Framework and overall objectives of the future development of IMT for 2030 and beyond

April 2024

ITU-D SG2 Q2/2 Workshop

Content

Organisation of ITU-R WP5D

IMT-2030

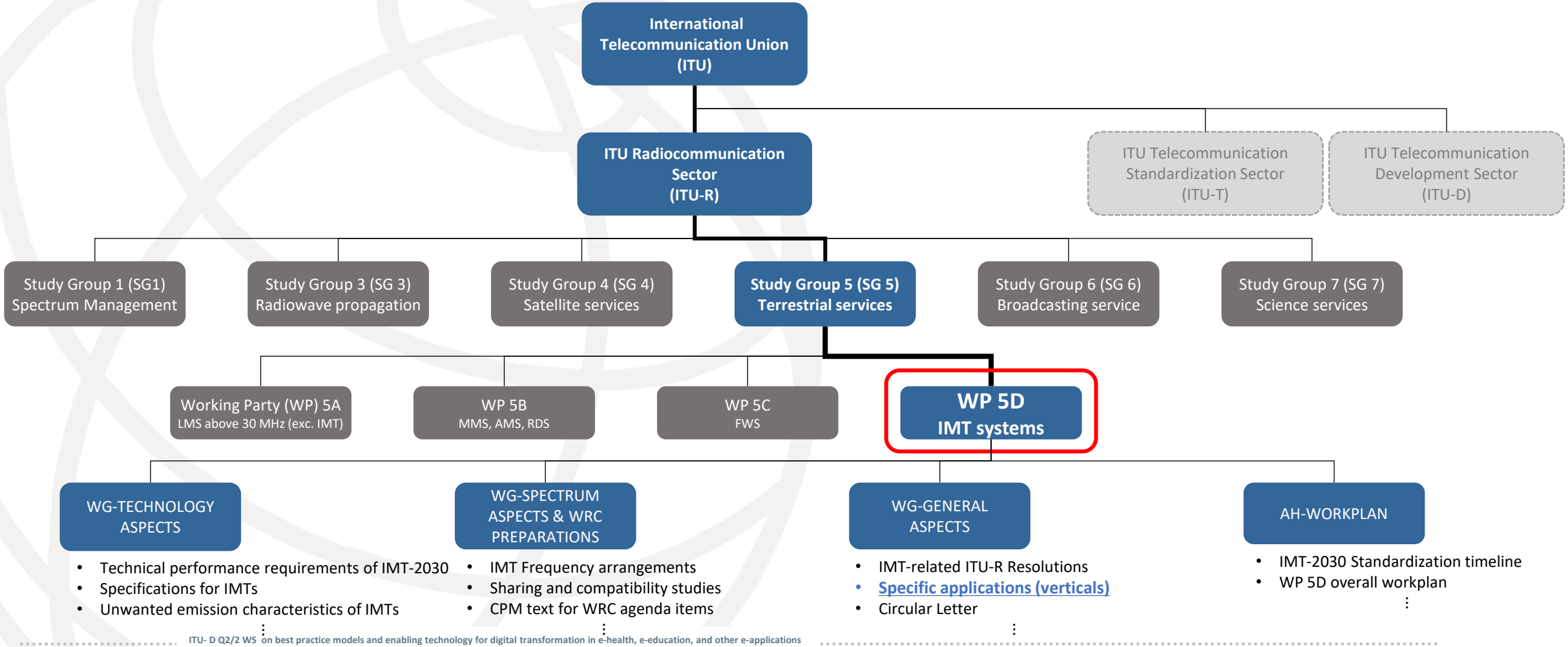
- **IMT-process and timeline**
- **Future Technology Trends**
- **Framework Recommendation ITU-R M.2160**

