Overview of Radiocommunication Sector (ITU-R) Activities in Radicommunication Standardization

Dr. Valery TIMOFEEV

Director, Radiocommunication Bureau (BR)

Res. 123 (Rev. Antalya, 2006) and ITU-R

Bridging the standardization gap between developing and developed countries

taking into account

a) that developing countries could benefit from improved capability in the application and development of standards;

b) that ITU-T and ITU-R activities and the telecommunication/information and communication technology (ICT) market could also benefit from better involvement of developing countries in standard-making and standards application;

resolves to instruct the Secretary-General and the Directors of the three Bureaux

1 to work closely with each other on the follow-up and implementation of this resolution, as well as the operative paragraphs of Res. 44 & 54 (Florianópolis, 2004), 17 (Rev. Florianópolis, 2004) and Res. (Doha, 2006) that assist in bridging the standardization gap between developing and developed countries;

2 to maintain, to the extent practicable, a close coordination mechanism among the three Sectors at the regional level through ITU regional offices;

ITU-R Functions – ITU Constitution

78 PP-98	1 1) The functions of the Radiocommunication Sector shall be, bearing in mind the particular concerns of developing countries, to fulfil the purposes of the Union, as stated in Article 1 of this Constitution, relating to radiocommunication: – by ensuring 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, subject to the provisions of Article 44 of this Constitution, *and* – by carrying out studies without limit of frequency range and adopting recommendations on radiocommunication matters. ….

How ITU-R Implements these Functions?

Developing and implementing ITU-R standards on:

- **radio devices/applications/systems/networks;**
- **procedures, rules and algorithms for development, introduction and maintenance of radio applications/devices/systems/networks.**

Fulfilling international spectrum management functions (through the Radiocommunication Bureau and the Radio Regulations Board) in accordance with the Radio Regulations and Regional Agreements/ Plans, including:

- **processing frequency assignments/allotments submitted by Administrations;**
- **determination of coordination requirements;**
- **maintenance of the Master International Frequency Register (MIFR) and Regional Plans; etc.**

Specificity of Radio Waves and Necessity of Standardization

As radio waves do not recognize political borders, the global nature of the problem required international cooperation, and the need for standardization was recognized at the beginning of the radio-era.

All parties: governments, service provides and users want interference-free communications and all came to the conclusion that the management of the radio spectrum is an unavoidable necessity.

The use of the spectrum has been regulated *by necessity:* to prevent mutual interference, and to allow for inter-communication.

Types of ITU-R Standards

Two kinds of standards:

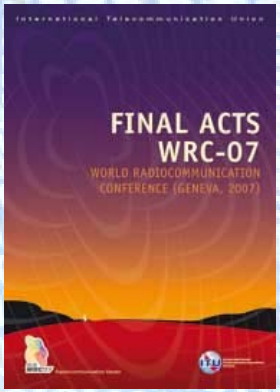
1) Mandatory – international treaty status:

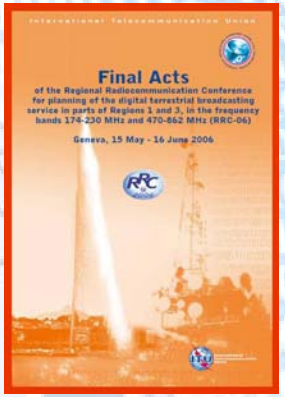
- **Decisions of World Radiocommunication Conferences (WRC);**
- **Decisions of ITU Regional Radiocommunication Conferences (RRC);**
- **Radio Regulations (RR) – 4 volumes;**
- **ITU-R Recommendations incorporated by reference in the Radio Regulations (RR);**

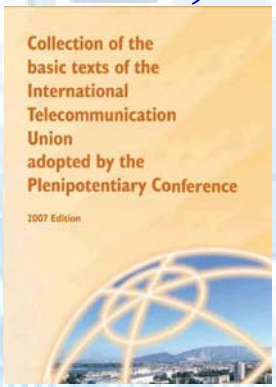
2) Voluntary:

- **Other ITU-R Recommendations;**

ITU Constitution, Convention and Resolutions adopted by ITU Plenipotentiary Conferences are also mandatory standards





