Regulations (RR).

Agenda Item 1.2 “taking into account the ITU R studies carried out in accordance with Resolution **951 (Rev.WRC-07)**, to take appropriate action with a view to enhancing the international regulatory framework”

Resolution **951 (Rev.WRC-07)** calls for the ITU-R to continue studies in order to develop concepts and procedures for enhancing the Radio Regulations to meet the demands of current, emerging and future radio applications, while taking into account existing services and usage. The Resolution also invites WRC-11 to take into consideration the results of these studies, including sharing and their impact on allocations in the concerned frequency bands, and take appropriate action in accordance with Annex 2 of the Resolution. Conference preparatory meeting CPM11-1 identified Working Party 1B (WP 1B) of the ITU-R Study Group 1 as the responsible group for preparation of the draft CPM text related to this Agenda Item.

SFCG Objective

SFCG supports the opportunity to improve the Radio Regulations. SFCG members are encouraged to take an active role in the development of proposals and positions within their respective Administrations' preparatory processes for WRC-11 on this agenda item. SFCG proposes that no change to the current definitions of science services to be introduced in RR. SFCG members should monitor proposed modifications to RR which could affect operation of systems belonging to the science services.

Status

WP 1B is the responsible group and Study Group 7 is a contributing group. WP 1B has established a Workplan (Method of Work and Organization of Studies) to address this issue (Annex 4 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>), a Working Document Towards Draft CPM Text on enhancing the international regulatory framework (Annex 2 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>), a Working Document that may lead to a related Draft New Report (Annex 3 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>), and finally, established a Rapporteur Group under Vladimir Minkin (RUS) with explicit Terms of Reference (Annex 5 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>) for this particular A.I.

Agenda Item 1.3 “to consider spectrum requirements and possible regulatory actions, including allocations, in order to support the safe operation of unmanned aircraft systems (UAS), based on the results of ITU-R studies, in accordance with Resolution **421 (WRC-07)**”

Resolution **421 (WRC-07)** calls for WRC-11 to consider, based on the results of ITU-R studies, the spectrum requirements and possible regulatory actions, including additional allocations, to support the operation and control of UAS systems.

SFCG Objective

SFCG supports the protection of existing space science service allocations. No allocations of spectrum to support UAS systems should be made in space science service bands unless acceptable sharing criteria are developed. Airborne system downlinks can be particularly troublesome for space research and EESS receive ground stations. Airborne system uplinks have the potential to interfere with space-based receivers, especially passive remote sensors.

Status

WP 5B is the responsible group and WP 7B and 7C are interested groups. WP 5B has developed a Working document on the workplan and milestones for UAS (Annex 27 to ITU-R Doc. 5B/45, see at: <http://www.itu.int/md/R07-WP5B-C-0045>), a Working Document Towards Draft CPM Text (Annex 10 to ITU-R Doc. 5B/45 see at: <http://www.itu.int/md/R07-WP5B-C-0045>).

Agenda Item 1.4 “to consider, based on the results of ITU-R studies, any further regulatory measures to facilitate introduction of new aeronautical mobile (R) service (AM(R)S) systems in the bands 112-117.975 MHz, 960-1164 MHz and 5000-5030 MHz in accordance with Resolutions **413 (Rev.WRC-07)**, **417 (WRC-07)** and **420 (WRC-07)**“

Resolution **420 (WRC-07)** calls for WRC-11 to consider, based on the results of ITU-R studies, AM(R)S spectrum requirements for surface applications in the 5 GHz range, in order to determine if they can be fulfilled in the band 5 091-5150 MHz. It also calls to study the feasibility of an allocation for AM(R)S for surface applications at airports and the technical and operational issues relating to the protection of RNSS in the bands between 5 000 and 5 030 MHz.

SFCG Objective

SFCG supports the protection of existing RNSS allocations in the band 5000-5030 MHz. RNSS systems operating in this band are under development by some SFCG member agencies.

Status

WP 5B is the responsible group. WP 5B has developed a Working Document Towards Draft CPM Text (Annex 11 to ITU-R Doc. 5B/45 see at: <http://www.itu.int/md/R07-WP5B-C-0045>).

Agenda Item 1.5 “to consider worldwide/regional harmonization of spectrum for electronic news gathering (ENG), taking into account the results of ITU R studies, in accordance with Resolution **954 (WRC-07)**”

Resolution **954 (WRC-07)** calls for WRC-11 to address the feasibility of achieving a satisfactory degree of worldwide/regional harmonization of spectrum for ENG use in terms of the frequency bands and tuning ranges based on studies undertaken by the ITU-R and that methods should be identified for the possible harmonization of frequency bands and tuning ranges for ENG usage.

