Accessible Americas IV:
Information and Communication for ALL

Standardization and ICT accessibility in ITU

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Contents

- Introduction to ITU
- Importance of standardization
- ICTs and rights of persons with disabilities
- Accessibility and human factor standardization in ITU

Extra slides

- UN CRPD
- Examples of ITU standards helping persons with disabilities

About ITU

International Telecommunication Union
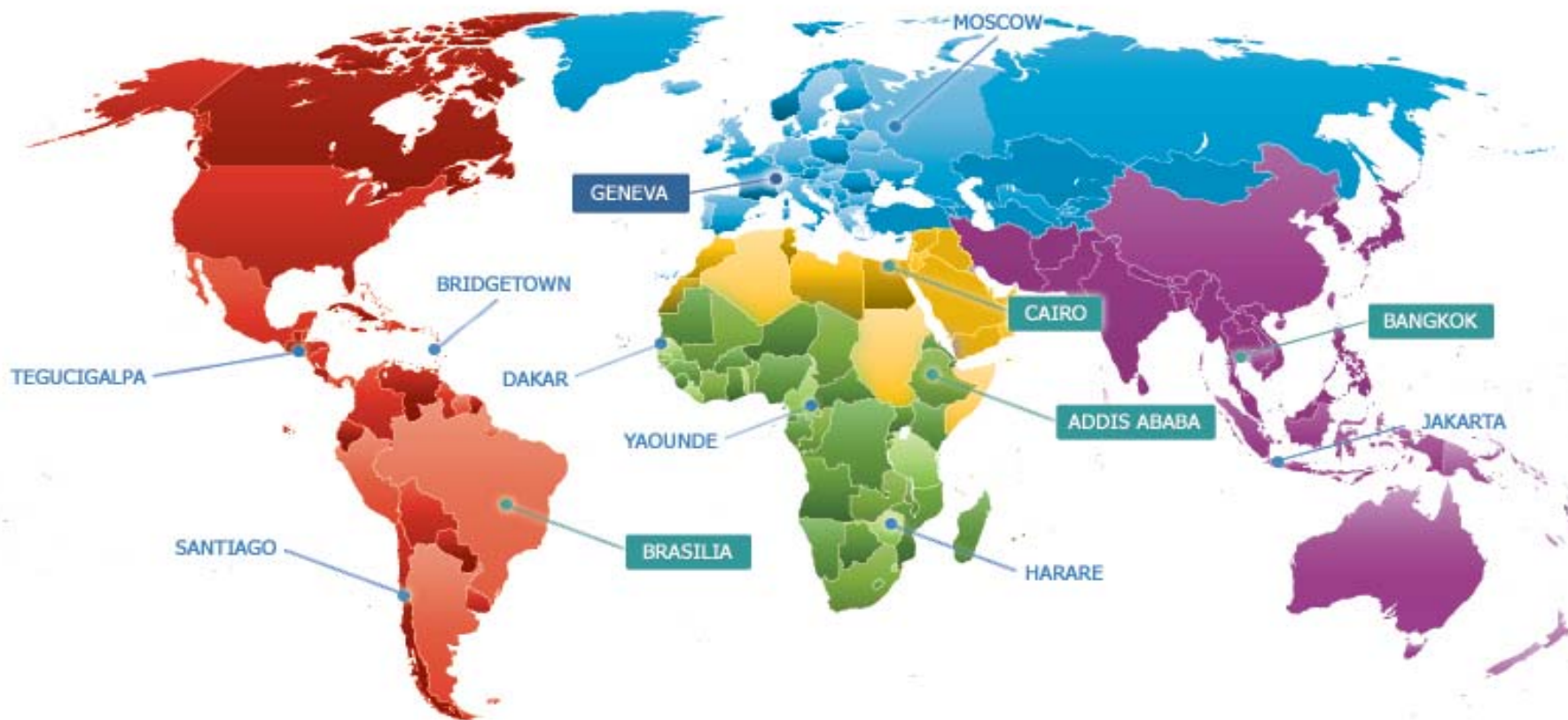
- ✓ The **United Nations Specialized Agency** for Information and Communication Technologies (ICTs)

- ✓ Founded in Paris in 1865 as the **International Telegraph Union**

- ✓ 2015 marked **150 years** of experience and innovation
  - ✓ 2016: 60 years of CCITT/ITU-T & 110 years of the Radio Regulations
  - ✓ 2017: 25 years of ITU-D

ITU's Global Presence

ITU's Structure

Radiocommunication

ITU-R

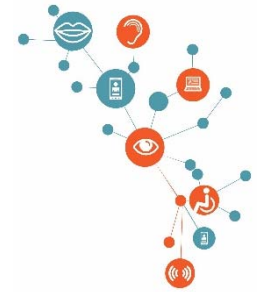Coordinates global wireless communication

Standardization

ITU-T

Produces interoperable technical ICT standards

Development

ITU-D

Provides assistance to the un-connected

The **General Secretariat** provides intersectoral coordination for the whole organization

