# The ITU Report of the activities for the IAM-2009

## III. Current and forthcoming space-related activities

### A. Protecting the Earth's environment and managing resources

**1.** The ITU Radiocommunication Sector (ITU-R) has developed many texts, e.g. Recommendations, Reports and Handbooks that address the technical characteristics of the services concerned, as well as related spectrum issues. Amongst new texts currently in preparation are Recommendations on ground-based meteorological aids and space-based meteorological systems using optical frequencies, spectrum aspects of active and passive sensors, data collection and dissemination, and interference mitigation techniques applicable in certain bands used by the Earth exploration and meteorological-satellite services. [1]

**2.** ITU-R Study Group 7 in cooperation the Steering Group on Radio Frequency Coordination (SG-RFC) of the World Meteorological Organization (WMO) developed a new version of the ITU/WMO Handbook "**Use of Radio Spectrum for Meteorology: Weather, Water and Climate Monitoring and Prediction**" that describes modern radio-based technologies and systems (space and terrestrial) used for environmental monitoring, prediction, detection and mitigation of the negative effects of natural disasters.

**3.** The ITU Telecommunication Development Sector (ITU-D) in close collaboration with ITU-R is continuing the further development of the Spectrum Management System for Developing Countries (SMS4DC) [2] that will help the developing world to effectively manage their spectrum management related issues. Amongst the other, determination of satellite earth stations coordination zone as well calculation of earth to space radio- communication path loss caused by water vapour, rain, cloud, scintillation and atmospheric gaseous are included in its Technical Functions.

**4.** The ITU Telecommunication Standardization Sector (ITU-T) Focus Group on ICTs and Climate Change (FG ICT&CC) is working on the development of methodologies for the analysis, evaluation and quantification of greenhouse gas emissions from the ICT sector and the reductions that may be achieved through the use of ICTs in other sectors (teleconferencing and related reduction of carbon-generating travel, "work-at-home", dematerialization – paperless technologies, use of Internet instead of CDs and DVDs, etc.).

**5.** The ITU organised in 2008 two Symposia on ICTs and Climate Change[3]. The first was held in Kyoto, Japan 15-16 April 2008, hosted by MIC Japan, and the second was held in London, UK, on 17-18 June, hosted by BT. These symposia brought together key specialists in the field, from top decision-makers to engineers, designers, planners, government officials, regulators, standards experts and others. Many presentations and discussions were devoted to the role of space radiocommunications in combatting the effects of climate change.

[1] see http://www.itu.int/ITU-R/study-groups/rsg7/index.asp
[2] see http://www.itu.int/ITU-D/tech/spectrum-management/index.html
[3] see http://www.itu.int/ITU-T/worksem/climatechange/index.html

**B. Using space applications for human security, humanitarian assistance, development and welfare**

6. When disaster strikes, communications links are often disrupted, yet for relief workers who arrive on the scene these links are essential. Victims of disasters will now be able to benefit from faster and more effective rescue operations, thanks to the Tampere Convention on the Provision of Telecommunication Resources for Disaster Mitigation and Relief Operations that came into force 8 January 2005, following the ratification by **36** countries (*as of 09.07.2007*). Until now, the trans-border use of telecommunication equipment by humanitarian organizations was often impeded by regulatory barriers that make it extremely difficult to import and rapidly deploy telecommunications equipment for emergency without prior consent of the local authorities. The treaty simplifies the use of life-saving telecommunication equipment. A dedicated website has been developed for this Convention [4]

**7.** Aspects of radiocommunication services associated with disasters include, *inter alia*, disaster prediction, detection, alerting and disaster relief. In certain cases, when the "wired" telecommunication infrastructure is significantly or completely destroyed by a disaster, only radiocommunication services can be employed for disaster relief operation. The Radio Regulations contain numerous provisions for those services associated with disaster prediction, detection and planning of relief operations such as Earth exploration-satellite and meteorological-satellite services. Many provisions regulate activities related to distress and safety communications, such as the maritime, aeronautical and radiodetermination services. Studies on radiocommunications for emergency situations and for ensuring safety of life represent a major responsibility of the ITU-R. A dedicated website has been developed which describes the role that ITU-R plays in disaster mitigation and relief operations [5].