SFCG Objective

SFCG supports the protection of existing space science service allocations. In recent years there were occurrences of interference from ENG systems to EESS systems in some countries. It is critical that worldwide/regional harmonization of spectrum for ENG does not affect the use of the 2 GHz band by systems belonging to the space science services. In addition worldwide/regional harmonization of spectrum to support ENG systems should not be made in other space science service bands unless acceptable sharing criteria are developed.

Status

Liaison sent from WP 7B to WP 5C (ITU-R Doc. 5C/42, see at: <http://www.itu.int/md/R07-WP5C-C-0042/en>) reminding WP 5C to consider SRS and EESS systems use of the 2025-2110 MHz, 2200-2290 MHz, 7145-7235 MHz, 7750-7850 MHz and 8025-8500 MHz bands.

WP 5C is the responsible group and WP 7B is an interested group. WP 5C has developed a document “Proposed CPM framework for studies on WRC-11 Agenda item 1.5 - Harmonization of spectrum for use by terrestrial electronic news gathering systems (ENG)” (Annex 1 to ITU-R Doc. 5C/26, see at: <http://www.itu.int/md/R07-WP5C-C-0026>)

Agenda Item 1.6 “to review No. **5.565** of the Radio Regulations in order to update the spectrum use by the passive services between 275 GHz and 3 000 GHz, in accordance with Resolution **950 (Rev.WRC-07)**, and to consider possible procedures for free-space optical-links, taking into account the results of ITU R studies, in accordance with Resolution **955 (WRC-07)**”

Resolution **950 (Rev. WRC-07)** calls for WRC-11 to review No. **5.565**, excluding frequency allocations, in order to update the spectrum use between 275 GHz and 3 000 GHz by the passive services, taking into account the result of the ITU-R studies. Additionally, Resolution **950 (Rev. WRC-07)** also states that administrations may submit for inclusion in the Master International Frequency Register (MIFR) details on systems which operate between 275 and 3 000 GHz and which may be recorded by the Radiocommunication Bureau under Nos. **8.4**, **11.8** and **11.12**.

SFCG Objective

SFCG supports the revision of RR No. **5.565** to include all appropriate frequency bands within the range 275 to 3000 GHz to be used by systems belonging to the Earth exploration-satellite (passive), space research (passive) and radio astronomy services in order to protect these bands for scientific applications now and in the future. SFCG also supports inclusion of details in the MIFR on any systems of the science services that use these frequency bands and encourages member agencies to submit such information to the ITU-R Radiocommunication Bureau.

Status

WP 1A is the responsible group based on requirements to be developed within SG 7. WPs 7C and 7D are contributing groups. WP 1A has developed a Provisional Workplan for its studies related to A.I. 1.6 (Annex 8 to ITU-R Doc. 1A/62, see at: <http://www.itu.int/md/R07-WP1A-C-0062/en>).

WPs 7C and 7D have begun the work to address the appropriate frequency bands and scientific justifications for such bands in the 275 to 3000 GHz range. SFCG has prepared a document on this issue, that is expected to be submitted to WP 7C by a SFCG member.

Resolution **955 (WRC-07)** calls for the consideration of possible procedures for free-space optical links, taking into account the results of ITU-R studies covering at least sharing aspects

with other services, a clear definition of the band limits and measures to be considered if allocations to various services in the Radio Regulations above 3000 GHz are considered feasible.

SFCG Objective

SFCG supports the protection of existing space science service use of satellite optical links and does not want any undue constraints applied to their use. Any technical constraints that are applied to terrestrial optical links should not be applied to satellite optical links unless and until tests or analyses show the need for such constraints. Terrestrially-based Earth-to-space optical links could cause at least temporary interference to certain EESS instruments. Vertically, or near vertically-pointing optical links such as from ground to the top of tall buildings may need studying to ensure that no significant interference to satellites is caused.

Status

WP 7B has stated to WP 1A (ITU-R Doc 1A/22, see at: <http://www.itu.int/md/R07-WP1A-C-0022/en>) that WP 1A should treat terrestrial and satellite optical links separately.

WP 1A is the responsible group and WP 7B is a contributing group. WP 1A has developed a Provisional Workplan for its studies related to A.I. 1.6 (Annex 8 to ITU-R Doc. 1A/62, see at: <http://www.itu.int/md/R07-WP1A-C-0062/en>).