Specific societal, industrial Applications

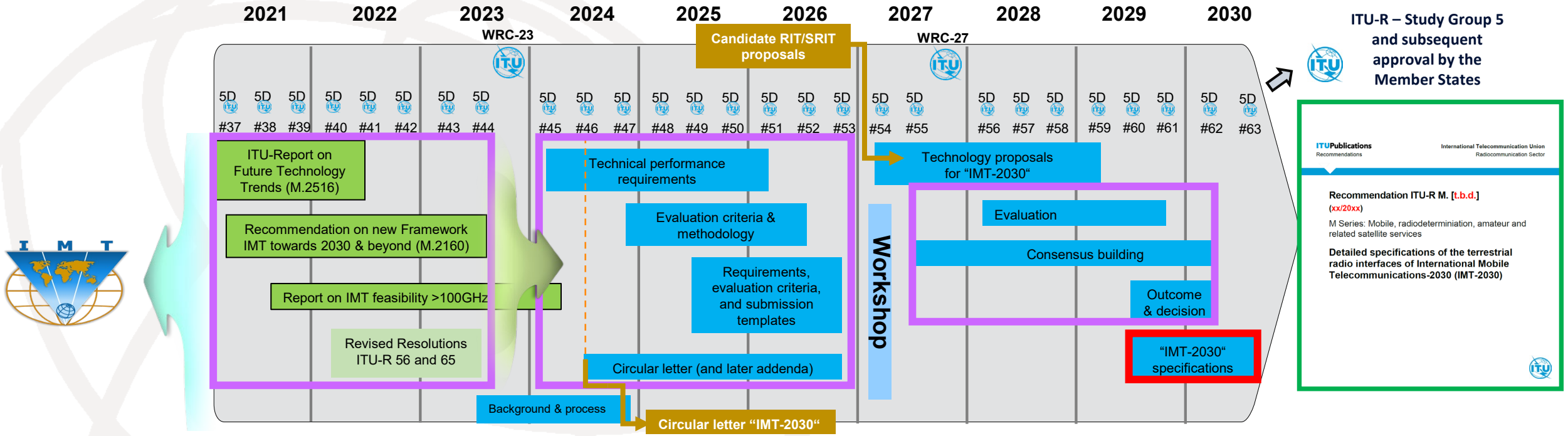
- **Report ITU-R M 2527**

ITU-R Working Party 5D

WP 5D is responsible for the overall radio system aspects of the terrestrial component of International Mobile Telecommunications (IMT) systems, comprising the current IMT-2000, IMT-Advanced and IMT-2020 as well as IMT-2030.



ITU-R Timeline and Process



Note 1: WP 5D #59 will additionally organize a workshop involving the Proponents and registered Independent Evaluation Groups (IEGs) to support the evaluation process

Note 2: While not expected to change, details may be adjusted if warranted. Content of deliverables to be defined by responsible WP 5D groups

Framework ⇨ **Requirements and Evaluation criteria** ⇨ **Evaluation and Consensus building** ⇨ **Specification** ⇨ **Approval**

ITU-R M.2516 – Future Technology Trends

- This new Report provides a broad view of **future technical aspects** of terrestrial IMT systems considering the timeframe up to 2030 and beyond, characterized with respect to **key emerging services, applications trends and relevant driving factors.**

Emerging services and applications Drivers for future technologies	Emerging technology trends and enablers	Technologies to enhance the radio interface	Technology enablers to enhance the radio network

- The technology trends of terrestrial IMT systems described in Report ITU-R M.2516 **are applicable to radio interfaces, mobile terminals, and radio access networks** by considering the timeframe up to 2030 and beyond.

ITU-R M.2160 “Framework for IMT-2030”

Main body (Preamble)

Scope

Keywords

Abbreviations/Glossary

Related documents

The ITU Radiocommunication Assembly,

considering

considering further

recognizing

recommends

that the Annex should be considered as **the framework and the overall objectives to guide the future development of IMT-2030**.

Annex

Table of Contents

Why is IMT-2030 needed?
IMT-2030 expected benefits

Trend and prospect of IMT-2030 features/technology/spectrum in around 2030

Guidance of IMT-2030 features

Guidance of IMT-2030 capabilities to fulfil usage scenarios

Relationship with existing IMTs and other access systems
Roadmap for technology/standardization/ deployment/spectrum

ITU-R M.2160 (§2) - Trends

§ 2.1 Motivation and societal considerations

IMT-2030 is expected to be an important enabler for achieving the following characteristics, among others:

- Inclusivity
- Ubiquitous connectivity
- Sustainability
- Innovation
- Enhanced and resilience
- Standardization and interoperability
- Interworking

§ 2.3 Technology trends

§ 2.3 Technology trends

"Summary of Future Technology Trends (FTT)"