**8.** The ITU Radiocommunication Assembly 2007 (RA-07) adopted Resolution ITU-R 55 which invites the ITU-R Study Groups to take into consideration the scope of ongoing studies/activities outlined in the annex to the Resolution, and to develop guidelines related to the management of radiocommunications in disaster prediction, detection, mitigation and relief, collaboratively and cooperatively, within ITU and with organizations external to the Union, in order to avoid duplication of effort.

**9.** The RA-07 adopted Resolution ITU-R 53 which instructs the Director of the Radiocommunication Bureau to assist Member States with their emergency radiocommunication preparedness activities such as the listing of currently available frequencies for use in emergency situations for inclusion in a database maintained by the Bureau.

**10.** The World Radiocommunication Conference 2007 (WRC-07) updated Resolution **644** in order to emphasize on the urgent need for studies of those aspects of radiocommunications/ICT that are relevant to early warning, disaster mitigation and relief operations, highlighting in particular the importance of the space radiocommunications for those operations. WRC-07 also adopted new Resolution **647 (WRC-07)** calling for the development of spectrum management guidelines for radiocommunication in emergency and disaster relief as well as the identification and maintenance of available frequencies for use in the very early stages of humanitarian assistance intervention in the aftermath of disaster. The ITU Radiocommunication Bureau developed in 2008 an on line database [6] for frequency management in disaster situations and facilitate online access thereto by administrations, national regulatory authorities, disaster relief agencies and organizations, in particular the UN Emergency Relief Coordinator, in accordance with the operating procedures developed for disaster situations.

**11.** Preparation for the next World Radiocommunication Conference 2011 (WRC-11) has started within the ITU-R. In particular, studies are on-going to prepare methods to satisfy WRC-11

[4] see http://www.itu.int/ITU-D/emergencytelecoms/tampere.html
[5] see http://www.itu.int/ITU-R/index.asp?category=information&link=emergency&lang=en
[6] see http://www.itu.int/ITU-R/index.asp?category=information&rlink=res647&lang=en

Agenda items[7], which include, among others, needs for additional radio-frequency spectrum for safety and emergency communications, as well as for scientific services to better monitor climate changes and global warming and reduce the potential effects of meteorological and natural disasters. Studies are also on-going on other WRC-11 Agenda items to ensure long-term spectrum availability for the aeronautical mobile-satellite (R) service, on the spectrum usage of the 21.4-22 GHz band for the broadcasting-satellite service and the associated feeder-link bands in Regions 1 and 3, on a global primary allocation to the radiodetermination-satellite service in the frequency band 2 483.5-2 500 MHz (space-to-Earth) and on possible additional allocations to the mobile-satellite service.

**12.** The ITU in collaboration with the OCHA, the UN Working Group on Emergency Telecommunications (WGET) and other organizations, as appropriate, is developing and arranging the dissemination of standard operating procedures and relevant spectrum management practices for use in the event of a disaster situation.

**13.** ITU-D organized in 2008 a series of events related to the disaster communication[8]:

**14.** The ITU published a Handbook on Emergency Telecommunications and a special ITU-R supplement on Emergency and Disaster relief[9]. This publication is written to serve as a close companion to those involved in the noble work of providing as well as using telecommunications for disaster mitigation and relief. It simplifies and demystifies the complex technical issues that characterize the fast evolving field of telecommunications, especially in this era of convergence and emergence of next-generation networks. While designed to be simple, the handbook is comprehensive, compact and contains useful factual information that is concise and organized for easy access, in particular by practitioners. In addition, the ITU-R Study Groups have continued their efforts to develop Recommendations and Reports in support of radio services and systems employed for emergency and disaster situations. Examples are Recommendations ITU-R BO/BT.1774-1 "Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief" and S.1001-1 "Use of systems in the fixed-satellite service in the event of natural disasters and similar emergencies for warning and relief operations". A preliminary draft new Recommendation on the "Use of systems in the mobile-satellite service for early warning and relief operations in the event of disasters and similar emergencies" has also been developed.

## D. Utilizing and facilitating information and communications technology for development

**15.** The ITU is organizing a global multi-stakeholder partnership "**Connect"** [10] to mobilize the human, financial and technical resources required to bridge major gaps in information and communication technology (ICT) infrastructure across the region, with the aim of supporting affordable connectivity and applications and services to stimulate economic growth, employment and development through the world. The next **Connect CIS** [11] will be organized in 2009. Enhancing security and building confidence in the use of ICT **applications i**s one of six priority domains for Programme 3 of the Doha Action Plan adopted at the ITU 2006 World Telecommunication Development Conference[12].