Agenda Item 1.7 “to consider the results of ITU R studies in accordance with Resolution **222 (Rev.WRC-07)** in order to ensure long-term spectrum availability and access to spectrum necessary to meet requirements for the aeronautical mobile-satellite (R) service, and to take appropriate action on this subject, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz”

Resolution **222 (Rev.WRC-07)** calls for the consideration by WRC-11 of the results of ITU-R studies and to take appropriate action to ensure the long-term spectrum availability for the aeronautical mobile-satellite (R) service, while retaining unchanged the generic allocation to the mobile-satellite service in the bands 1 525-1 559 MHz and 1 626.5-1 660.5 MHz.

SFCG Objective

SFCG supports the protection of existing space science service allocations. There is a primary SOS allocation and a secondary EESS allocation in the band 1525-1535 MHz. No changes to the mobile-satellite service allocation in the 1525-1535 MHz band or other bands allocated to the space services should be made under this A.I. unless acceptable sharing criteria are developed with the SOS and EESS.

Status

WP 4C is the responsible group and WPs 7B and 7C are interested groups.

Agenda Item 1.8 “to consider the progress of ITU-R studies concerning the technical and regulatory issues relative to the fixed service in the bands between 71 GHz and 238 GHz, taking into account Resolutions **731 (WRC-2000)** and **732 (WRC-2000)**”

Resolution **731 (WRC-2000)** calls for consideration by a future competent World Radiocommunication Conference of issues dealing with sharing and adjacent-band compatibility between passive and active services above 71 GHz.

Resolution **732 (WRC-2000)** calls for consideration by a future competent World Radiocommunication Conference of issues dealing with sharing between active services sharing bands above 71 GHz.

This agenda item focuses on the technical and regulatory issues for the fixed service in bands allocated to this service between 71 and 238 GHz. The intent is to deal with various fixed service bands and to develop sharing criteria between the fixed service and other active services in certain shared bands, as well as between passive and active services in both shared and adjacent bands, as needed.

SFCG Objective

SFCG supports the protection of space science service in bands allocated in the 71-238 GHz frequency range, including protection of passive services from unwanted emissions from adjacent bands.

Status

WP 5C is the responsible group for this agenda item and WPs 7B and 7C are contributing groups. WP 1A is an “interested” group in this issue. Some preliminary information related to studies by WP 5C under A.I. 1.8 is contained in sub-section 3.3.6 of ITU-R Doc. 5C/26 (see at: <http://www.itu.int/md/R07-WP5C-C-0026>). CEPT at its meeting (February 2008) indicated that there was no intention by CEPT countries to propose new allocations under this A.I..

Agenda Item 1.10 “to examine the frequency allocation requirements with regard to operation of safety systems for ships and ports and associated regulatory provisions, in accordance with Resolution **357 (WRC-07)**”

Resolution **357 (WRC-07)** calls for the consideration of regulatory provisions and spectrum allocations for use by enhanced maritime safety systems for ship safety and port security applications. This includes studies to determine the spectrum requirements and potential frequency bands suitable to support these ship and port security applications.

SFCG Objective

SFCG supports the protection of existing space science service allocations. No allocations of spectrum to support enhance maritime safety systems should be made in space science service bands unless acceptable sharing criteria are developed.

Status

WP 5B is the responsible group for this agenda item and WPs 7B and 7C are interested groups. WP 5B at its meeting in February 2008 has produced Working document towards draft CPM text on this A.I. (Annex 13 to ITU-R Doc. 5B/45 see at: <http://www.itu.int/md/R07-WP5B-C-0045>).

Agenda Item 1.11 “to consider a primary allocation to the space research service (Earth-to-space) within the band 22.55-23.15 GHz, taking into account the results of ITU R studies, in accordance with Resolution **753 (WRC-07)**”

Resolution **753 (WRC-07)** calls for consideration of sharing between space research service systems operating in the Earth-to-space direction and the fixed, inter-satellite and mobile services in the band 22.55-23.15 GHz, with a view to consider the inclusion of the sharing criteria within the Radio Regulations and appropriate modifications to the Table of Frequency Allocations.

SFCG Objective

SFCG supports the addition of a new SRS (Earth-to-space) primary allocation in the band 22.55-23.15 GHz with a bandwidth up to 600 MHz, taking into account the results of ITU-R studies. A primary space research service allocation in the 22.55-23.15 GHz band will provide adequate uplink (Earth-to-space) bandwidth capacity to support the potentially, many concurrent manned and unmanned exploration missions particularly in the vicinity of the Moon. Furthermore, this new allocation will provide a needed companion uplink (Earth-to-space) band to the SRS downlink (space-to-Earth) allocation in the band 25.5-27.0 GHz that will be used for the transmission of mission data, command and control links.