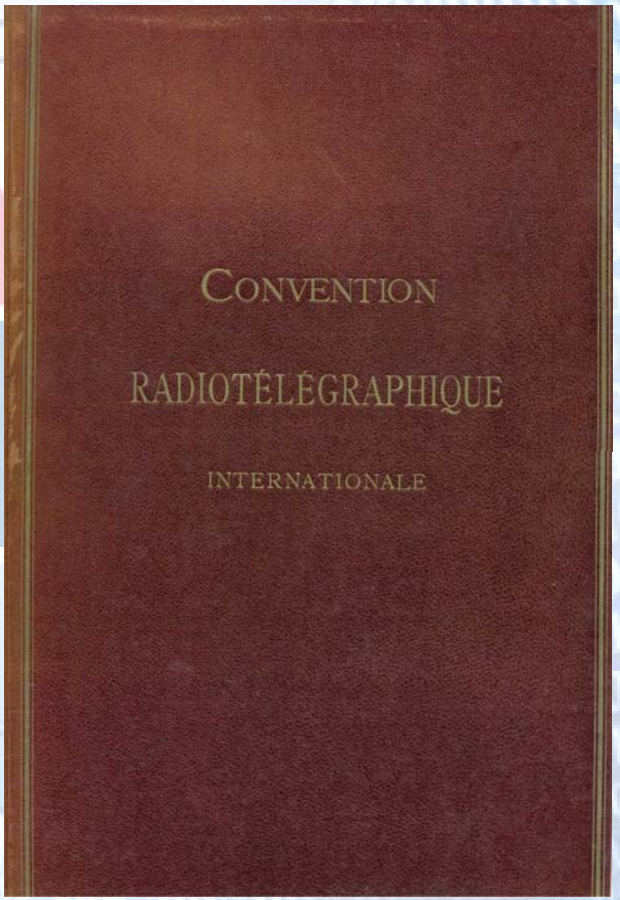


First Step in Spectrum Management & Radiocommunication Standardization

The *Radio Telegraph Conference of Berlin* in 1906: 29 countries adopted a Radiotelegraph Convention modelled after the International Telegraph Convention.

The first Radio Regulations were born more than 100 years ago!

Two wavelengths corresponding to 1000 and 500 kHz were set for public correspondence, The band between 188 and 500 kHz was reserved for "services not open to public correspondence", mainly military and naval.



Main Principles of RR Today

The main goal of the Radio Regulations is to provide radio-frequency spectrum management on the international level with the maximum possible flexibility.

RR guiding principles:

- **providing equitable access to radio frequencies and any associated orbits, including the geostationary-satellite orbit, taking into account the special needs of the developing countries and the geographical situation of particular countries;**
- **avoid causing harmful interference to services rendered by stations using frequencies assigned in accordance with the Table of Frequency Allocations and the other provisions of RR, the characteristics of which assignments are recorded in the Master International Frequency Register (MIFR);**
- **endeavour to apply the latest technical advances, etc.**

