*ITU-D Regional Development Forum for the Africa Region:*
***"NGN and Broadband, Opportunities and Challenges"***
***Lusaka, Zambia, 18-19 May 2009***

# ITU-R Standardization Activities

***Nelson MALAGUTI***
*Counsellor, ITU Radiocommunication Bureau (BR)*
***E-mail: nelson.malaguti@itu.int***

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## Presentation

- Objectives of ITU-R Study Groups
- Structure of Study Groups
- Radiocommunication Assembly
- Scope of Study Groups
- Current key areas of standardization
- ITU-R Recommendations, Reports and Handbooks

# Role of ITU-R

- ensure the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services, including those using the geostationary-satellite or other satellite orbits,…
- carry out studies without limit of frequency range and adopting Recommendations on radiocommunication matters.

(ref. Article 12 of Constitution)



# Role of ITU-R

**Role conducted through** *(inter alia)*:

- World (and Regional) Radiocommunication Conferences
- Approval of **Recommendations** by Member States

**Technical studies** are required which are conducted in **Study Groups**

# Principal Tasks of ITU-R Study Groups

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Develop technical bases for WRCs (and RRCs) → e.g. CPM process for WRCs

Develop Recommendations

- International voluntary ***Standards*** on:
  - •spectrum management, satellite orbits, frequency sharing
  - •system characteristics and operation
- ITU-R represents:
  - **International focal point for the standardization of wireless systems**

Compile Reports and Handbooks



# ITU-R Study Groups

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- Groups of experts (> 1500)from ITU membership
- Currently 6 Stu
- Subordinate
  - Working Par
  - Group

SG 1: Spectrum management
SG 3: Radiowave propagation
SG 4: Satellite services
SG 5: Terrestrial se
SG 6: Broadcasting serv
SG 7: Science services

Member States
Sector Members
Associates

WP 5D: IMT

Regional/National SDO's
e.g. ETSI, IEC

UN bodies
e.g. WHO, WMO

WP 1C: spectrum monitoring

Regional Frequency Management
e.g. CEPT

WP 3K: Point-to-area propagation

e.g. WiMAX

WP 4A: Orbit/spectrum utilization

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# ITU-R Study Groups

- SG 1: Spectrum management
- SG 3: Radiowave propagation
- SG 4: Satellite services
- SG 5: Terrestrial services
- SG 6: Broadcasting service
- SG 7: Science services

Supported by Counsellors and Assistants in Study Group Department of BR



# Radiocommunication Assembly

- convened every 3-4 years
- associated in time and place with WRCs

(Article 13 of Constitution)

- Adopts Study Group work programmes
- Approves ITU-R Resolutions
  - working procedures
  - specific aspects of Study Group responsibility
- Approves Recommendations
- Establishes ITU-R Study Groups (and elects their chairmen/vice-chairmen)

# Study Group 1
# Spectrum management

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Principles and techniques for
- spectrum management
- sharing criteria
- spectrum monitoring
- long-term strategies for spectrum utilization

- Short Range radio Devices (SRD)

- International spectrum regulatory framework



# Study Group 3
# Radiowave propagation

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- Propagation in ionized and non-ionized media
- Development of prediction methods

- Characteristics and mapping of propagation medium

- Propagation prediction methods
  e.g. for terrestrial digital broadcasting (RRC-06)

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# Study Group 4
# Satellite services

- Systems and performance in FSS, BSS, MSS and RDSS
- Efficient orbit/spectrum utilization for FSS, BSS, MSS and RDSS
- IP Global broadband Internet access via satellite
- Early warning and relief operations

- Technical characteristics for systems and networks in the RNSS

- Satellite radio interface of IMT-2000



# Study Group 5
# Terrestrial services

- IMT-2000 and IMT-Advanced
- Fixed, mobile, portable and nomadic communications, including BWA, RLANs, HAPS
- Maritime and aeronautical services
- Radiodetermination service
- Amateur service
- SDR and CRs

- Next generation mobile access "IMT Advanced"

- Spectrum issues for maritime and aeronautical services

# Study Group 6
# Broadcasting service

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- Programme production
- Programme assembly
- Delivery
- Reception quality

- Sharing issues at UHF

- Multimedia and data broadcasting for mobile reception



# Study Group 7
# Science services

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- Systems for space operation, space research, Earth exploration and meteorology
- Radio astronomy
- Standard frequency and time signals

- EESS including meteorological satellite service for disaster prediction and detection, and for climate monitoring
- Protection of passive services, e.g. Radio astronomy

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## ITU-R Study Groups on Internet

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See: http://www.itu.int/ITU-R/go/rsg



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## Study Group 4 (SG 4) - Satellite services

## Some key areas of ITU-R Standardization

- Broadband wireless access (terrestrial and satellite) – *separate presentation*
- IMT - International Mobile Telecommunications – *separate presentation*
- Broadcasting technologies
- Emergency communications
- Environmental monitoring



## Digital broadcasting

**Advantages over analogue systems:**

- Expanded services
- Higher quality video and sound
- Lower power consumption
- Greater variety and faster rates of data transmission
- Spectrum efficient – several programmes on one channel

**Key achievements in ITU-R:**

- GE-06 digital broadcasting plan providing opportunity for "digital dividend" arising from analogue-to-digital switch-over
- HDTV standard (ITU-R BT.709) now 25 years old, being deployed worldwide
- Report ITU-R BT.2140 on transition from analogue to digital terrestrial broadcasting + many ITU-R Recommendations on digital TV, video, audio

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# Future Broadcasting Technologies

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## Ultra High Definition Television (UHDTV):

- Studies underway to provide better visual experience than HDTV by expanding the field-of-view;
- two image systems being studied: 3 840 x 2 160 and 7 680 x 4 320 pixels;
- complementary multichannel audio system with 22.2 channels.

