

# ITUWRS

GENEVA2024

2-6 December 2024  
Geneva, Switzerland



# Radiocommunication Study Groups

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**Mr Sergio Buonomo**

*Chief, Radiocommunication Study Groups Department*

**Ms Alicia Soto Romero**

*Project Officer, Radiocommunication Study Groups Department*

2-6 December 2024, Geneva, Switzerland

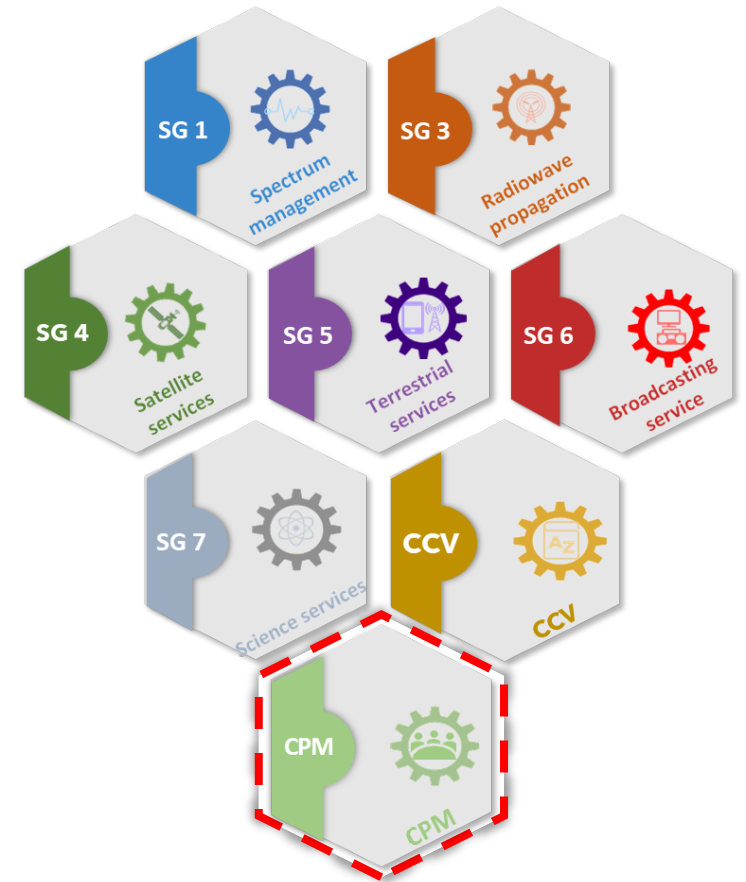
# The Study Groups Department (SGD)

## Study Groups activities include:

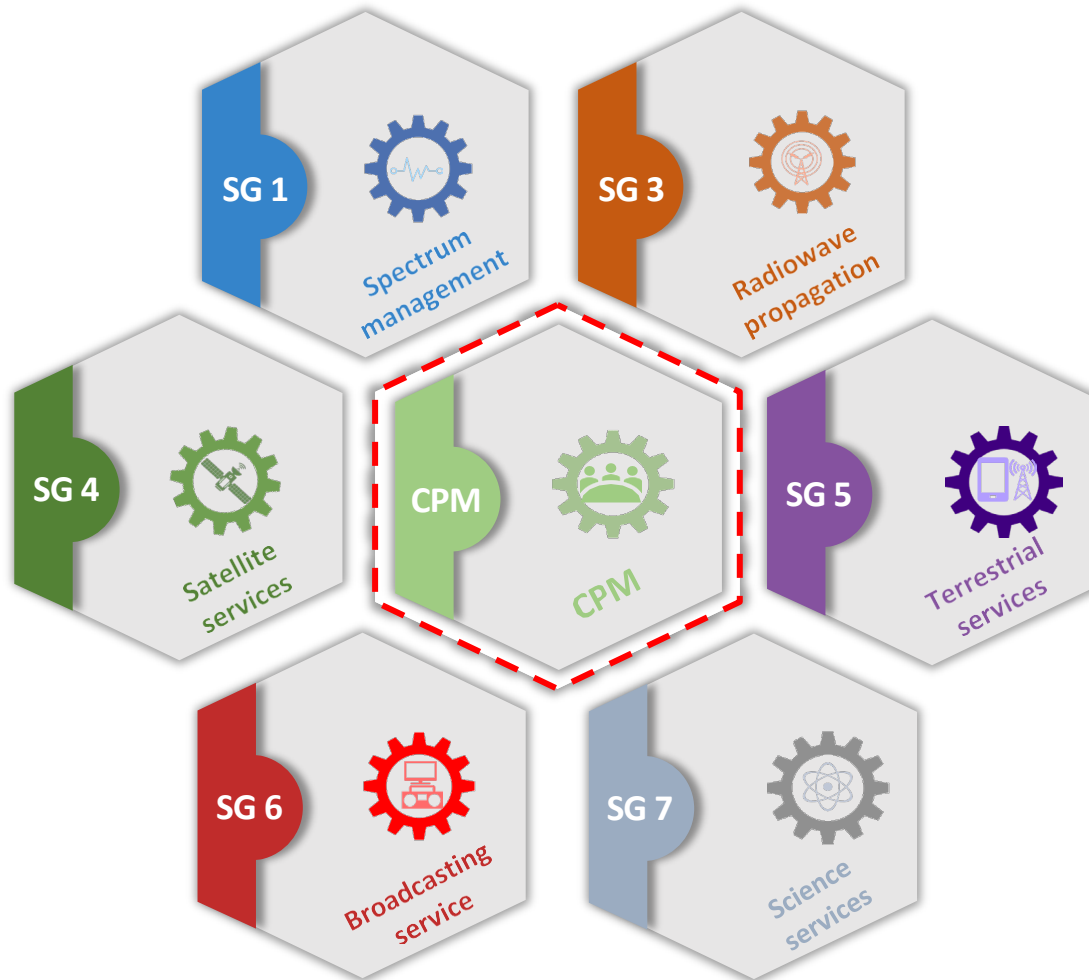
- Developing **ITU-R Recommendations** (i.e., standards) applicable to radio services;
- Developing **ITU-R Technical Reports and Handbooks** and their updates;
- Performing technical studies in preparation for the **ITU-R Conferences**;
- The work of the Study Groups is governed by the **ITU-R Resolutions**, in particular Resolution ITU-R 1, and WRC agenda items requesting preparatory studies;
- The studies are **driven by contributions** from the Membership.

## Study Groups Department activities include:

- Organizing and supporting the holding of Radiocommunication Assemblies (RA), World Radiocommunication Conferences (WRC) and Conference Preparatory Meetings (CPM);
- Organizing Inter-regional Workshops in preparation for WRCs;
- Providing Secretariat support for the ITU-R Study Groups and their Working Parties;
- Capacity-building activities, including supporting the regional preparatory activities for RAs and WRCs;
- Cooperating with external organizations, industry and academia on standardization activities.