Status

WP 7B is the responsible group for this agenda item. Preliminary sharing studies have been submitted to Working Party 7B showing that sharing should be possible without causing harmful interference to systems of the incumbent services. Liaison statements were sent to the Contributing Groups, WP 4A and WP 5C, requesting their review of and comments on the preliminary sharing studies with a view towards enabling WP 7B to progress the preparation of documentation for the CPM Report to WRC-11.

Agenda Item 1.12 “to protect the primary services in the band 37-38 GHz from interference resulting from aeronautical mobile service operations, taking into account the results of ITU R studies, in accordance with Resolution **754 (WRC-07)**”

Resolution **754 (WRC-07)** calls for consideration of modification of the aeronautical component of the mobile service allocation in the band 37-38 GHz for protection of other primary services.

SFCG Objective

SFCG supports the exclusion of the aeronautical mobile service (AMS) from the 37-38 GHz band to protect the deep space applications of the space research service in the band. However should the studies determine that sharing is feasible for specific AMS applications, then the SFCG would support the establishment of sharing criteria that both protects the space research service in the band 37-38 GHz, as well as allows for such compatible AMS applications.

Status

WP 7B is the responsible group for this agenda item. Preliminary sharing studies have been submitted to Working Party 7B showing that SRS earth stations would receive harmful interference from aeronautical mobile service transmitters operating within line-of-sight of the receiving earth stations, at the currently allowed EIRP limits and that substantially lower emissions would be required to prevent this interference. WP 7B has prepared a Working document towards draft CPM Text on Agenda item 1.12 containing outline of the relevant section of the report (Annex 9 to ITU-R Doc. 7B/32, see at: <http://www.itu.int/md/R07-WP7B-C-0032>).

Agenda Item 1.14 “to consider requirements for new applications in the radiolocation service and review allocations or regulatory provisions for implementation of the radiolocation service in the range 30-300 MHz, in accordance with Resolution **611 (WRC-07)**”

Resolution **611 (WRC-07)** calls for consideration by WRC-11 of a primary allocation to the radiolocation service in certain portions of the band 30-300 MHz for the implementation of new applications in the radiolocation service, with bandwidth no larger than 2 MHz, taking into account the results of ITU-R studies.

SFCG Objective

SFCG supports the protection of existing space science service allocations. No allocation changes for implementation of new applications in the radiolocation service should be made in space science service bands unless acceptable sharing criteria are developed.

Status

WP 5B is the responsible group for this agenda item and WP 7B is an interested group. A preliminary structure of the draft CPM text on A.I. is described in Annex 14 to ITU-R Doc. 5B/45 (see at: <http://www.itu.int/md/R07-WP5B-C-0045>).

Agenda Item 1.15 “to consider possible allocations in the range 3-50 MHz to the radiolocation service for oceanographic radar applications, taking into account the results of ITU R studies, in accordance with Resolution **612 (WRC-07)**”

Resolution **612 (WRC-07)** calls for the consideration by WRC-11 of the use of the radiolocation service between 3 and 50 MHz to support high-frequency (HF) oceanographic radar operations.

SFCG supports the protection of existing space science service allocations. No allocation changes to support HF oceanographic radar operations should be made in space science service bands unless acceptable sharing criteria are developed.

Status

WP 5B is the responsible group for this agenda item and WP 7B is an interested group. A preliminary structure of the draft CPM report related to A.I. is shown in Annex 15 to ITU-R Doc. 5B/45 (see at: <http://www.itu.int/md/R07-WP5B-C-0045>).

Agenda Item 1.19 “to consider regulatory measures and their relevance, in order to enable the introduction of software-defined radio and cognitive radio systems, based on the results of ITU R studies, in accordance with Resolution **956 (WRC-07)**”

Resolution **956 (WRC-07)** calls for studies on whether or not there is a need for regulatory measures related to the application of cognitive radio systems (CRS) technologies and software-defined radio (SDR).

SFCG Objective

SFCG supports studies to determine the relevancy of possible regulatory measures for CRS and SDR within the ITU-R, but sees no need at this time to identify or designate either SDR or CRS in the RR. The application of these technologies needs to be accomplished on a national basis. SFCG supports the use of SDR technologies for the space science services while recognizing the need to protect existing space science service allocations and their use. This is especially true with respect to the passive bands given in RR No. **5.340** where the spectrum would appear to be unused due to the lack of intentional emitters in these bands. SDR and CRS technologies would need to be deployed in such a manner so as to avoid the possibility of operation within exclusively passive spectrum bands.