- Emerging technology trends and enablers
- Technologies to enhance the radio interface
- Technology enablers to enhance the radio network

§ 2.2 User and application trends

9 trends

- Ubiquitous intelligence
- Ubiquitous computing
- **Immersive multimedia and multi-sensory interactions**
- Digital twin and virtual world
- Smart industrial applications
- **Digital health and well-being**
- **Ubiquitous connectivity**
- Integration of sensing and communication
- Sustainability

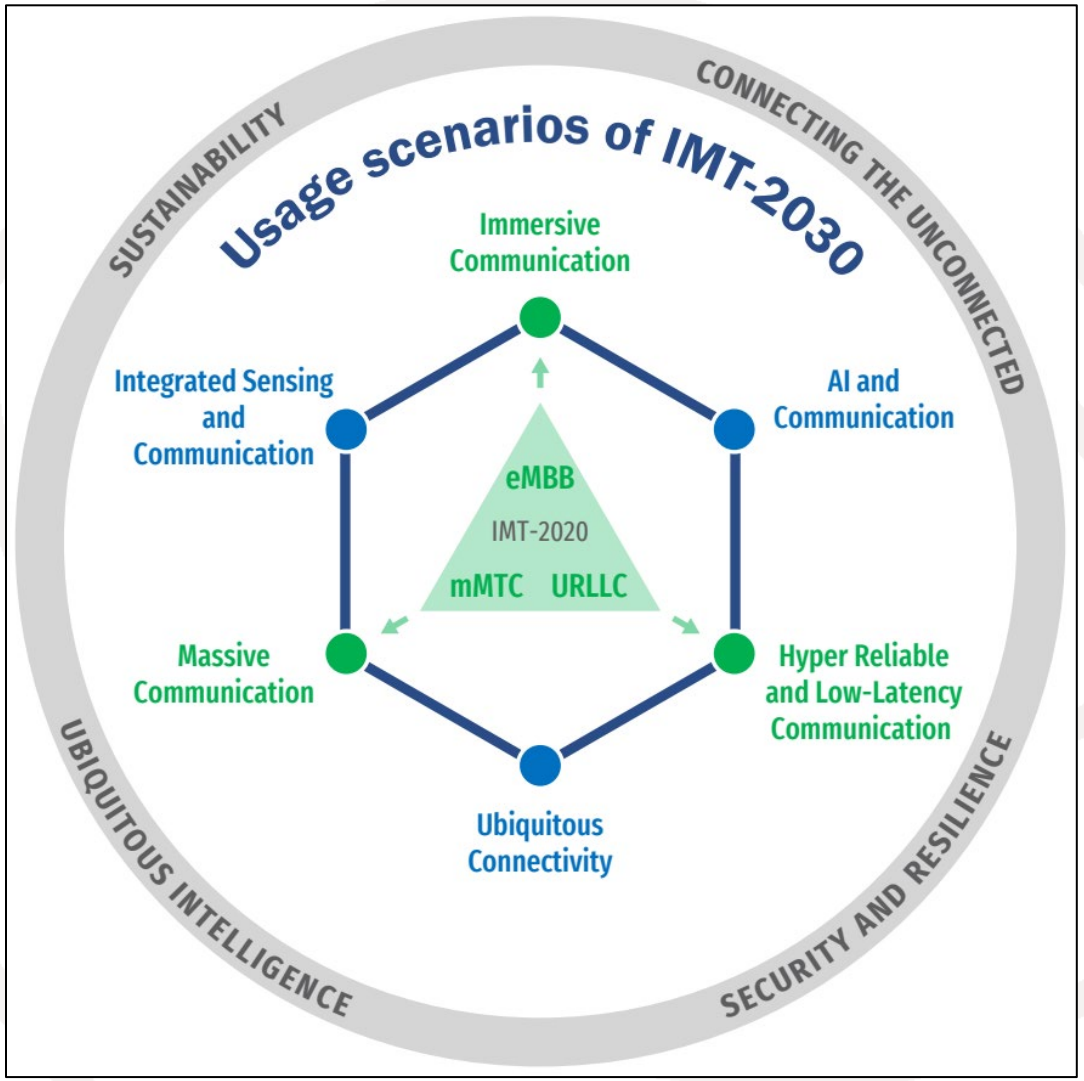
§ 2.4 Envisaged frequency bands and § 2.5 Spectrum harmonization