## 3D Television:

- new study programme has started: two groups identified;
- first generation systems, near future, plano-stereoscopic display;
- second generation systems, based on object wave recording, long term;
- Workshop was held in April 2009 in Geneva to examine current situation.



# Emergency Communications

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**Prediction and Detection:** Meteorological services (Met-Aids, Met-Sat); Earth Exploration Satellite Service

**Alerting:** Amateur service; Broadcasting services (terrestrial and satellite); fixed services (terrestrial and satellite); Mobile services (land, satellite, maritime)

**Damage assessment and Relief:** Amateur service; Broadcasting services (terrestrial and satellite); fixed services (terrestrial and satellite); Mobile services (land, satellite, maritime); Earth Exploration Satellite Service

**Regulatory role** **Standardization role**

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# Emergency Communications

**Databases relating to safety of life and rescue operations**

•available frequencies for use in emergency situations and guidelines on the management of radiocommunications (Res 647 (WRC-07), Res ITU-R 53)

•Maritime mobile Access and retrieval System (MARS)

**Regionally Harmonized Frequency Bands for Public Protection and Disaster Relief**

•preferred frequency bands listed in Res 646 (WRC-03)

**Study Group activities**

•spectrum management guidelines

•Recommendations, Reports, Handbooks providing technical basis for development and operation of the radiocommunication services used in the various phases of emergency and disaster situations



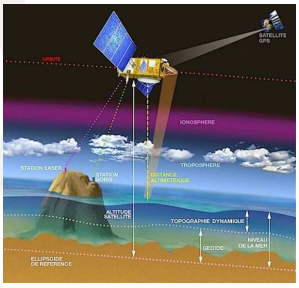
# Climate change

- ITU-R's standardization role on monitoring and mitigating the effects of climate change is very closely linked with that on Emergency Communications
- Through its responsibility for international spectrum management, ITU-R provides interference-free spectrum and satellite orbits for climate monitoring
- Cooperates with UN agencies (e.g. WMO) and international and national organizations involved with climate change

# Climate change

- Study Groups develop Recommendations, Reports and Handbooks on
  - operation of radio systems for environmental monitoring, including climate change; e.g. ITU/WMO Handbook on "Use of Radio spectrum for meteorology: weather, water and climate monitoring and prediction"
  - facilitating the introduction and operation of low-energy systems; e.g. analogue to digital broadcasting
- Satellite-based remote sensors (passive and active) are main tools for obtaining environmental data for climate monitoring
- Systems belonging to
  - Earth exploration satellite service
  - Meteorological-satellite service
  - Meteorological aids service

form backbone of the
*WMO Global Climate Observing System*






# Study Group Products

- **Technical bases for WRC (and RRC)**
  - ➡ **CPM Report**
- ITU-R Recommendations
- Reports and Handbooks

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## Table of contents of the CPM Report to WRC-11

| Chapters of CPM Report | WRC-11 Agenda items |
|---|---|
| 1. Maritime and Aeronautical issues | 1.3, 1.4, 1.9, 1.10 |
| 2. Radiolocation and Amateur issues | 1.14, 1.15, 1.21, 1.23 |
| 3. Fixed, Mobile and Broadcasting issues | 1.5, 1.8, 1.17, 1.20, 1.22 |
| 4. Science issues | 1.6, 1.11, 1.12, 1.16, 1.24 |
| 5. Satellite issues | 1.7, 1.13, 1.18, 1.25, 7 |
| 6. Future work programme and other issues | 1.2, 1.19, 2, 4, 8.1, 8.2 |



## Study Group Products

- Technical bases for WRC (and RRC)
  - ➡ CPM Report
- **ITU-R Recommendations**
- Reports and Handbooks

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## ITU-R Recommendation Series

- **BO:** Satellite delivery
- **BR:** Recording for production, archival and play-out; film for television
- **BS:** Broadcasting service (sound)
- **BT:** Broadcasting service (television)
- **F:** Fixed service
- **M:** Mobile, radiodetermination, amateur and related satellite services
- **P:** Radiowave propagation
- **RA:** Radio astronomy
- **RS:** Remote sensing systems
- **S:** Fixed-satellite service
- **SA:** Space applications and meteorology
- **SF:** Frequency sharing and coordination between fixed-satellite and fixed service systems
- **SM:** Spectrum management
- **SNG:** Satellite news gathering
- **TF:** Time signals and frequency standards emissions
- **V:** Vocabulary and related subjects



## Study Group Products

- Technical bases for WRC (and RRC)
  - ➡ CPM Report
- ITU-R Recommendations
- **Reports and Handbooks**

# Example Reports from ITU-R

- Economic aspects of spectrum management
- Fixed service applications using free-space optical links
- Means of calculating low-orbit satellite visibility statistics
- Guidelines for evaluation of radio interface technologies for IMT-Advanced
- Transition from analogue to digital terrestrial broadcasting



# Example Handbooks from ITU-R

- National Spectrum Management
- Spectrum Monitoring
- Satellite Communications (FSS)
- Radiowave Propagation information for designing terrestrial point-to-point links
- Use of radio spectrum for meteorology: weather, water, climate monitoring and prediction
- Digital terrestrial TV broadcasting
- Land mobile including wireless access
- Frequency adaptive systems

## Concluding remarks

- ITU Radiocommunication Sector represents focal point for standardization of radiocommunication services and systems
- The **ITU-R Study Groups** are the "home" for the technical studies required for the standardization activities
- Principal products:
  - Technical bases for Radiocommunication Conferences
  - Recommendations, Reports and Handbooks



## Thank you!

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