Status

WP 1B is the responsible group for this agenda item and Study Group 7 is a contributing group. WP 1B has established a Workplan for its studies of SDR and CRS (Annex 7 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>), a Working Document Towards Draft CPM text (Annex 6 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>), a Correspondence Group under Peter Anker (NZL) with explicit Terms of Reference (Annex 8 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>) to progress studies of SDR and CRS, and Liaison Statements (Annex 9 to ITU-R Doc. 1B/40, see at: <http://www.itu.int/md/R07-WP1B-C-0040/en>) to other ITU-R Working Parties that is intended to lead to definitions for SDR and CRS.

Agenda Item 1.20 “to consider the results of ITU R studies and spectrum identification for gateway links for high altitude platform stations (HAPS) in the range 5 850-7 075 MHz in order to support operations in the fixed and mobile services, in accordance with Resolution **734 (Rev.WRC-07)**”

Resolution **734 (Rev.WRC-07)** calls for studies by the ITU-R that would identify possible spectrum for gateway links to be used by high altitude platform stations (HAPS) in the range 5850 to 7075 MHz.

SFCG Objective

SFCG does not support additional spectrum for HAPS gateway links within the portion of the band 5850 to 7075 MHz where passive sensors operate. Passive microwave sensors may utilize channels in the 6425 to 7075 MHz band within this frequency range (RR No. **5.458**). The AMSR-E passive microwave sensor is currently operational on NASA's AQUA mission and is also used on current and future meteorological satellites. This sensor operates in the 6750 to 7100 MHz band. While this band is not allocated, passive sensors utilizing this band already receive a great deal of interference from ground-based transmitters. The addition of HAPS gateways in this band would only exacerbate the current situation.

Status

WP 5C is the responsible group for this agenda item and WPs 7B and 7C are interested groups. The current footnote that addresses passive sensing notes that measurements are made over oceans in the band 6425-7025 MHz and states that "Administrations should bear in mind the needs of the Earth exploration-satellite (passive) and space research (passive) services in their future planning of the bands 6425-7025 MHz and 7075-7250 MHz." A preliminary consideration related to studies by WP 5C under A.I. 1.20 contained in the subsection 3.2.5 of ITU-R Doc. 5C/26 (see at: <http://www.itu.int/md/R07-WP5C-C-0026>).

Agenda Item 1.22 "to examine the effect of emissions from short-range devices on radiocommunication services, in accordance with Resolution **953 (WRC-07)**"

Resolution **953 (WRC-07)** calls for studies of the emissions from short-range devices (SRDs), in particular radio-frequency identification devices (RFIDs), inside and outside the frequency bands designated in the Radio Regulations for ISM applications, to ensure adequate protection of radiocommunication services.

SFCG Objective

SFCG supports studies of SRD emissions to ensure adequate protection of radiocommunication services, especially the space science services and particularly an aggregate SRD effect on EESS remote sensing systems (both active and passive), from such emissions. SFCG stresses the fact that the aggregate effect of emissions from SRDs deployed within one country could have negative impact on space-based radiocommunication systems operated by other administrations.

Status

WP 1A is the responsible group for this agenda item and Study Group 7 is a contributing group. At its June 2008 meeting, WP 1A approved its work plan (Annex 6 to ITU-R Doc. 1A/62, see at: <http://www.itu.int/md/R07-WP1A-C-0062/en>) of studies for this A.I. A correspondence group with explicit Terms of Reference (Annex 7 to ITU-R Doc. 1A/62, see at: <http://www.itu.int/md/R07-WP1A-C-0062/en>) was established to progress studies of this issue under Justine Sider (CAN). Liaison Statements were sent from WP 1A to ITU-T Study Groups 12 and 16 seeking information on SRDs. Additionally, the Director of the ITU Radiocommunication Bureau was asked to contact the ISO and the IEC for additional available information on SRDs.

Agenda Item 1.24 “to consider the existing allocation to the meteorological-satellite service in the band 7 750-7 850 MHz with a view to extending this allocation to the band 7 850-7 900 MHz, limited to non-geostationary meteorological satellites in the space-to-Earth direction, in accordance with Resolution **672 (WRC-07)**”

Resolution **672 (WRC-07)** calls for the extension of the 7750 to 7850 MHz allocation to the meteorological-satellite service into the band 7850 to 7900 MHz in the space-to-Earth direction, limited to non-geostationary meteorological satellites.