- § 2.4. Multiple frequency ranges will be needed to meet the capacity and coverage requirements of IMT systems and to serve the emerging services and applications. New generations of IMT may expect new spectrum for increasing data rates, capacity, new applications and to provide for new capabilities. IMT-2030 is envisaged to utilize a wide range of frequency bands ranging from sub-1 GHz up to frequency bands above 100 GHz. Low bands will continue to be crucial to enable nationwide coverage, in particular addressing the digital divide and expanding deep indoor coverage. Mid bands provide a balance between wide area coverage and capacity.
- § 2.5. The benefits of spectrum harmonization include facilitating economies of scale, enabling global roaming, reducing complexity of equipment design, improving spectrum efficiency including potentially reducing cross border interference. Harmonization of spectrum for IMT would lead to increased commonality of equipment and is desirable for achieving economies of scale and affordability of equipment, thus promoting digital inclusion.

§ 2.6 IMT in bands above 100 GHz

The development of IMT for 2030 and beyond is expected to enable new use cases and applications with high data rate and low latency, which will benefit from large contiguous bandwidths of tens of GHz. This suggests the need to consider spectrum in higher frequency ranges above 92 GHz as a complement to the use of lower frequency bands.

ITU-R M.2160 (§3) - Usage scenarios for IMT-2030



So called “Wheel diagram”, Recommendation ITU-R M.2160

6 Usage scenarios

Extension from IMT-2020

- eMBB ➡ Immersive Communication
- mMTC ➡ Massive Communication
- URLLC ➡ HRLLC (Hyper Reliable & Low-Latency Communication)

New

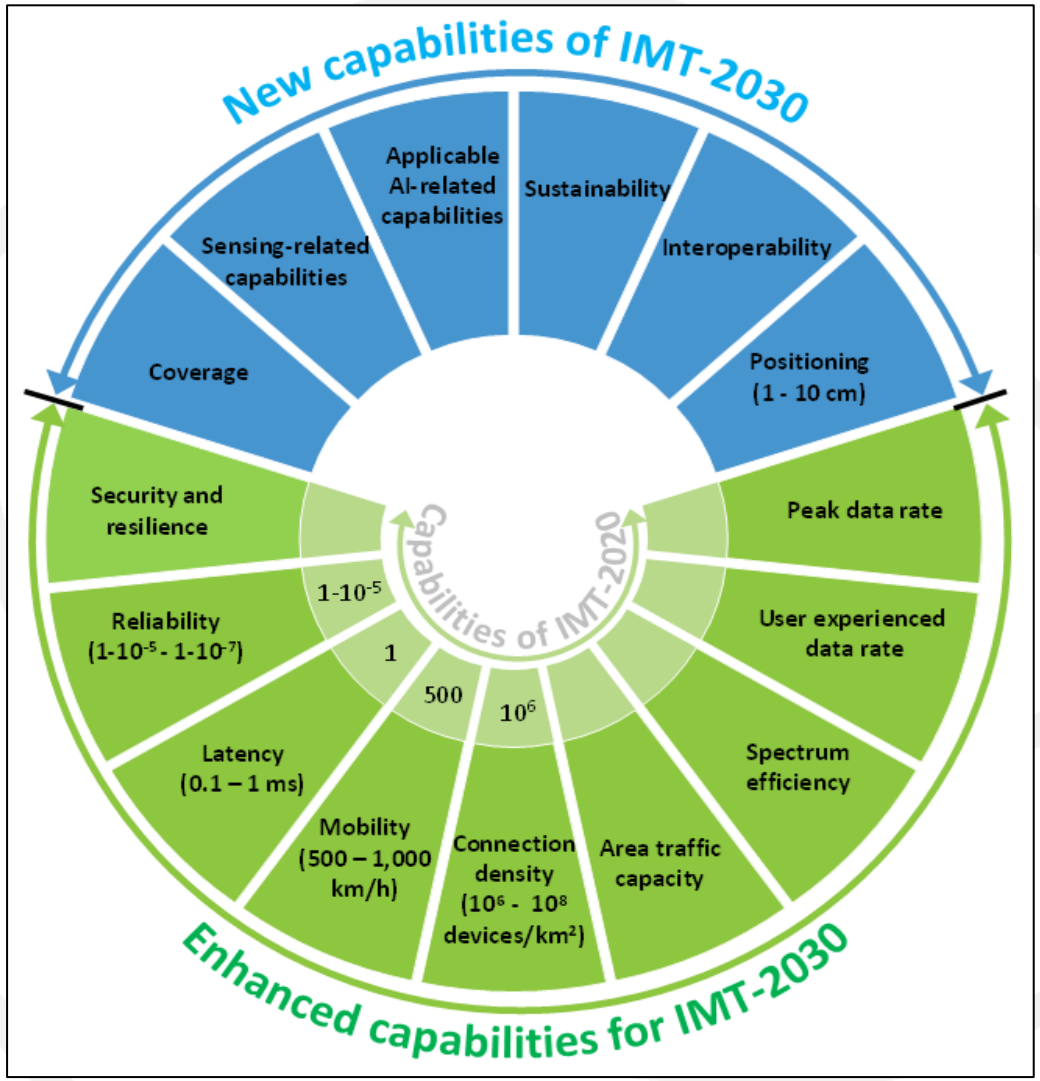
- Ubiquitous Connectivity
- AI and Communication
- Integrated Sensing and Communication