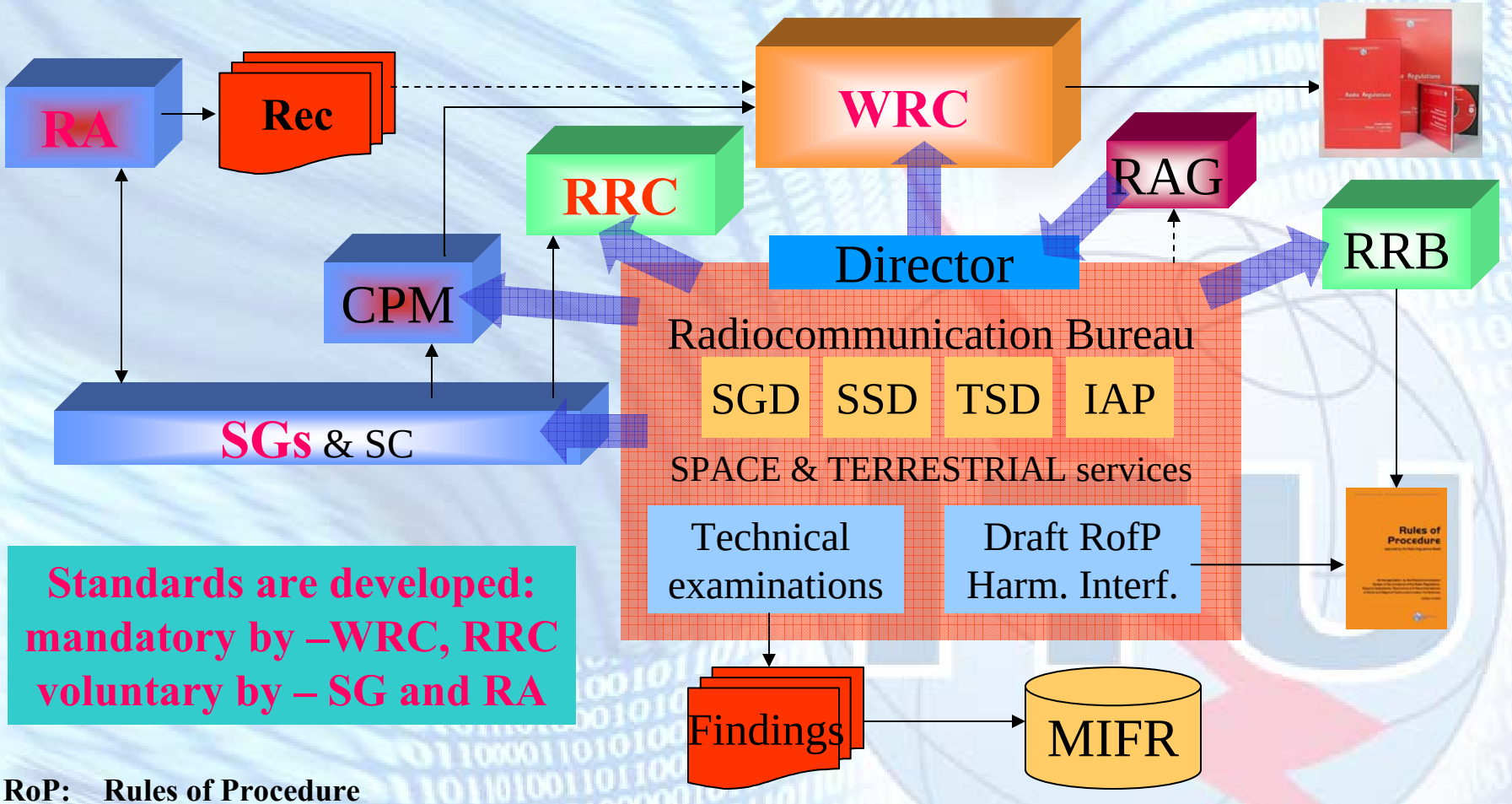
ITU-R Recommendation

Definition:

«An answer to a Question or part(s) of a Question which, within the scope of existing knowledge and studies or the results of studies referred to in § 3.3, recommends specifications, data or guidance provides a recommended way or ways of undertaking a specified task; or a recommended procedure or procedures for a specified application and which is considered to be sufficient to serve as a basis for international cooperation in a given context in the field of radiocommunications.»

Section 6.1.2 of Resolution ITU-R 1-5 (Radiocommunication Assembly 2007)

ITU-R Structure and Standardization Forums



Standards are developed: mandatory by –WRC, RRC voluntary by – SG and RA

RoP: Rules of Procedure
RR: Radio Regulations (treaty status)
RRB: Radio Regulations Board
SGs: ITU-R Study Groups
RRC: Regional Radiocommunication Conference
WRC: World Radiocommunication Conference

CPM: Conference Preparatory Meeting
MIFR: Master International Frequency Registry
RA: Radiocommunication Assembly
RAG: Radiocommunication Advisory Group
Rec: Recommendations (international voluntary standards)