# ITU-R SGs and WPs structure



All groups are supporting and contributing to the studies.

## ITU-R Responsible Groups for studies on WRC-27 agenda items/topics

SG 1	<a href="#">WP 1A</a> – Spectrum <b>engineering techniques</b>
	<a href="#">WP 1B</a> – Spectrum <b>management methodologies</b> and <b>economic strategies</b>
	<a href="#">WP 1C</a> – Spectrum <b>monitoring</b>
SG 3	<a href="#">WP 3J</a> – Propagation <b>fundamentals</b>
	<a href="#">WP 3K</a> – <b>Point-to-area</b> propagation
	<a href="#">WP 3L</a> – <b>Ionospheric</b> propagation and <b>radio noise</b>
	<a href="#">WP 3M</a> – <b>Point-to-point</b> and <b>Earth-space</b> propagation
SG 4	<a href="#">WP 4A</a> – <b>Efficient orbit/satellite utilization</b> for <b>FSS and BSS</b>
	<a href="#">WP 4B</a> – <b>Systems, air interfaces, performance and availability objectives</b> for <b>FSS, BSS and MSS</b> (incl. IP-based applications and SNG)
	<a href="#">WP 4C</a> – <b>Efficient orbit/satellite utilization</b> for <b>MSS and RDSS</b>
SG 5	<a href="#">WP 5A</a> – <b>Land mobile &gt; 30 MHz (excl. IMT), fixed WAS</b> in the <b>FS</b> , <b>amateur &amp; amateur-satellite services</b>
	<a href="#">WP 5B</a> – <b>Maritime</b> (incl. GMDSS) and <b>aeronautical mobile services &amp; radiodetermination</b>
	<a href="#">WP 5C</a> – <b>Fixed wireless systems and HF and other systems &lt; 30 MHz</b> in the <b>fixed and land mobile services</b>
	<a href="#">WP 5D</a> – <b>IMT systems</b>
SG 6	<a href="#">WP 6A</a> – Terrestrial broadcasting <b>delivery</b>
	<a href="#">WP 6B</a> – Broadcast service <b>assembly and access</b>
	<a href="#">WP 6C</a> – <b>Programme production</b> and <b>quality assessment</b>
SG 7	<a href="#">WP 7A</a> – <b>Time signals</b> and <b>frequency standard emissions</b>
	<a href="#">WP 7B</a> – Space radiocommunication applications: <b>space operation, space research, Earth exploration, meteorological</b> satellite services
	<a href="#">WP 7C</a> – <b>Remote sensing</b> systems (active and passive): <b>Earth exploration-satellite, MetAids, space research services</b> (incl. planetary sensors)
	<a href="#">WP 7D</a> – <b>Radio astronomy</b>

# BR SGD structure and staff roles



Sergio BUONOMO

Chief, Radiocommunication Study Groups  
Department



Philippe AUBINEAU

Counsellor for  
ITU-R SG 1 and the CPM



David BOTHA

Counsellor for  
ITU-R SG 3 and the RRB



Nick SINANIS

Acting Counsellor for  
ITU-R SG 4



Uwe LÖWENSTEIN

Counsellor for  
ITU-R SG 5



Ruoting CHANG

Counsellor for  
ITU-R SG 6 and WP 4C



Vadim NOZDRIN

Counsellor for  
ITU-R SG 7 and WP 5B



Joaquín RESTREPO

Capacity Building  
Coordinator

ITU-R Study Groups Counsellors and Capacity Building Coordinator

Supporting ITU-R Study Groups Counsellors



Alicia SOTO ROMERO

Project Officer  
Counsellor for the CCV



Jaekyung PARK

Study Group Advisor



Amer ALTHIAB

Junior Project Officer

Assistants



Fabienne HUGUET



Emma NORTON-VIARD



Alisa CHAMOVA



Virginia FERNÁNDEZ JIMÉNEZ



Julieth GARCÍA BORREGO



Catherine LIMOUSIN

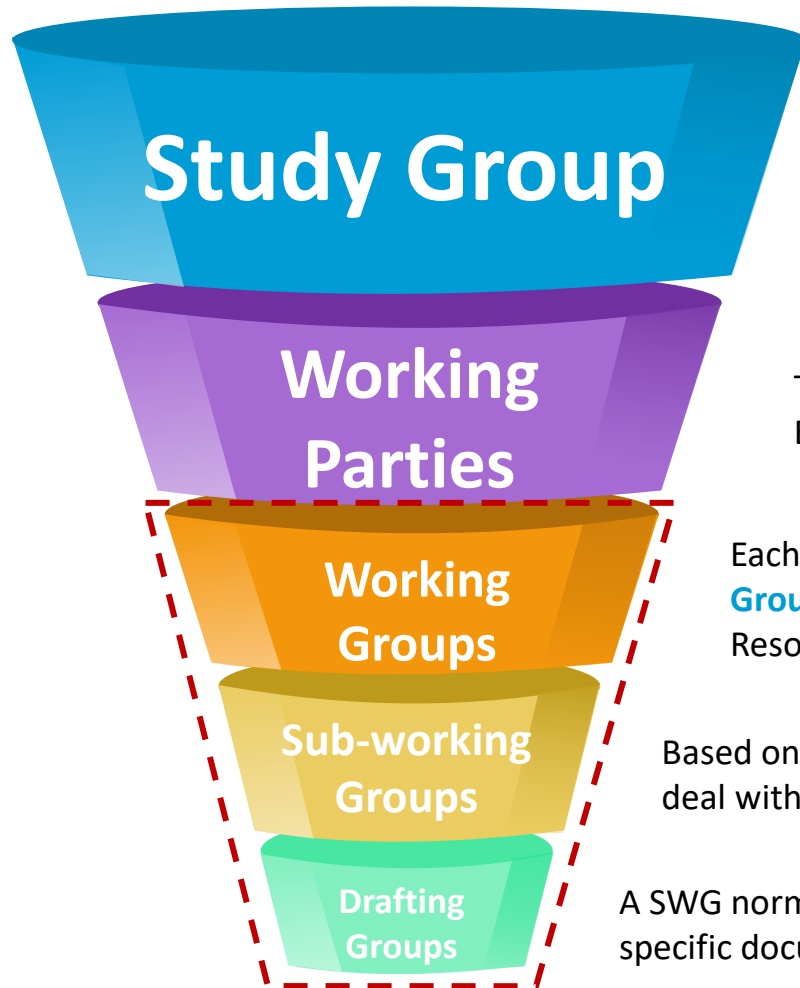


Juan Gabriel MARÍN MATAS



Adrián SORIANO

# Study Groups and subordinate groups



**Each Study Group (SG)** shall perform an executive role in carrying out studies and adopting Recommendations and Questions, as well as approving Decisions, Reports, Opinions and Handbooks, on radiocommunication matters under its mandate, including the planning, scheduling, supervision, delegation and approval of the work and other related matters. The scope and work programme of a Study Group is set up by the Radiocommunication Assembly.