SFCG Objective

The mission requirements for next generation non-GSO meteorological satellites in terms of observations, instruments and user-services clearly show a need to transmit higher data rates compared to current systems. SFCG supports the extension of the existing allocation of the 7750-7850 MHz band to the meteorological-satellite service (space-to-Earth) for use by non-geostationary satellites into the 7850-7900 MHz band pending successful completion of appropriate sharing studies and determination of mutually acceptable sharing criteria. SFCG notes that sharing scenarios in the frequency band 7850-7900 MHz are similar to ones in the frequency band 7750-7850 MHz.

Status

WP 7B is the responsible group for this agenda item.

Agenda Item 1.25 “to consider possible additional allocations to the mobile-satellite service, in accordance with Resolution **231 (WRC-07)**”

Resolution **231 (WRC-07)** calls for additional allocations to the mobile-satellite service (MSS) with particular focus on the bands between 4 GHz and 16 GHz.

SFCG Objective

SFCG supports the protection of all space science service bands in the 4-16 GHz frequency range. SFCG member agencies make substantial use of a large number of frequency bands in this range that are critical to space research and Earth exploration-satellite service missions.

Status

WP 4C is the responsible group for this agenda item and Study Group 7 is a contributing group. WP 1A, is an “interested” group for this A.I. Working plan and milestones of studies to be carried out by WP 4C are described in Annex 15 to ITU-R Doc. 4C/66 (see at: <http://www.itu.int/md/R07-WP4C-C-0066>).

Agenda Item 7 “to consider possible changes in response to Resolution **86 (Rev. Marrakesh, 2002)** of the Plenipotentiary Conference: “Advance publication, coordination, notification and recording procedures for frequency assignments pertaining to satellite networks”, in accordance with Resolution **86 (Rev.WRC-07)**;

This standing agenda item to the WRCs deals with any possible changes to the Radio Regulations affecting the advance publication, coordination, notification and recording of satellite networks.

SFCG Objective

SFCG supports possible changes to the Radio Regulations to improve the handling of the advance publication, coordination, notification and recording procedures for satellite networks.

Status

WP 4A is the responsible group for any technical aspects of this agenda item and the Special Committee is the responsible group for the regulatory and procedural aspects of the agenda item.

Agenda Item 8.1 “to consider and approve the Report of the Director of the Radiocommunication Bureau:

8.1.1 “on the activities of the Radiocommunication Sector since WRC-07”

Issue C: Earth observation applications

Resolution **673 (WRC-07)** calls for ITU-R studies on possible means to improve the recognition of the essential role and global importance of Earth observation radiocommunication applications and the knowledge and understanding of administrations regarding the utilization and benefits of these applications. The results are to be included in the *Director’s Report to WRC-11* for the purpose of considering adequate actions in response to the results of these studies.

SFCG Objective

SFCG supports ITU-R studies on improving the recognition of Earth observing systems and their benefits, including the possible protection of the radiocommunication systems that support such observations. SFCG emphasises that radio based observing systems have a crucial role in detecting, warning and forecasting weather, water and climate related disasters. Since these disasters represent more than 90% of natural disasters, these systems are essential components of all-hazards emergency and disasters early-warning and mitigation systems.

Agenda Item 8.2 “to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent conference and on possible agenda items for future conferences, taking into account Resolution **806 (WRC-07)**”

SFCG Objectives with respect to the draft Agenda for WRC 20[15]

Future SRS (deep space) (space-to-Earth) Wideband Requirement

Up to 3 GHz of spectrum in the range between 27.5 GHz and 31 GHz. The timeframe when this allocation is required is not later than 2017 to permit the implementation of systems (space- and ground-based) and components. SFCG should support this requirement being placed on the draft agenda of WRC-2015. The issue will be studied within ITU-R under a draft new Question raised within Working Party 7B and expected to be adopted at the October 2008 meeting of ITU-R Study Group 7 (Document 7/5, see at: <http://www.itu.int/md/R07-SG07-C-0005/en>).

Designation of SRS bands for Emergency Communications

It is important to have specific existing SRS bands designated for use during emergencies so that they may be monitored by as many Agencies as possible and communication established with the distressed spacecraft. This will ensure that necessary and appropriate actions can be taken in an expeditious manner.

Disaster Prediction, Detection and Mitigation and Climate Change Monitoring

Timely warning of impending natural and environmental disasters, accurate climate prediction and detailed understanding of the status of global water resources: these are all critically important everyday issues for the global community. Systems belonging to Earth exploration-satellite and meteorological services around the world provide data, which are essential for the protection of the environment, economic development (transport, energy, agriculture, etc.) and the safety of life and property.