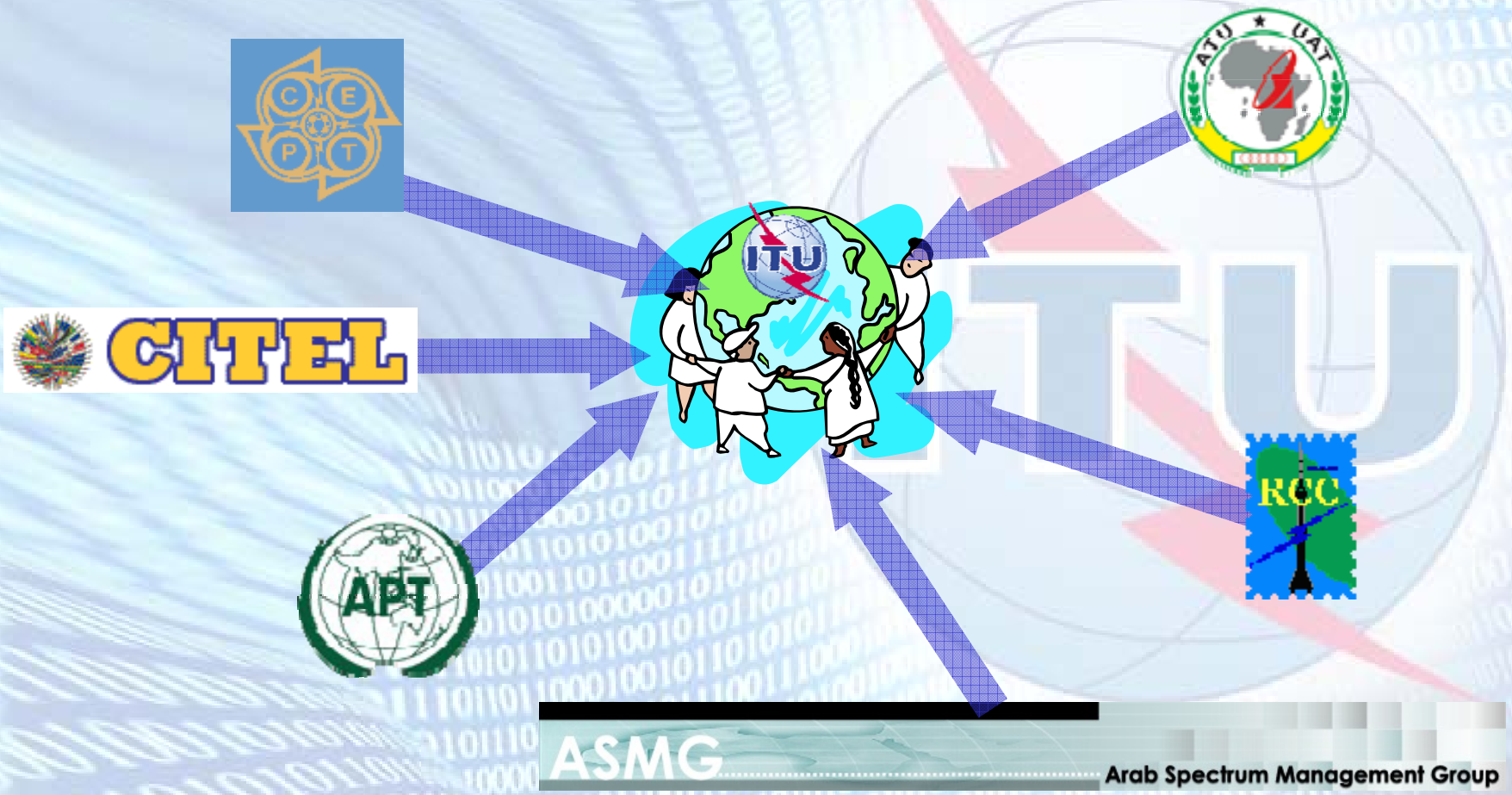
Development of Radiocommunication Standards – Radio Regulations

The **Radio Regulations** (*treaty status)* is a mandatory standard, which incorporates the decisions of the World Radiocommunication Conferences (WRCs), including all Appendices, Resolutions, Recommendations and ITU-R Recommendations incorporated by reference.

- Frequency block **allocations** to defined radio services (Article 5)
- Mandatory or voluntary **regulatory procedures** (coordination, plan modification, notification, recording) that are adapted to the allocation structure

Regional Preparation to WRCs and RRCs

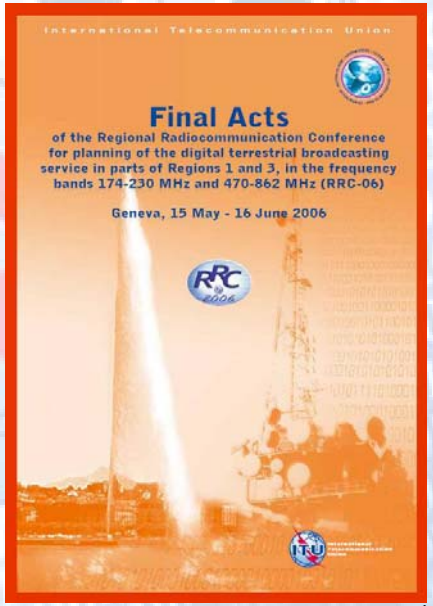
The regional coordinated proposals submitted by regional groups/organizations are "de facto" main input document of WRCs!



Development of Radiocommunication Standards – Regional Agreements/Plans

- developed by ITU Regional Radiocommunication Conferences (RRCs);
- based on proposals by ITU Member States belonging to that ITU-R Region;
- takes into account the coordinated proposals by regional groups, which are part of that ITU-R Region (such as APT, ATU, ASMG, CEPT, CITEL, RCC);
- mandatory for ITU Member States - parties of that Agreement.