The SGs may establish subgroups necessary to facilitate the completion of their work. Each **Working Party (WP)** deals with specific topics of interest to a more limited group of specialists.

Each WP may establish its own structure and attribute the work to sub-groups known as **Working Groups (WGs)**. Each WG may be assigned with ITU-R Questions, ITU-R Resolutions or WRC Resolutions to perform the necessary studies during the study period.

Based on the input contributions, each WG may establish **Sub-working Groups (SWGs)** to deal with specific topics during (a) specific meeting(s).

A SWG normally establishes **Drafting Groups (DGs)** to deal with an assigned task to produce a specific document or output (e.g., revision of an ITU-R Recommendation).

Other Groups could include **Ad-hoc groups** on a specific subject, normally set up at Plenary level and reporting back to the Plenary.

# Studies developed by the ITU-R SGs & WPs

ITU-R Study Groups and their Working Parties carry out regular activities within their mandate and they also perform studies in response to requests from WRCs and RAs.

## Studies to revise and maintain the existing publications

Maintenance and update of existing publications to adapt them to the technology evolution.



## Studies to develop new technology and new publications

Discussion and studies on new trends and publication of standards and reports on the emerging technologies.



## Studies in application of WRC and RA Resolutions

Development of studies in response to the requests from WRCs and RAs.



Regular activities of ITU-R SGs and WPs

Activities of ITU-R SGs and WPs  
related to WRC and RA



# Overview of ITU-R activities (1)



## Emergency

- ✓ Public Protection and Disaster Relief (PPDR)
- ✓ Climate change
- ✓ Search and rescue



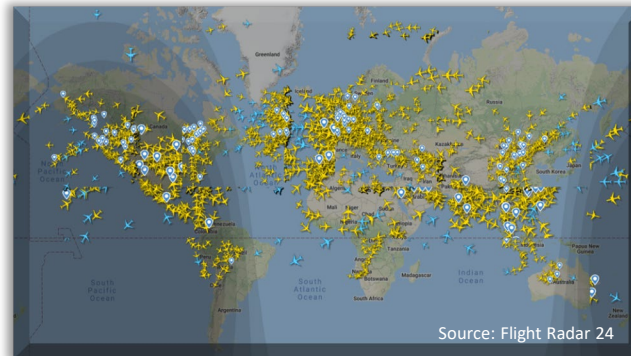
## Mobile

- ✓ IMT systems and applications (4G, 5G...)
- ✓ Industry applications
- ✓ Mobile communications
- ✓ Short-range devices
- ✓ Cognitive radio systems



## Aeronautical

- ✓ Global Flight Tracking (GFT)
- ✓ Wireless Avionics Intra-Communications (WAIC)
- ✓ Unmanned aircrafts
- ✓ Air traffic control management
- ✓ Sub-orbital vehicles



## Terrestrial

- ✓ Intelligent transport systems
- ✓ Railways
- ✓ Smart sustainable cities
- ✓ Amateur services
- ✓ Wireless networks
- ✓ HAPS
- ✓ Internet of Things (IoT)





## Overview of ITU-R activities (2)



### Satellite

- ✓ Broadband connectivity (HTS, ESIMs, VSAT, etc.)
- ✓ GSO and non-GSO satellite systems
- ✓ Global Radionavigation Satellite Systems (GNSS)



### Broadcasting

- ✓ Global advanced standards for television
- ✓ Accessibility to broadcasting services for persons with disabilities



### Maritime

- ✓ Safety of life at the sea
- ✓ Global Maritime Distress and Safety System (GMDSS)
- ✓ Digital Selective-Calling (DSC) system



### Science

- ✓ Radioastronomy
- ✓ Earth and meteorological observation
- ✓ Space research
- ✓ Time signals, time scales and timing applications



# Development of the study period

Start of a 4-year study period

**Study Groups**

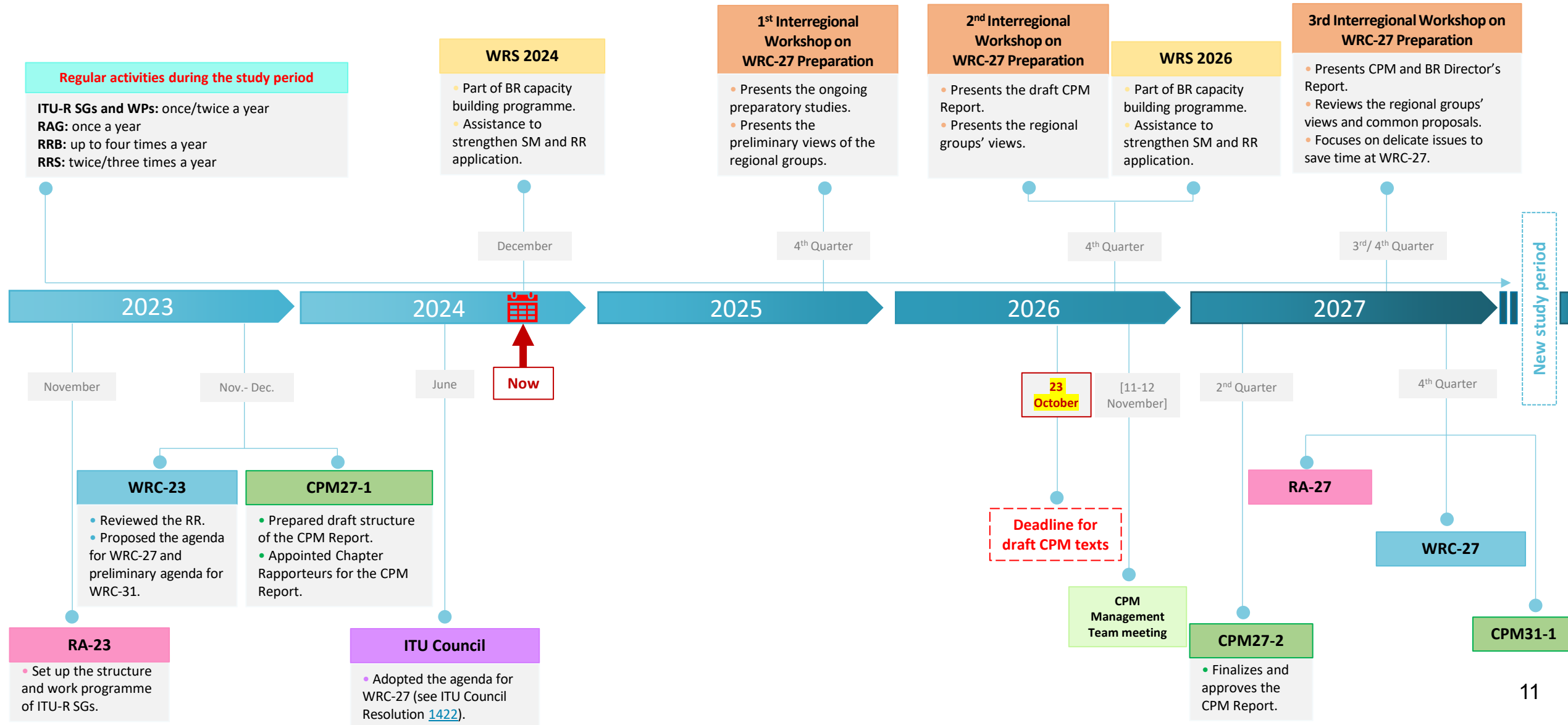
- Adopt ITU-R Recommendations;
- Approve ITU-R Reports and other documents.