Radio-frequencies represent scarce and key resources used by these systems to measure and collect the observation data upon which analyses and predictions, including warnings, are based or processed, and to disseminate this information to governments, policy makers, disaster management organisations, commercial interests and the general public.

On a more general basis, the utmost importance of radio-frequencies for all Earth observation activities is to be stressed, in particular with regards to the global warming and climate change activities.

In this regard some possible items of relevance for future WRCs are the following

- To review RR No. **5.438** for 4.2-4.4 GHz and enhance EESS (passive) allocation status, to enable improved monitoring of soil moisture and sea surface temperature, to better understand global water circulation for oceans mainly in higher latitudes, global warming, and to improve weather prediction;
- To review RR No. **5.458** for 6-7GHz and enhance EESS (passive) allocation status, to enable improved monitoring of soil moisture and sea surface temperature,

to better understand global water circulation for oceans mainly in lower latitudes, global warming, and to improve weather prediction;

- To review RR Nos. **5.332** and **5.332A** with a view to possible expansion of bandwidth available for SAR operations above the current 1215 to 1300 MHz band to improve monitoring of deformation of the Earth's surface with little influence from vegetation, and to improve monitoring of soil moisture with higher spatial resolution.

Annex 2 to SFCG Resolution 28-1**ITEMS OF INTEREST TO SFCG MEMBERS FOR
CONSIDERATION AT FUTURE CONFERENCES****Improve allocations for active sensors**

Review RR Nos. **5.469A**¹, **5.476A**², **5.498A**³, **5.501B**⁴ and **5.513A**⁵, which affect active sensor operations in the following bands:

8550 – 8650 MHz
9300 – 9800 MHz
13.25 – 13.75 GHz
17.2 – 17.3 GHz

Improve allocation status at 26 GHz

Review the need for RR Nos. **5.536A**⁶ and **5.536B**⁷ appended to the space science services' allocations in the 25.25-27.5 GHz band.

Improve allocation status at 24 GHz

Upgrade from secondary to primary the allocation to EESS (active) in the band 24.05-24.25 GHz

¹ **5.469A** In the band 8 550-8 650 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, or constrain the use and development of, stations of the radiolocation service. (WRC-97)

² **5.476A** In the band 9 300-9 800 MHz, stations in the Earth exploration-satellite service (active) and space research service (active) shall not cause harmful interference to, nor claim protection from, stations of the radionavigation and radiolocation services. (WRC-07)

³ **5.498A** The Earth exploration-satellite (active) and space research (active) services operating in the band 13.25-13.4 GHz shall not cause harmful interference to, or constrain the use and development of, the aeronautical radionavigation service. (WRC-97)

⁴ **5.501B** In the band 13.4-13.75 GHz, the Earth exploration-satellite (active) and space research (active) services shall not cause harmful interference to, or constrain the use and development of, the radiolocation service. (WRC-97)

⁵ **5.513A** Spaceborne active sensors operating in the band 17.2-17.3 GHz shall not cause harmful interference to, or constrain the development of, the radiolocation and other services allocated on a primary basis. (WRC-97)

⁶ **5.536A** Administrations operating earth stations in the Earth exploration-satellite service or the space research service shall not claim protection from stations in the fixed and mobile services operated by other administrations. In addition, earth stations in the Earth exploration-satellite service or in the space research service should be operated taking into account Recommendations ITU-R SA.1278 and ITU-R SA.1625, respectively. (WRC-03)

⁷ **5.536B** In Germany, Saudi Arabia, Austria, Belgium, Brazil, Bulgaria, China, Korea (Rep. of), Denmark, Egypt, United Arab Emirates, Spain, Estonia, Finland, France, Hungary, India, Iran (Islamic Republic of), Ireland, Israel, Italy, the Libyan Arab Jamahiriya, Jordan, Kenya, Kuwait, Lebanon, Liechtenstein, Lithuania, Moldova, Norway, Oman, Uganda, Pakistan, the Philippines, Poland, Portugal, the Syrian Arab Republic, Dem. People's Rep. of Korea, Slovakia, the Czech Rep., Romania, the United Kingdom, Singapore, Sweden, Switzerland, Tanzania, Turkey, Viet Nam and Zimbabwe, earth stations operating in the Earth exploration-satellite service in the band 25.5-27 GHz shall not claim protection from, or constrain the use and deployment of, stations of the fixed and mobile services. (WRC-07)

APPENDIX 2

SFCG-28
16 – 24 September 2008
Quebec City, Canada

SF28-SWG-3/TEMP 1

SFCG

SFCG Liaison Statement to CGMS concerning Coordination of Future Use of the Band 401 – 403 MHz by Data Collection Systems (DCSs) by Geostationary and Non-geostationary MetSat and EESS Satellite Systems

The SFCG is pleased to inform CGMS about its discussion on the urgent need for coordination of the future use of the band 401 – 403 MHz by Data Collection Systems (DCSs) by geostationary and non-geostationary MetSat and EESS satellite systems.