A sample: GE06 Agreement.



Development, Approval and Application of ITU-R Recommendations

ITU-R Recommendations:

- **are developed by experts from Administrations, operators and private companies (>1500 experts from most countries);**
- **are approved by the ITU Member States either by correspondence or at the Radiocommunication Assembly *(see presentation on session "International radiocommunication standards and guidelines")*;**
- **are voluntary standards (except those incorporated in RR by reference). However, even voluntary ITU-R Recommendations are, in practice, applied everywhere;**
- **application of ITU-R Recommendations incorporated in RR is mandatory for spectrum management on the international level;**
- **applied by spectrum management specialist/planners, system designers, radiocommunication operators/engineers, etc.**

Radiocommunication Study Groups

Res. ITU-R 4-5 of Radiocommunication Assembly 2007: decided to establish 6 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

- ✓ >900 Recommendations
- ✓ "Standards" in areas of spectrum management and radio technology
- ✓ Result of consensus from meetings of world-wide experts
- ✓ Some referred to in RR
- ✓ Used by spectrum planners and system designers

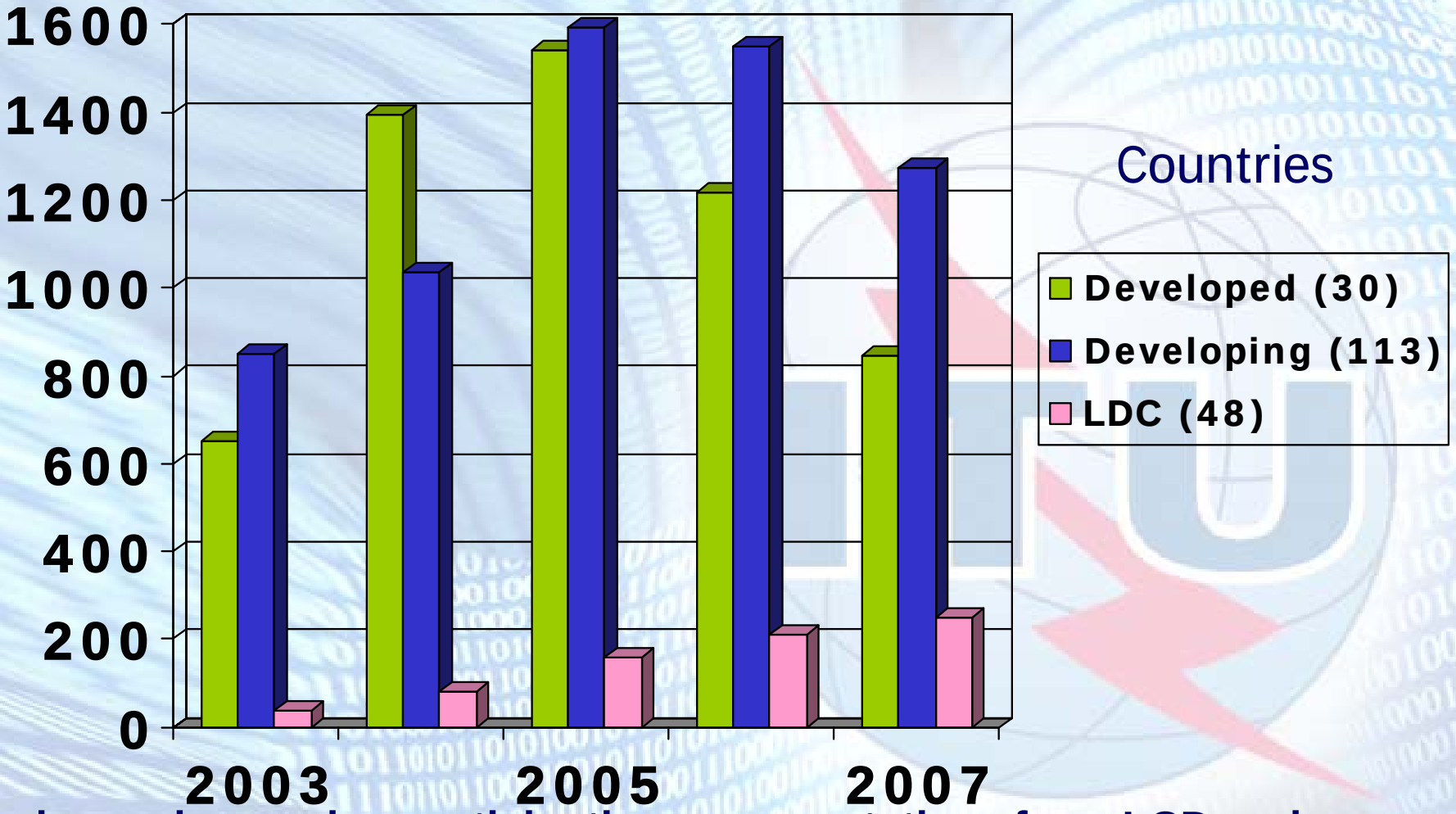
In addition:
CCV: Coordination Committee for Vocabulary
CPM: Conference Preparatory Meeting
SC: Special Committee on regulatory and procedural matters