4 Overarching aspects

act as design principles commonly applicable to all usage scenarios

- Sustainability
- Connecting the unconnected,
- Ubiquitous intelligence,
- Security / resilience

ITU-R M.2160 (§4) - Capabilities of IMT-2030



Note: The range of values given for capabilities are estimated targets for research and investigation of IMT-2030

So called “Palette diagram”, Recommendation ITU-R M.2160

The Framework Recommendation identifies **15 capabilities** for IMT-2030 technology

- Nine of those capabilities are derived from existing IMT-2020 systems

The range of values given for capabilities are estimated targets for research and investigation of IMT-2030

- All values in the range have equal priority in research and investigation
- For each usage scenario, a single or multiple values within the range would be developed in future in other ITU-R Recommendations/Reports

IMT-2030 is also expected to help **address the need for increased environmental, social and economic sustainability,** and also support the goals of the Paris Agreement of the United Nations Framework Convention on Climate Change

ITU-R M.2160 (§5) - Relationship and Timelines

§ 5.1 Relationships

- § 5.1.1 Relationship between IMT-2030 and existing IMT

  Enhancements to existing IMT

  Interworking with existing IMT

- § 5.1.2 Relationship between IMT-2030 and other access systems

  Interworking between different access networks

  such as non-terrestrial network of IMT (including satellite, HIBS and UASs)

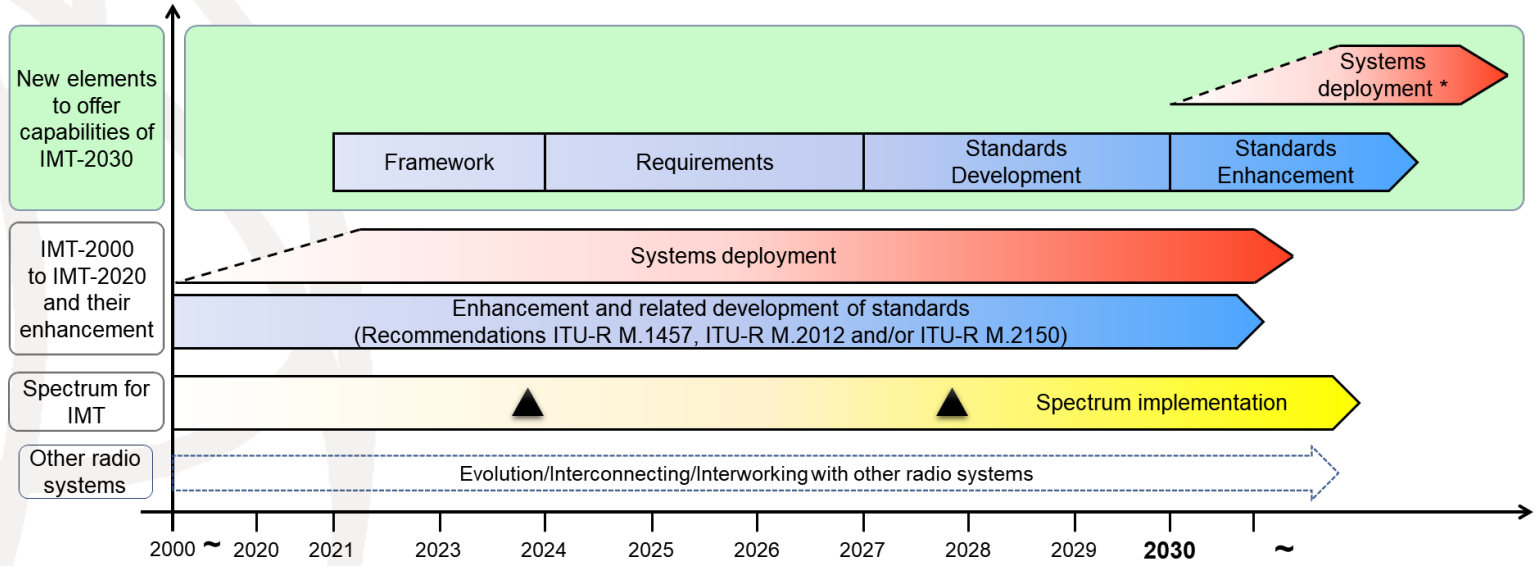
  as well as with other non-IMT terrestrial networks (including RLAN and broadcast)