This discussion was triggered by a frequency declaration for the ARGOS-4 system in which 5 so called “beams” were identified with frequency bands in the range 401 – 403 MHz (Beam-1: 401.275 – 401.580 MHz, Beam-2: 401.690 – 402.400 MHz, Beam-3: 402.521 – 402.650 MHz, Beam-4: 402.850 – 403 MHz and Beam-6: 401 – 401.225 MHz).

Those ARGOS-4 beams would overlap with the current and future planned frequency bands used by geostationary MetSat systems for regional DCPs and the IDCS.

At SFCG-28 an overview of the current and future planned use of the band 401 – 403 MHz by geostationary and non-geostationary MetSat and EESS satellite systems and a potential partitioning of the band was presented.

Beside the issue of coexistence between next generation non-geostationary and geostationary DCS systems in the frequency range 401 – 403 MHz, plans for expansion of the frequency spectrum requirements for next generation GSO MetSat systems requires to coordinate or segment the spectrum resource among the operators in order to allow an effective and interference-free use of the spectrum, as it successfully demonstrated today by the segmentation of the band as was agreed by the geostationary MetSat operators in the framework of CGMS.

CGMS may wish to take into account the following findings of SFCG in its deliberations on this urgent subject, considering that not all MetSat operators were present at the meeting, allowing SFCG-28 to draw a conclusive picture of the current and future planned use in the band 401 – 403 MHz and the resulting sharing and coordination issues:

- 1) For the band 401.701 - 402.435 MHz, SFCG concluded that overlapping frequency use as it would be the case for Beam-2 (401.690 – 402.400 MHz) between ARGOS-4 on non-geostationary MetSat systems and regional DCP and IDCS use on current geostationary MetSat systems would result in mutual harmful interference. Therefore, the band 401.701 - 402.435 MHz should remain available only for DCS using geostationary MetSat systems in cross-support between the regions. This would also avoid interference into neighbouring MetSat systems.
- 2) The band 402.435 – 402.850 MHz could be designated for DCS using geostationary MetSat systems and split-up in two sub-bands (402.435 – 402.635 MHz and 402.635 – 402.850 MHz) in similar fashion as done for the current regional DCP bands in order to avoid interference into neighbouring MetSat systems. The concept of cross-support between the regions could also be applied.

Note: For the partitioning for regional DCP use and cross support among GSO MetSat operators no conclusion could be drawn as such a split would not provide the amount of spectrum which is planned for GOES-R, pending NOAA's and potentially other GSO MetSat operator's (Russia, India) support of the proposed partitioning.

- 3) Within the band 402.435 – 402.850 MHz that could be designated for regional DCP use on GSO MetSat systems, 100 kHz could be designated for an ARGOS-GEO component, ideally made available on a global basis by all geostationary MetSat operators. If the concept of cross-support would be applied, these 100 kHz could be positioned in the middle of both sub-bands (e.g. 402.585 – 402.685 MHz), or in one of the two sub-bands. CNES and EUMETSAT are currently arranging a test at which ARGOS platform messages are relayed via geostationary MetSat system.
- 4) For the band 401.1 – 402.4 MHz which is currently used by FY-2 satellites, no conclusion could be drawn, as CNES and CMA are currently in coordination negotiations and CMA was not present at the SFCG-28 meeting.
- 5) The remaining portions of the band 401 – 403 MHz, namely 401- 401.1 MHz, 401.4 – 401.7 MHz and 402.850 – 403 MHz, could be designated to the ARGOS LEO component, if there are no other requirements identified by CMGS.

The attached figure tries to provide an overview of the current and planned spectrum use for Data Collection Systems in the range 401 – 403 MHz and illustrates the findings of SFCG as described above. It should be noted that the completeness and correctness of this overview could not be verified as not all geostationary MetSat operators were present at the SFCG-28 meeting.

CGMS is invited to consider the issue and to provide SFCG with their view on the future use of the band 401 – 403 MHz for Data Collection Systems of meteorological satellites. In particular CGMS members not having participated at SFCG-28 are invited to provide their views and information on their future plans for the band 401 – 403 MHz.