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

Supported by Counsellors and Assistants in Study Group Department of BR

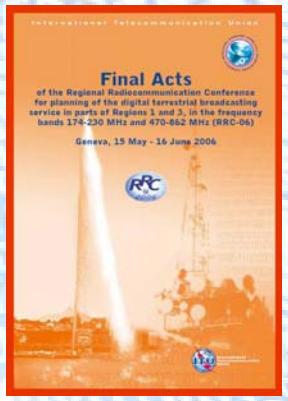
Participation in Development of ITU-R Recommendations

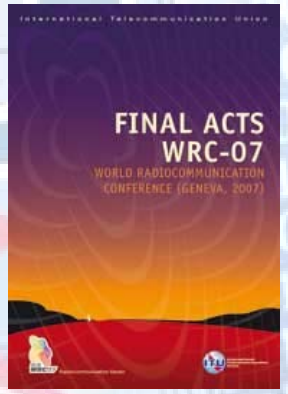
Delegates in ITU-R Study Group meetings



Tendency: increasing participation representatives from LCD and developing countries (comparing with 2003)

ITU-R Milestones in Standardization in 2003-2007





1) Regional Radiocommunication Conference 2006 (RRC-06) – Digital broadcasting Plan for 120 countries;
2) Radiocommunication Assembly 2007 (RA-07) – new ITU Study Group structure, several important ITU-R Recommendations (including Rec. on IMT – see presentation at 4th session);
3) World Radiocommunication Conference 2007 (WRC-07) – modification of the frequency allocation table (including bands for IMT, science services, etc.), modification of procedures of Appendix 30B - FSS Plan (new improved technical parameters and improved provisions), modification of some provisions of RR taking into account the latest technological achievements.

In 2003-2007 ITU-R Study Groups revised many existing and developed many new ITU-R Recommendations.

RRC-06 – Switching from Analogue to Digital

170°E

Digital terrestrial broadcasting Plan in frequency bands 174–230 and 470–862 MHz for 120 countries and Plan modification procedures:

- **4-8 (depending on modulation and compression) TV programs in one 8 МГц channel;**
- **improved quality of picture and sound;**
- **allow to transmit high-definition TV;**
- **decrease TV transmitter power by almost 10 times;**
- **Administrations requests' satisfaction level > 90%.**

***Transition period*: 17 July 2015 with exception of countries mentioned in footnote 7 of Article 12 of GE06 Agreement. For those countries** *(including some Arab countries)* **the *Transition period* shall end on 17 June 2020.**

Technical basis – Recommendations ITU-R:

- **BT.1306-3 - DVB-T system (TV) – it is also used for sound and data transmission;**
- **BS.1114-5 - T-DAB system (sound) – it is also used for TV and data transmission;**
- **P.1546-2 – a method for point-to-area radio propagation predictions in the VHF and UHF bands (field-strength calculation).**

WRC-07 in brief

Mr. François Rancy **(France)**
Chairman, ITU WRC-07

Participation: **2,822** delegates, **161** Member States, **94** observer organizations

Documentation: Over **3,100** proposals in **350** documents, **11,800** pages translated, **2,380,000** downloads

Meetings: Over **1,100** meetings,
30 meetings/day

Final Acts: ~**500** pages

http://www.itu.int/ITU-R/go/WRC-07

International Mobile Telecommunications (IMT)

Globally harmonized spectrum identified for use by IMT represents an important step in the worldwide development of IMT systems:

450–470 MHz (((

)))) 698–862 MHz
R2 & R3 (9 countries)

)))) 790–862 MHz
R1 & R3

3.4–3.6 GHz band (((
(no global allocation)

)))) 2.3–2.4 GHz

Note:

- Higher frequencies: to face growth in densely populated areas.