**16.** The ITU is maintaining a Cybersecurity Gateway [13] to provide an easy-to-use information resource on national and international cyber security related initiatives worldwide.

**17.** The ICT Applications and Cybersecurity Division (CYB) is the ITU-D's focal point to assist developing countries in bridging the digital divide by advancing the use of ICT-based

[7] see http://www.itu.int/ITU-R/go/rcpm-wrc-11-studies&lang=en
[8] see http://www.itu.int/ITU-D/emergencytelecoms/events.html
[9] see http://www.itu.int/pub/R-HDB-48/en
[10] see http://www.itu.int/ITU-D/connect/africa/2007/
[11] see http://www.itu.int/ITU-D/connect/cis/programme.html
[12] see http://www.itu.int/ITU-D/cyb/cybersecurity/
[13] see http://g4chat.itu.ch/cybersecurity/gateway/index.html

networks, services and applications, and promoting cybersecurity. The ITU organized in 2008 a series of Forums related to the Cybersecurity[14]

**18.** The ITU-R Sector is continuing the development of information related to Spectrum Monitoring for the next edition of the ITU-R Spectrum monitoring Handbook[15]. In the meantime, ITU-R has published a Supplement[16] to that Handbook, in which Section 5.1 on Space Emissions has been completely revised and updated to include, in addition to the description of new space monitoring techniques and equipments, particular focus on: i) the monitoring of the pre-phase of the launch of a space station, to monitor the frequencies used for TT&C; ii) the measurement techniques related to the geo-location of transmitters; and iii) the increasing importance of reliable database systems in support of space monitoring, as well as of common format for exchange of satellite monitoring information.

## E. Using and improving satellite positioning and location capabilities

**19.** The World Radiocommunication Conferences (Geneva, 2003 and 2007) agreed on the frequency allocation and sharing criteria for satellite systems in the radionavigation-satellite service (RNSS) and established a RES-609 RNSS Consultation Meeting for administrations operating or planning to operate RNSS systems. There were 5 consultation meetings (Geneva 2003, Ottawa 2004, Munich 2005, Bangalore 2006 and Xi'an 2008) with the participation of all RNSS notifying administrations and operators. A determination of the epfd level produced by all space stations of the RNSS systems was made and agreed at the last 2008 Meeting to achieve the level of protection for aeronautical radionavigation service (ARNS) systems.[17]

**20.** ITU-R Study Group 4 has developed several Recommendations describing systems and networks in the RNSS as well as technical characteristics, performance requirements and protection criteria for associated space and earth stations.

## G. Advancing scientific knowledge of space and protecting the space environment

**21.** The meteorological and Earth exploration-satellite services (passive and active) play a major role in prediction and detection of disasters, retrieving and relaying data from monitoring equipment (e.g. on buoys) to land-based siren systems.[18] More advanced systems will involve remote sensing of the ocean temperature, wind and state whose variations can be linked with seismic activity and measurement of rain, snow, wind and soil moisture. In this respect, the WRC-07 provided additional spectrum and approved protection criteria for these services[19], including those using passive sensors.

**22.** WRC-07 also approved several Resolutions requesting ITU-R Study Groups to carry out studies and prepare proposals to WRC-11 for the further development of radio systems and applications (including spaceborne) involved in environment monitoring, weather and climate forecasting, disaster prediction and detection.

**23.** ITU-R Study Group 7 has developed several Recommendation and Reports describing technical parameters, spectrum requirements, protection and sharing criteria of systems operating in space research service (SRS). These publications provide guidelines on development and the use of radiocommunication systems in deep space research operations and on Moon, Mars and other planets exploration.

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[14] see http://www.itu.int/ITU-D/cyb/
[15] see http://www.itu.int/publ/R-HDB-23/en
[16] see http://www.itu.int/publ/R-HDB-53/en
[17] see http://www.itu.int/ITU-R/space/res609/index.html
[18] see http://www.itu.int/itunews/manager/display.asp?lang=en&year=2007&issue=08&ipage=space-cscience&ext=html
[19] see http://www.itu.int/newsroom/wrc/2007/index.html