

**Task Number:** AR-06-11

**Task Title:** Radio Frequency Protection

**Area:** ARCHITECTURE

**Relevant Committee:** ADC

**Related Targets:** (to be included in 2009)

**Task Definition** (as given in the 2009-2011 Work Plan):

Recognizing the fundamental importance of radio-frequencies necessary for all GEOSS components, in particular in-situ, ground- and space-based observations, as well as the increasing economical and political pressure on corresponding parts of the spectrum, undertake appropriate coordinated advocacy activities in association with Member countries, including representations to the International Telecommunication Union (ITU) and other bodies in charge of frequency management. This also includes a support to GEO Members in influencing their national and regional frequency management bodies. In particular, the case of passive bands, essential for Earth observations, will be monitored with the highest care, endeavouring to assess the potential impact of interference on Earth observation applications and final products. In this respect, it is also important to link with Scientific Committee on Frequency Allocations for Radio Astronomy and Space Science (IUCAF).

**Leads** (GEO Member or PO, Entity carrying out the work, Contact: e-mail):

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**Motivation/Background**

Radio frequencies represent scarce and key resources used by Earth observation systems to measure and collect 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.

From the initialization of GEO, and more recently reiterated in the Cape Town Declaration (Nov 07), Radio frequency protection has been recognized as a critically important issue for Earth observations, in particular but far being limited to frequency bands where passive sensing measurements are performed. Early in the development of the GEOSS 10-Year Implementation Plan, the *ad hoc* GEO subgroup on data utilisation (SGDU) stressed a specific goal of the GEOSS initiative to ensure that these radio frequencies be protected.

Some of these frequencies are in high demand for active applications not related to GEOSS, i.e. some groups would like to emit at these frequencies, even though protected by the Radio Regulations (RR) provision 5.340 that states that all emissions are prohibited. Further recognising that frequencies used for active remote sensing as well as ground-based applications are also important and must be protected should they become threatened, GEO Task AR-06-11 was set-up to prepare, in particular, a series of advocating activities through national and international bodies in charge of frequency management, such as the International Telecommunication Union (ITU) that in particular prepares for World Radiocommunication Conferences.

**Outputs (and reference documents)**

- GEO response to the European Union public consultation (related to the EU RSPG Opinion on “A coordinated EU spectrum approach for scientific use of radio spectrum”, see reference documents 8 and 9)
- GEOSS “Recommendation” on the use and protection requirements of related frequency bands (Delivered February 2007, for the ITU Conference Preparatory Meeting (CPM), see Reference document 13)
- Text on Frequency Protection to be included in the EOS declaration (initially delivered March 2007, basis for inclusion of the frequency issue in the Ministerial declaration, see reference document 17)

Also, the impressive results obtained at the last WRC-07 (see reference document 14 and 15) for the overall Earth Observation community were largely attributable to the careful preparation and active participation of WMO, several NMHSs and meteorological and environmental satellite agencies, as well as, in particular, to the SG-RFC members that were attending and actively participating to this WRC-07 (see reference document 14 and 15)

### *Reference documents*

N°	Title and/or description	Date
1	Report of the Subgroup on Data Utilization (SGDU) (March 19, 2004)	March 2004
2 rev1	WMO Resolution 4 (Cg-XV) : "Radio Frequencies for meteorological and related environmental activities"  <i>NOTE: New version of the Resolution adopted at the May 2007 WMO Congress. Included in Document N°4rev1</i>	May 2007
3	WMO response to the Australian ACMA consultation on Short-Range Radars 24 GHz	April 2006
4 rev1	WMO position on World Radio communication Conference 2007 agenda	May 2007
5	UK report on "The role of science in Physical Natural Hazard Assessment"	June 2005
6 rev1	CEOS "Survey of Earth observation radio frequency spectrum use and interference threats"	August 2006
7	EC Decision 2005/50/EC on the "harmonisation of the 24 GHz range radio spectrum band for the time-limited use by automotive short-range radar equipment in the Community"	17 January 2005
8 rev1	European Commission Radio Spectrum Policy Group (RSPG) Report and Opinion on "A coordinated EU spectrum approach for scientific use of radio spectrum".	25 October 2006
9	GEO response to the EU public consultation (related to document 8)	14 July 2006
10	WMO response to the EU public consultation (related to document 8)	14 July 2006
11	EUMETNET response to the EU public consultation (related to document 8)	14 July 2006
12	UK Metoffice response to the EU public consultation (related to document 8)	14 July 2006
13	Importance of radio spectrum for the Global Earth Observation System of systems (GEOSS) and related frequency protection requirements <i>Note : This Document was presented by WMO at the February 2007 ITU CPM</i>	February 2007
14 rev1	WRC-07 Resolution on EO	Nov 2007
15	WRC-07 outcomes (WMO report)	Nov 2007
16	Cape Town Declaration	Nov 2007
17	WRC-11 Agenda	Nov 2007
18	GEO-ITU Memorandum of Understanding	Nov 2007
19	WMO position on World Radio communication Conference 2011 agenda	July 2007
20	Joint ITU-WMO Handbook on "Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction"	March 2009

### *Activities*

- (1) GEOSS reference frequency bands list (delivery 2009)
- (2) Study on economical and societal impact of the scientific services and corresponding loss of Earth Observation microwave measurement data due to RF interference (delivery 2009) (see note 1 below)
- (3) As required, contributions to different radio communications bodies (delivery as needed) (See note 2)
- (4) Support to GEO members in their national actions through their National Radio-Administrations

Note 1: It has to be noted that while some of the Task issues relate to the regular work of frequency managers, as represented within this GEO task, and hence could be performed within AR-06-11, the task issue (2) on the potential impact (data products, economical and societal impacts) of the degradation or loss of measurements will need scientific and operational assessments that are not of Task AR-06-11 and its members competence.