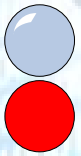
- Lower frequencies to provide, at a reasonable cost, high speed mobile services everywhere, in particular in less densely populated areas.

New Appendix 30B (Plan for FSS)

- **incorporated new technical parameters based on the latest technological achievements;**
- **Plan FSS provides 800 MHz national allotment (covering national territory) for each ITU Member State (at the time of Plan development).**
- **establishes top priority in obtaining national allotment for countries, that do not currently have it;**
- **contains new provisions, which will significantly speed up the processing of modifications to the Plan and to the List;**
- **etc.**

A sample of processing of request by a "new" ITU Member State in accordance with procedures of new Appendix 30B

Queue for processing



additional system

Allotment for a "new" ITU Member State

Emergency Situations and Climate Change

Taking into account a very important role of radio technologies and radiocommunication services in:

- **emergency situations when "wired" telecommunication infrastructure is significantly or completely destroyed by a disaster;**
- **environment monitoring and weather forecasting;**
- **monitoring of climate change;**
- **disaster prediction, detection and planning relief operations**

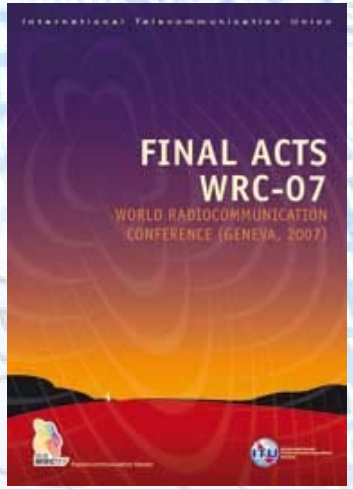
WRC-07:

- **allocated additional frequency bands for science services;**
- **approved protection criteria for non-interference operation of systems involved in climate and weather monitoring;**
- **requested BR to create a database of frequencies to be used in emergency situations (Res. 647 (WRC-07));**
- **invited ITU-R to carry out the studies for further development of systems used for environment monitoring.**

WRC-07 vs WRC-11

WRC-07 (22.10-16.11.2007)

- 30 agenda items, 3100 proposals, 2800 del.!
- almost all services (terrestrial: FS, MS, BS, Amat.S, RAS, RLS, space: FSS, BSS, MSS, EESS, SRS, SO, MetSat, Amat.Sat)
- several applications: IMT, HAPS, HF, GMDSS



WRC-11 ([dates in 2011 to be confirmed])

- 33 agenda items,
- again almost all services (terrestrial: RLS, AM(R)S, passive S, FS, BS, MS, Maritime MS, Amat.S, space: AMS(R)S, SRS, BSS, MSS, MetAids, RDSS, MetSat) and other issues (Res.951, SRDs, Cognitive Radio)
- and many applications and systems : UAS, ENG, HAPS, oceanographic radar, …

Application of ITU-R Standards

The best samples:

- **Radio Regulations – applied by all countries around the World for international spectrum management;**
- **ITU-R Regional Agreements – applied by all country parties of a given agreement (some countries are parties of several Agreements/Plans);**
- **ITU-R M-Series Rec. – e.g. for land mobile service: there are currently > 3.5 billions customers (more than 50% people on the Earth) using mobile phones built in accordance with ITU-R Rec.;**
- **ITU-R BT&BR-Series Rec. – used for broadcasting (TV and sound). There are more than 1.5 billions TV sets based on ITU-R standards;**
- **ITU-R standards for the use of radiocommunication services/systems for emergency situations;**
- **etc..**

Assistance by Radiocommunication Bureau (BR) in Application of ITU-R Standards

- **consultation and technical assistance to Member States in application of the Radio Regulations for coordination and notification of frequency assignments;**
- **organization of Biennial seminars by the BR (***deal with the application of the provisions of the ITU Radio Regulations and the BR software***) – *next seminar will be held on 8-12 December 2008 in Geneva*;**
- **organization of regional seminars on spectrum management and other aspects of radiocommunications** *(some together with the Telecommunication Development Bureau)*;
- **participation of BR staff in meetings of other international organizations and regional groups;**
- **developing of Handbooks (guidelines describing the problem and providing advice on the use of ITU-R Rec.);**
- **individual training of experts from the ITU Member States;**
- **etc.**

ITU-R on INTERNET

http://www.itu.int/ITU-R/index.asp?category=information&rlink=rhome&lang=en

Radiocommunication Sector (ITU-R)