**Working Parties**

- Conduct studies in response to ITU-R and WRC Resolutions;
- Carry out preliminary studies on WRC agenda items;
- Prepare ITU-R Recommendations, Reports and other documents.

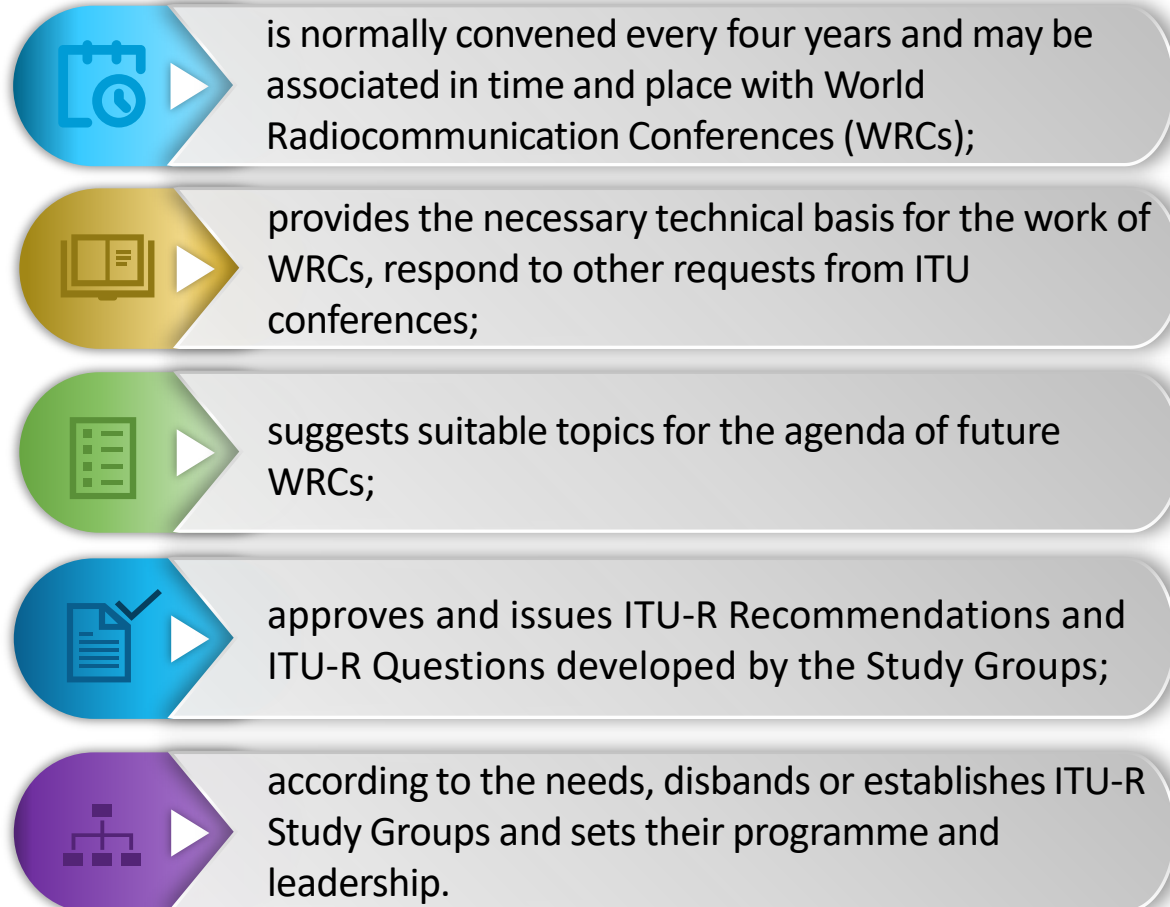


# Roadmap towards RA-27 and WRC-27



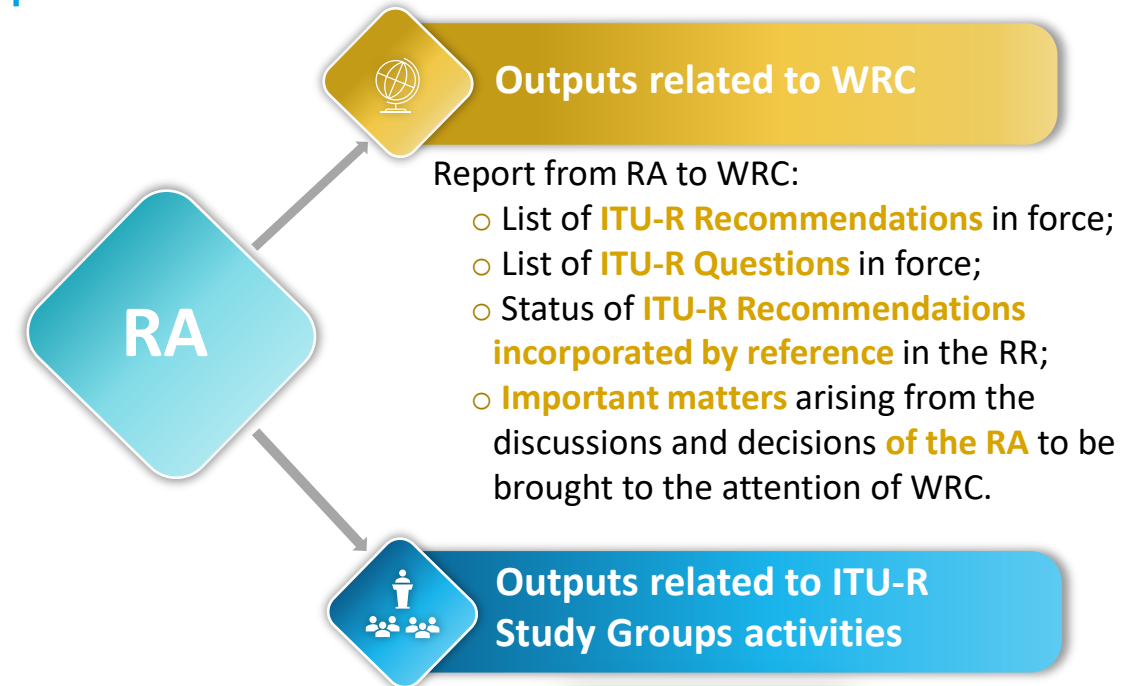
# Radiocommunication Assembly

## Overview and mission

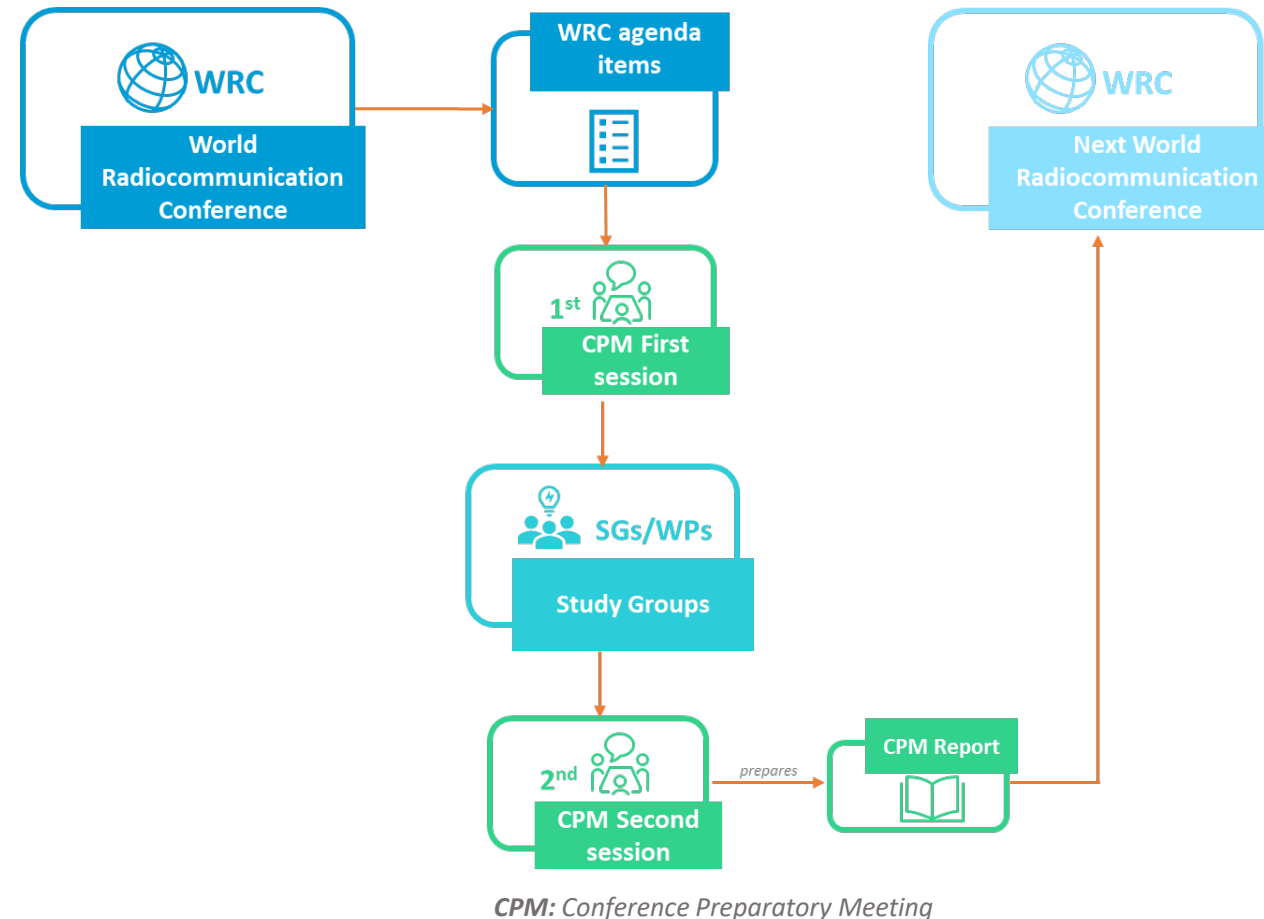


Article 13 of the ITU Constitution and  
Article 8 of the ITU Convention

## Outputs



# WRC-27 agenda items



AI	Responsible WP	Contributing WPs					
		SG 1	SG 3	SG 4	SG 5	SG 6	SG 7
1.1	4A	-	M	C	A B C D	-	B C D
1.2	4A	-	M	-	A B C	-	A B C
1.3	4A	-	M	-	A C	-	C D
1.4	4A	-	M	B	A B C	-	C
1.5	4A	B	-	C	-	-	-
1.6	4A	-	M	B C	A B C D	A	B C D
1.7	5D	-	K M	A C	A B C	-	B C D
1.8	5B	-	J K M	A C	A C	-	C D
1.9	5B	-	L	-	C	A	A
1.10	5C	-	J M	A B C	A B	A	C D
1.11	4C	-	L M	A B	A B C D	-	B C D
1.12	4C	-	L M	B	A B C D	-	C D
1.13	4C	-	L M	A B	A B C D	A	B C D
1.14	4C	-	L M	B	A C D	-	B C
1.15	7B	-	J	A C	A B C D	-	A C D
1.16	7D	-	J M	A C	A B D	-	-
1.17	7C	-	L M	C	A B C D	A	B D
1.18	7C, 7D	-	J M	A C	A B C	-	-
1.19	7C	-	J M	A	A B C D	-	B



# Types of publications



## Questions

A question is a statement of a technical, operational or procedural study, generally seeking a Recommendation, Report or Handbook.



## Recommendations

A recommendation is an answer to a Question that normally provides recommended specifications, requirements, data or guidance for recommended ways of undertaking a specified task; or recommended 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.



## Reports

A report is a technical, operational or procedural statement, prepared by a Study Group on a given subject related to a current Question or the results of studies without Questions.



## Handbooks

A handbook is a text which provides a statement of the current knowledge, the present position of studies, or of good operating or technical practice, in certain aspects of radiocommunications.