§ 5.3 Focus areas for further study

- Radio interface(s) standards development
- Access network related issues
- Traffic characteristics
- Spectrum related issues

§ 5.2 Timelines

- Roadmap for technology/standard development, deployment and spectrum
- In addition, enhancement of existing IMTs and relationship with other radio systems



The sloped dotted lines in systems deployment indicate that the exact starting point cannot yet be fixed.

▲ : Possible spectrum identification at WRC-23, WRC-27 and future WRCs

* : Systems to satisfy the technical performance requirements of IMT-2030 could be developed before year 2030 in some countries.
: Possible deployment around the year 2030 in some countries (including trial systems)

REPORT ITU-R M.2527– "Specific IMT applications

IMT technologies are expected to be utilized and support a wide range of industrial and enterprise usage and applications such as mining, oil and gas, distribution and logistics, enterprises and retail, healthcare, utilities, community and education, manufacturing, airports, maritime, agriculture, gaming and rail.

The report brings focus on usage of IMT technologies for these applications and provides information on technical and operational as well as deployment and implementation aspects of IMT for meeting specific needs of societal, industrial and enterprise usages.

§ 5- Industrial and enterprise usages and applications supported by IMT

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§ 5.5 IMT application in Healthcare

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§ 5.7 IMT application in community and education sector

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§ 6 – Capabilities of IMT to support industrial and enterprise usages

§ 6.1 Community, education(A/V application)

….

§ 6.4 Healthcare

……

§ 7 - Technical and operational aspects of industrial and enterprise usages supported by IMT