- World Radiocommunication Conferences (WRC)
- Radiocommunication Assemblies (RA)
- Radio Regulations Board (RRB)
- Radiocommunication Advisory Group (RAG)
- Study Groups
- Space Services
- Terrestrial Services
- Sector Organization
- Membership

Activities

- Conferences and Meetings
- Information
- Publications
- Administrative Circulars and Circulars Letters
- Operational Plans
- Performance Reports

Databases and Services

- MARS
- GLAD
- BR IFIC (Space Services)

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Radiocommunication Sector (ITU-R)

The ITU Radiocommunication Sector (ITU-R) plays a vital role in the global management of the radio-frequency spectrum and satellite orbits - limited natural resources which are increasingly in demand from a large and growing number of services such as fixed, mobile, broadcasting, amateur, space research, emergency telecommunications, meteorology, global positioning systems, environmental monitoring and communication services - that ensure safety of life on land, at sea and in the skies. More...

In Focus: Spotlight on ITU-R´s key activities

- ITU global standard for international mobile telecommunications ´IMT-Advanced´
- Maritime mobile Access and Retrieval System (MARS)
- Radiocommunications and Climate Change
- World Radiocommunication Conference 2011 (WRC-11)
- Emergency Radiocommunications

Newsflashes

03/06/08	**SG6** - ITU journey to Worldwide ´3D Television´ System begins
18/04/08	**WRC-07** - Final Acts are available
11/04/08	ITU-R Sector contribution to Bridging the Digital Disabilities Divide
27/02/08	**MARS** - List of Ship Stations (List V) (48th Edition, 2008) - Order form
22/02/08	**RAG** - Draft Summary of Conclusions is now available
18/02/08	**RRB** - Schedule for consideration of Rules of Procedure

Directors´ corner

Biography

Meetings

18/06	**WP 1A**	(Geneva)
18/06	**WP 1B**	(Geneva)
18/06	**WP 1C**	(Geneva)
23/06	**RRB-08.2**	(Geneva)
24/06	**WP 5D**	(Dubai)

ITU-R Meetings schedule

Meeting sessions

Publications

Key Publications

- Radio Regulations
- List VIII - List of International Monitoring Stations
- List V - List of Ship Stations
- Maritime Manual - Manual for Use by the Maritime Mobile and Maritime Mobile

Thank you for your attention!

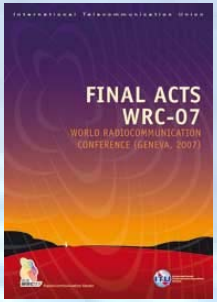
questions?

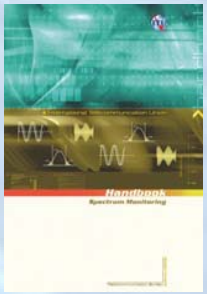
Supplementary Slides/

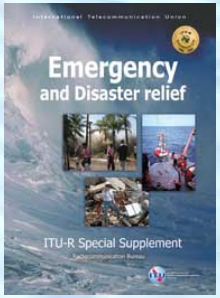
Information

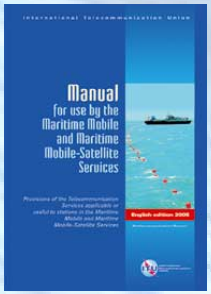
ITU-R Publications

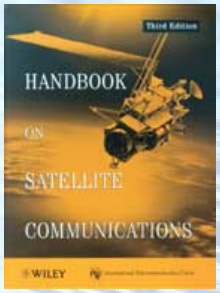
ITU electronic BOOKSHOP











- **BR International Frequency Information Circular (IFIC) – terrestrial and space services**
- **Space Radiocommunication Stations on DVD-ROM**
- **Radio Regulations**
  - **electronic file (WinWord, PDF)**
  - **CD-ROM**
  - **paper**
- **Service documents**
- **ITU-R Recommendations**
  - **online subscriptions**
  - **CD-ROM**
  - **paper**
- **Handbooks, etc.**

http://www.itu.int/publications

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

Some ITU-R Web Pages

Main ITU-R Web page:
→ **http://www.itu.int/ITU-R**

Terrestrial Services: http://www.itu.int/ITU-R/terrestrial

Space Services: http://www.itu.int/ITU-R/space

Study Groups: http://www.itu.int/ITU-R/index.asp?category=study-groups&rlink=rsg&lang=en

ITU-R Publications:
→**http://www.itu.int/publications/sector.aspx?sector=1&lang=en**