<https://www.itu.int/pub/R-QUE>

<https://www.itu.int/pub/R-REC>

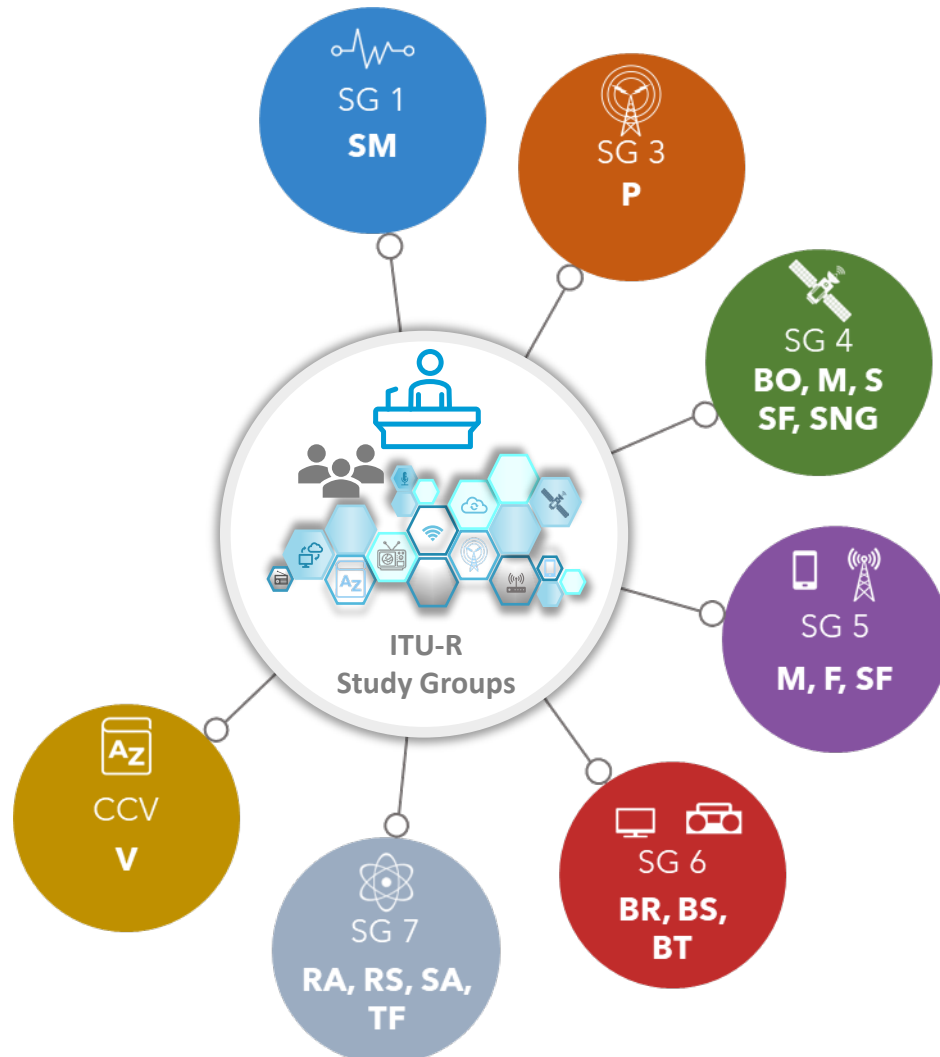
<https://www.itu.int/pub/R-REP>

<https://www.itu.int/pub/R-HDB>



# ITU-R Study Groups publications

## ITU-R Recommendations and Reports Series



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

[ITU-R Recommendations](#)

[ITU-R Reports](#)

# World and Regional Radio Seminars

- During the study cycle, the Bureau organizes events worldwide to convey latest changes to the Radio Regulations (RR) made by a WRC and other associated Rules of Procedure (RoP).
- It provides latest information on the status of the studies currently ongoing in ITU-R.

## World Radio Seminars (WRS)



The BR organizes the World Radiocommunication Seminars (WRS) on a **biennial basis**.



WRS are normally held at ITU in Geneva, **every other year**.



The agenda includes theoretical sessions and some days for **workshops** on terrestrial and space services.

## Regional Radio Seminars (RRS)



The BR maintains its strategy for **regional outreach** through the organization of RRS to visit every developing region worldwide, **fostering human capacity building** on the use of the radio-frequency spectrum and satellite orbits.



About **3-4 times per year**, RRS are held around the world and are jointly organized with the spectrum management authorities of host countries, in close cooperation with relevant regional organizations and the ITU regional/areas offices.



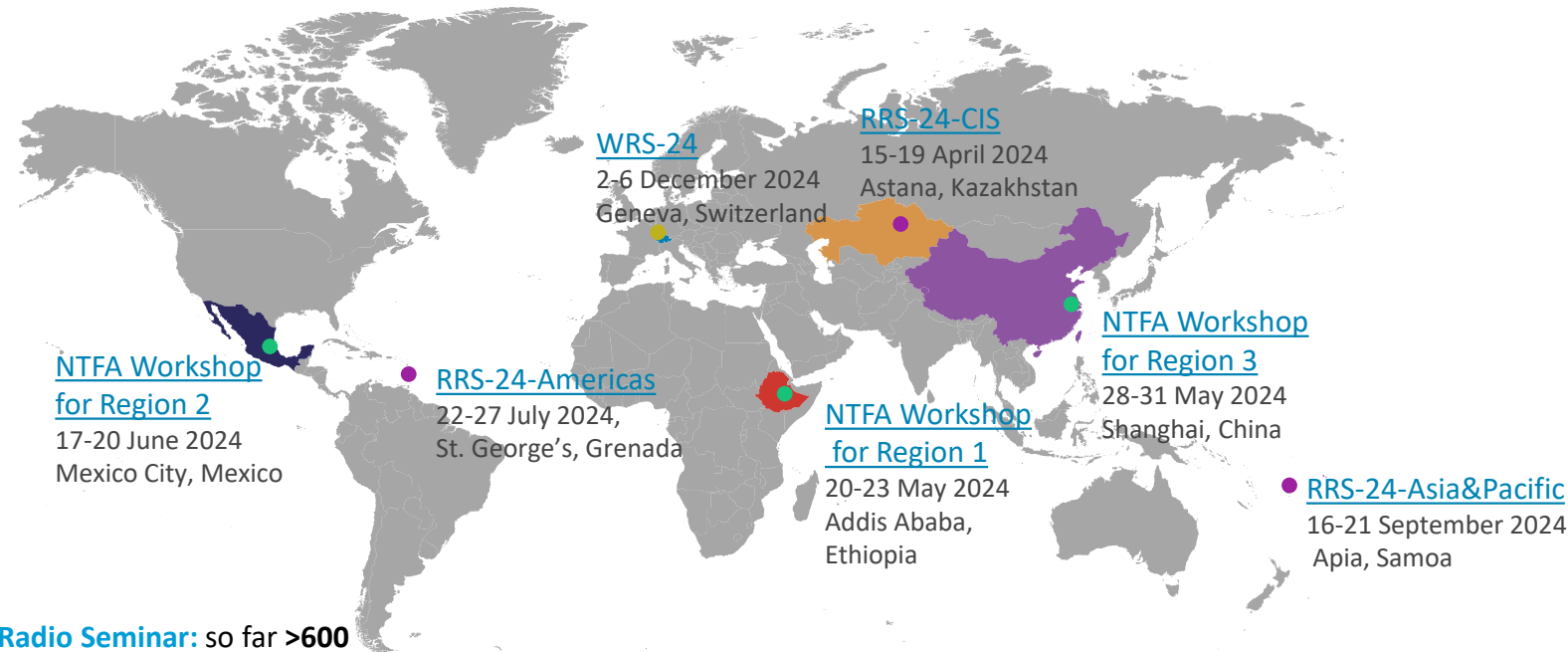
The agenda is complemented with a one or two-day **forum**, dedicated to spectrum-related topics of particular interest to the region.