§ 7.1 Non- public networks

§ 7.2 Network slicing

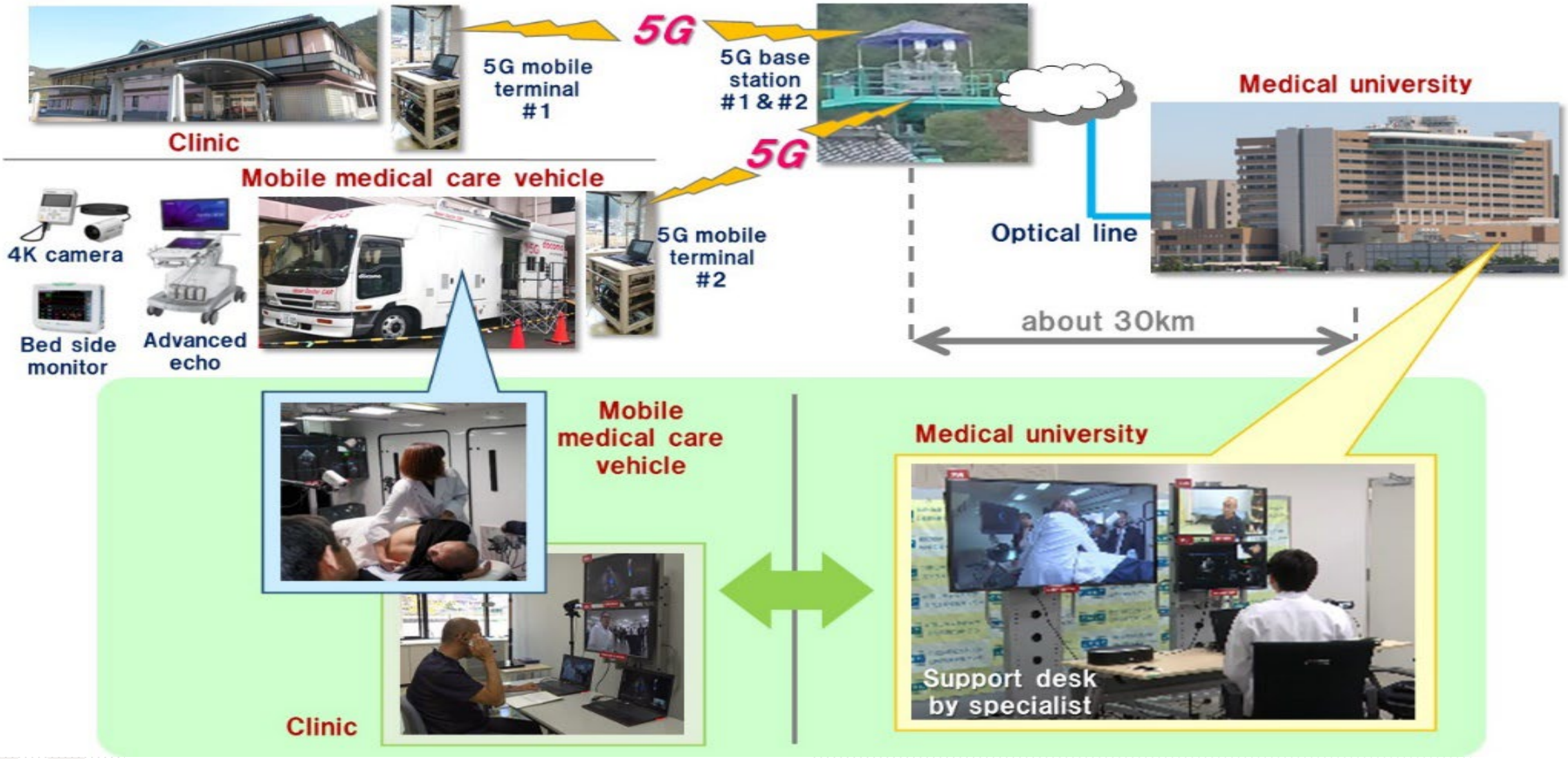
§ 7.3 TSN (Time Sensitive Network)

§ 7.4 High precision positioning

§ 8 - Summary

plus **8 Annexes with case studies**

Annex 4: Case study of IMT applications in Healthcare



Summary

- The Future Technology Trends Report ITU-R M.2516 summarizes anticipated developments
- The new "Framework Recommendation" ITU-R M.2160 for IMT-2030 describes the overall objectives including use cases
- This marks the achievement of the initial phase, setting the basis for the development of IMT-2030. The next phase (2024-2027) will be the definition of relevant requirements and evaluation criteria for potential radio interface technologies (RIT) for IMT-2030.

  •With the evolution of information and communications technologies, IMT-2030 is expected to facilitate the digital health services including interactive and remote monitoring, tele-diagnosis, remote tele-medical assistance (including tele-connected ambulances), tele-rehabilitation, digital clinical trials and telemedicine. The increased number of connections of wearable devices and body sensors may also make this technology pervasive. Also, holographic telepresence might become common for work, social interactions, entertainment, tele-education, remote live performances, etc
- Essential part of the IMT-process is liaison with External Organizations to receive contributions covering and elaborating future trends and new services …

  … but also, internal liaison within ITU (other ITU-R Study Groups and ITU-sectors)


thank you
danke
рахмат
謝謝
ngiyabonga
شكراً جزيلاً
teşekkür ederim
Баярлалаа
спасибо
faafetai lava
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감사합니다
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