A coordination within GEO and among a number of other GEO tasks would have to be handled but it should be stressed at this stage that the CEOS announced contribution on this issue is still awaited.

Note 2: It should here be stressed that all contributions to ITU-R relies on WMO representation and recognition in ITU and competences of WMO representatives.

### **Resources**

No financial resource is requested. Funding for the assessment study (issue (2)) may come from voluntary contribution by CEOS members.

The human resource related to the POC is provided by Météo France, through the Chairmanship of WMO Steering-Group on Radio-Frequency Coordination (SG-RFC).

It should also be emphasized that most task AR-06-11 actions were and are undertaken and coordinated by the WMO SG-RFC and by corresponding members, representing here an important human resource contribution.

### **Architecture and Data Component**

1) Please briefly describe any task-related Earth observation resources (data set, system, website/portal) and any related Web Service interfaces that are contributed to GEOSS. State whether these items are or will be registered with the GEOSS Component and Service Registry for access via the GEO Web Portals, and whether any associated standards or other interoperability arrangements will be registered in the Standards and Interoperability Registry.

2) Please also describe what data and information your activity/system needs that you would request to be accessible through the GEOSS Common Infrastructure.

### **Capacity Building Component**

Although not directly focused on capacity building per se, Task AR-06-11 has contributed significantly to global capacity building in advocating, through the publication and dissemination of a number of documents as well as WMO workshops, the nature and essential importance of specific frequency management issues related to Earth Observation, aiming at educating part-time spectrum managers about current radio-frequency issues and how best to address them via the ITU process.

### **User Engagement Component**

Acknowledging the increasing pressure of active services, mainly telecommunications, represented by a number of powerful lobbies, on the frequency bands used by the meteorological community and recognising that radio-frequency issues are managed either on national or international basis by National Radio-Administrations (NRA), advocating protection of radio-frequencies used by Earth Observations community is not only an issue for Task AR-06-11 but has to be further on a national basis by all end users.

Such action is sometimes complicated to handle due to difficulty of arguing about complex issues that need a deep knowledge of the situation but one of AR-06-11 aims is also to provide support to members in such action (contacts, details, specific arguments, ...).

These actions from GEO members would significantly facilitate and improve the AR-06-11 actions by allowing larger support to our positions from their country representatives in radiocommunication forum. On the contrary, understanding national opinions not in favour of GEO positions is also relevant information. In any case, a feed-back to the EUMETFREQ programme manager is needed.

**Science and Technology (S&T) Component**

1) Please briefly describe the elements of scientific research or technological development contained in this Task.

2) In relation to the S&T component(s) of this task, please describe gaps, priorities, continuity needs, barriers, scientific expertise and additional resource needs (this information will be used for developing a gaps and needs assessment in Task ST-09-01)

**Members and POs' Contributions to Outputs and Activities above:****JAPAN**

JAXA: To coordinate the JAXA's requirement of radio frequency protection through the CEOS community.

**CEOS**

Assess the potential impact of the degradation or loss of measurements in microwave atmospheric sounding and SAR bands due to interference with unregulated emissions of other commercial users. This impact will be evaluated in terms of economical and social impact on the final user, the average citizen. The study will try to associate real economical figures to the loss of end data products (short and medium term weather forecast, climate research, various SAR end data products ...). It will be presented to the ITU and, possibly, other regional spectrum regulatory groups. It will be used, for example, as a tool to argue about the need for regulatory limits on unwanted emissions in purely passive bands (Agenda Item 1.20 of WRC 2007). More generally it will be used to counter the economical arguments used by commercial services to justify the lack of regulatory limits.

**EUMETNET**

One of EUMETNET programmes is dedicated to "protection of radio-frequencies" (EUMETFREQ) to coordinate and contribute to different forum where such issues are discussed, and in particular to the European Communication Committee with which EUMETNET has a Letter of Understanding (LoU) allowing to attend and contribute to its different meetings. EUMETNET contribution will take the form of an expertise in the frequency field and a relay of the GEO positions within the relevant forum within ECC as well as within the European Commission..

**ECMWF**

ECMWF, together with the UK MetOffice, is supporting EUMETNET in documenting the position of the numerical weather prediction (NWP) community facing radio frequency interference (RFI) on frequency bands that are crucial for meteorology. This support is mainly based on NWP expertise and to a smaller extent on impact studies and simulations of degraded availability of meteorologically sensitive frequency bands.

**WMO**

WMO participates in ITU-Radio communication Sector activities in its capacity as ITU-R Member. It is the focal point for ITU-R as regards frequency bands allocated for meteorological purpose (in broad sense): Met Aids, Met Radar (incl. wind profilers), Met Sat, EESS (spaceborne passive and relevant active remote sensing).

The WMO Commission for Basic Systems (CBS) has established the Steering Group on Radio-Frequency Coordination (SG-RFC) to coordinate radio-frequency issues for operation and research; Its work plan and deliverables are as follows:

- a. Organize, with the assistance of the WMO Secretariat, a joint WMO-ITU Workshop on Radio Frequencies for Weather, Water and Climate monitoring and prediction (WMO Headquarters, September 2009).
- b. Contributions (esp. to ITU-R) on issues on radio frequencies for meteorology, in particular related to the protection of space-borne passive sensing bands. Promote/facilitate (by providing information and guidance) Members' participation in national, regional and global (i.e. ITU-R) activities regarding radio frequencies.

- c. Develop guidance and information for Members on relevant issues for World Radio communication Conferences.

**Participation:**

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