**Workshops on the National Table of Frequency Allocations (NTFA)** (one per Region) are organized the year after WRC.

# Planned capacity building activities at ITU-R in 2024-2027

## Capacity building activities held at ITU-R in 2024



- 1 **World Radio Seminar:** so far >600 participants from over 130 countries
  - 3 **Regional Radio Seminars:** >300 participants from over 60 countries
  - 3 **ITU Workshops on National Table of Frequency Allocations (NTFA):** >350 participants from over 100 countries
- (BR offers some **fellowships** for these events)

## Planned capacity building activities

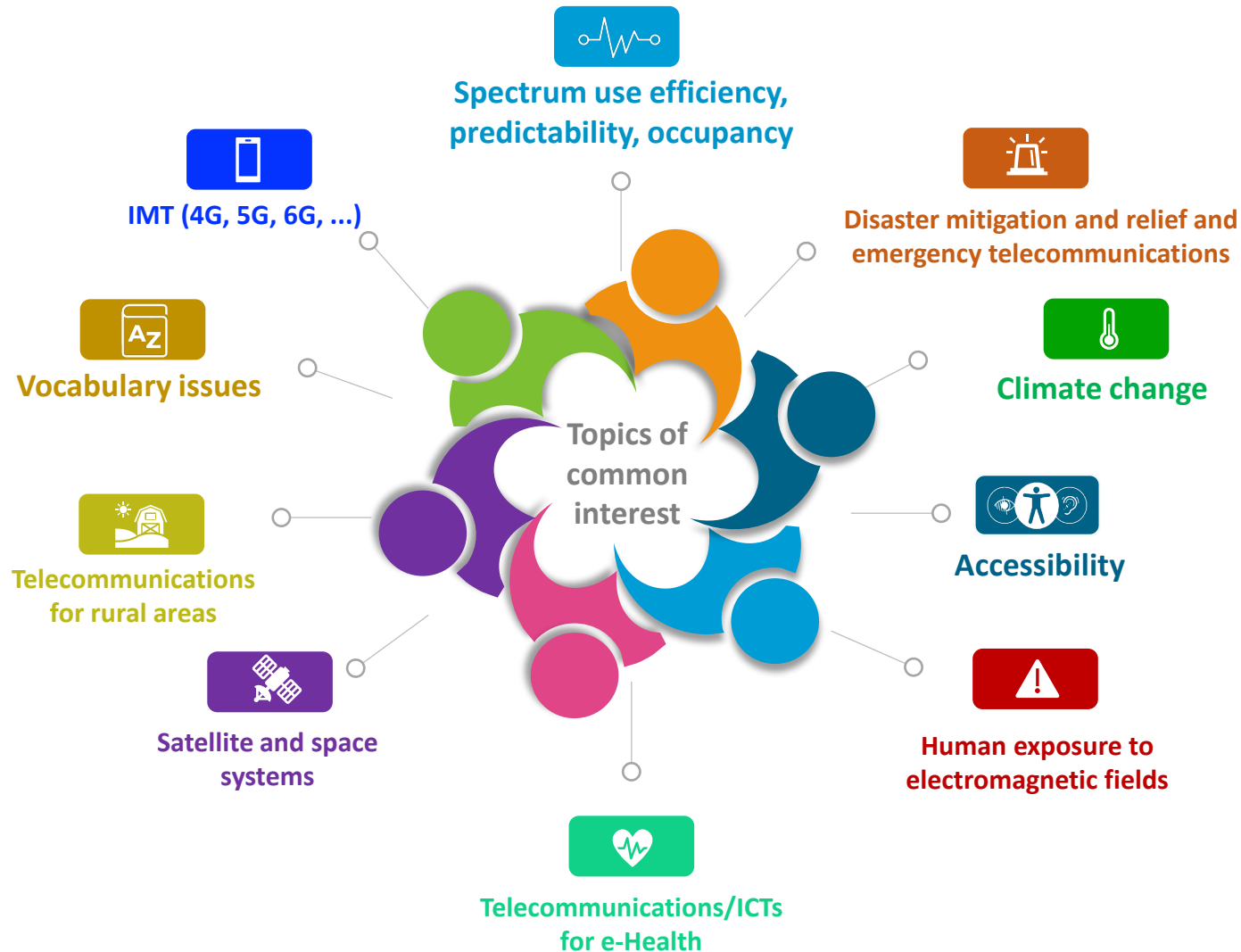
**2 WRS** – 6 UN languages

- **WRS-24:** Geneva, Switzerland, 2-6 December 2024
- **WRS-26:** Geneva, Switzerland, December 2026

**11 RRS**

- **Africa: 2 RRS** (E, F): planned in 2025 and in 2027
- **Americas: 3 RRS** (E, S)
  - **RRS-24-Americas:** St. George's, Grenada, 22-27 July 2024
  - 2 RRS planned in 2025 and in 2026
- **Asia& Pacific: 3 RRS** (E):
  - **RRS-24-Asia&Pacific:** Apia, Samoa, 16-21 Sept. 2024
  - **RRS-25-Asia&Pacific:** Shanghai, China, 2Q 2025
  - 1 RRS planned in 2026
- **CIS: 1 RRS** (R):
  - **RRS-24-CIS:** Astana, Kazakhstan, 15-19 April 2024
- **Arab States: 1 RRS** (A, E): Planned in 2026
- **Europe: 1 RRS** (E): Planned in 2027

# Collaboration with ITU Sectors and External Organizations



- Resolution [ITU-R 9](#) on *“Liaison and collaboration with other relevant organizations, in particular ISO, IEC and CISPR”*
- [Further information on Collaboration with other relevant organizations](#)
- Resolution [ITU-R 75](#) on *“Strengthening coordination and cooperation among the three ITU Sectors on matters of mutual interest”*
- Collaboration with other **UN system** organizations

# Recent events and capacity building activities



## [ITU Workshop on the Future of Television for Europe](#)

7 November 2024, Geneva, Switzerland



## [ITU/WMO Regional Workshops and Seminars for “Earth observations for Sustainable Development Goals: technologies, spectrum, applications, impacts”](#)



### [Regional Seminar on Earth observations for Sustainable Development Goals: technologies, spectrum, applications, impacts](#)

16-17 September 2024, Almaty, Kazakhstan



### **Global ITU/WMO Seminar**

**Use of Radio Spectrum for weather, climate, water and related environmental activities**

2025 Geneva, Switzerland



### **Regional training Workshop for the countries of the African Telecommunication Union (ATU) and the Arab Spectrum Management Group (ASMG)**

2026



# Get to know ITU-R Study Groups!

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 <https://www.itu.int/en/ITU-R/study-groups/Pages/default.aspx>

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[Alicia.Soto.Romero@itu.int](mailto:Alicia.Soto.Romero@itu.int)  
[brsgd@itu.int](mailto:brsgd@itu.int)





# Optional slides

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# Study Group 1: Spectrum management



## WP 1A

Spectrum engineering techniques

## WP 1B

Spectrum management methodologies and economic strategies

## WP 1C

Spectrum monitoring

## Scope

- ❖ Spectrum management principles and techniques;
- ❖ General principles of sharing;
- ❖ Spectrum monitoring;
- ❖ Long-term strategies for spectrum utilization;
- ❖ Economic approaches to national spectrum management automated techniques;
- ❖ Assistance to developing countries;
- ❖ Wireless Power Transmission (incl. for electric vehicles);
- ❖ Harmonization for short-range devices;
- ❖ Performance evaluation of mobile Direction Finder units;
- ❖ Electromagnetic field measurements to assess human exposure.



Chair: Mr Wael Sayed



Counsellor: Mr Philippe Aubineau



[SG 1 website](https://www.itu.int/wrs-24/sg1/)

# Study Group 3: Radiowave propagation



## WP 3J

Propagation fundamentals

## WP 3K

Point-to-area propagation

## WP 3L

Ionospheric propagation and radio noise

## WP 3M

Point-to-point and Earth-space propagation

## Scope

- ❖ Propagation of radio waves in ionized and non-ionized media;
- ❖ Characteristics of radio noise, for the purpose of improving radiocommunication;
- ❖ Propagation models in support to all radio services;
- ❖ Building entry loss models;
- ❖ Clutter loss models;
- ❖ Provide advice to other ITU-R Study Groups and Working Parties on the application of P-series Recommendations for use in sharing studies for WRC agenda items.



Chair: Ms Clare Allen



Counsellor: Mr David Botha



[SG 3 website](https://www.itu.int/wrs-24/sg3/)

# Study Group 4: Satellite services



## WP 4A

Efficient orbit/spectrum utilization for FSS and BSS

## WP 4B

Systems, interfaces, performance availability for FSS, BSS & MSS plus SNG

## WP 4C

Efficient orbit/spectrum utilization for MSS and RDSS

## Scope

- ❖ Systems and networks for:
  - fixed-satellite service (FSS);
  - mobile-satellite service (MSS);
  - broadcasting satellite service (BSS);
  - radiodetermination navigation-satellite service; and
  - radio navigation-satellite services (RNSS).
- ❖ Satellite News Gathering (SNG);
- ❖ IP global broadband Internet access via satellite;
- ❖ Integration of satellite systems into Next Generation Access Technologies (5G);
- ❖ Early warning and relief operations;
- ❖ Management of the Global Mobile Personal Communications by Satellite (GMPCS).



Chair: Mr Victor Strelets



Interim Counsellor: Mr Nick Sinanis

Interim Counsellor for WP 4C: Mr Ruoting Chang



[SG 4 website](#)

# Study Group 5: Terrestrial services



## WP 5A

Mobile >30 MHz, wireless access (fixed service), amateur including satellite services

## WP 5B

Maritime mobile & GMDSS, aeronautical mobile & radiodetermination services

## WP 5C

Fixed wireless systems; HF other <30 MHz in fixed & mobile services

## WP 5D

IMT Systems

## Scope

- ❖ Radio local area networks (RLANs), amateur service and emergency telecommunications and Intelligent Transport Systems (ITS);
- ❖ Wireless communications;
- ❖ Global Maritime Distress and Safety System (GMDSS), the aeronautical mobile service, the radiodetermination service, including both radiolocation and radionavigation services;
- ❖ Fixed service communications;
- ❖ Fixed wireless access (FWA) systems and HAPS;
- ❖ IMT-2000, IMT-Advanced and IMT-2020: which provide the global platform on which to build the next generation (5G) of mobile broadband connectivity;
- ❖ Machine-to-Machine communications including Internet of Things (IoT).



Chair: Mr Kyu-Jin Wee



Counsellor: Mr Uwe Löwenstein



Counsellor WP 5B: Mr Vadim Nozdrin



[SG 5 website](https://www.itu.int/wrs-24/sg5/)

# Study Group 6: Broadcasting service



## WP 6A

Terrestrial broadcasting delivery

## WP 6B

Broadcast service assembly and access

## WP 6C

Content production & quality assessment

## Scope

- ❖ Radiocommunication broadcasting, including vision, sound, multimedia data services intended for delivery to the general public;
- ❖ New audio-visual formats (HDTV, UHDTV, immersive sound);
- ❖ Formats for international content exchange;
- ❖ Compression techniques & new multiplexing techniques (MMT);
- ❖ New DTTB systems and development in IBB systems;
- ❖ Advancing accessibility services.



Chair: Mr Thiago Soares



Counsellor: Mr Ruoting Chang



[SG 6 website](https://www.itu.int/wrs-24/sg6/)



# Study Group 7: Science services



## WP 7A

Time signals and frequency standard emissions for terrestrial & satellite

## WP 7B

Space radiocommunication applications & research & meteorological satellite

## WP 7C

Satellite remote sensing systems, MetAids, weather & research sensors

## WP 7D

Radio & radar astronomy sensors Earth-& space-based, including VLBI

## Scope

- ❖ Preserving spectrum for operation and development of meteorological applications;
- ❖ Global environment monitoring – atmosphere (including greenhouse gases emissions), oceans, land surface, biomass, etc.;
- ❖ Weather forecasting and climate change monitoring and prediction;
- ❖ Detection and tracking of many natural and man-made disasters (earthquakes, tsunamis, hurricanes, forest fires, oil leaks, etc);
- ❖ Providing alerting/warning information;
- ❖ Damage assessment and planning relief operations;
- ❖ Use of radio spectrum for meteorology in close collaboration with WMO.



Chair: Mr Markus Dreis



Counsellor: Mr Vadim Nozdrin



[SG 7 website](#)

# Coordination Committee for Vocabulary



## CCV

### Coordination Committee for Vocabulary

The terminology is included in the [“ITU Terms and Definitions” database](#).

## Scope

Coordination and approval of:

- ❖ vocabulary, including abbreviations and initials;
- ❖ related subjects, quantities and units, graphical & letter symbols.

In close collaboration with:

- ❖ the Radiocommunication Study Groups;
- ❖ ITU-D and ITU-T Sectors
- ❖ the General Secretariat;
- ❖ Conferences and Publications Department;
- ❖ the International Electrotechnical Commission (IEC);
- ❖ other interested organizations.



Chair: Mr El Hadjar Abdouramane



Counsellor: Ms Alicia Soto Romero



[CCV website](#)