A sample of ITU's private sector members
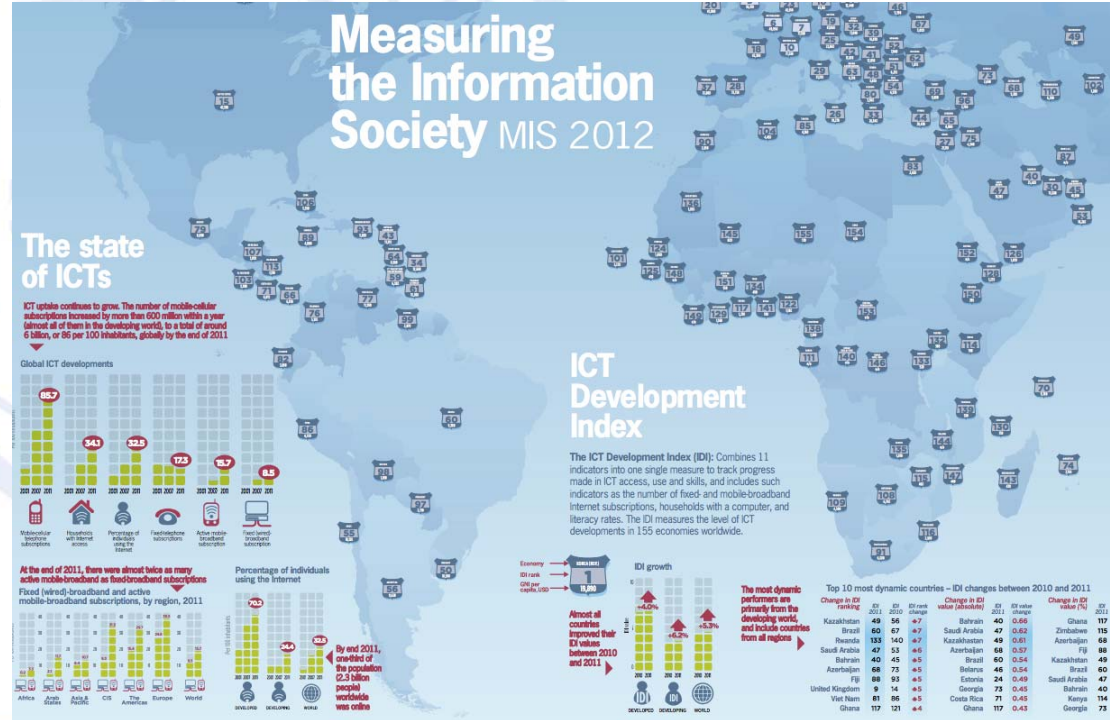
ITU-R: Radiocommunication Sector

Manages the radio-frequency spectrum and satellite orbits.

ITU-D: Development Sector

Fostering international cooperation and solidarity in the delivery of technical assistance and in the creation, development and improvement of telecommunication/ICT equipment and networks in developing countries.
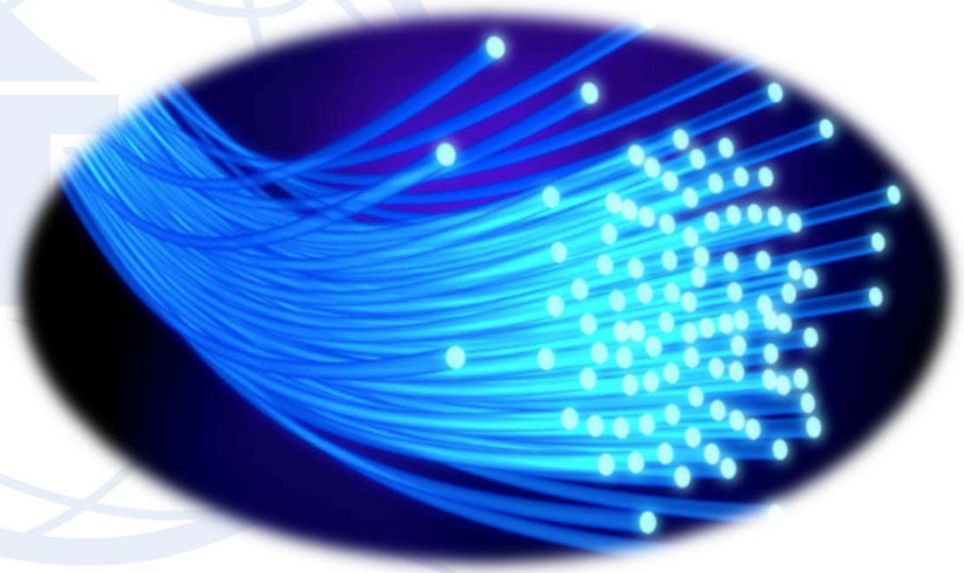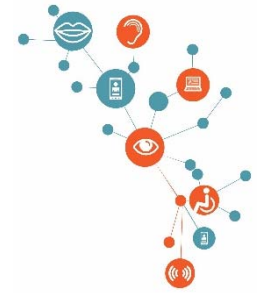
ITU-T: Standardization Sector

Provides a **neutral platform** where governments *and* the private sector develop international standards covering all fields of telecommunications.

Importance of standardization

Impact of standards

BSI study on *The Economic Contribution of Standards to the UK Economy* (June 2015)

- Use of standards improves client-supplier relationship through improved confidence

- Most productive companies are those heavily deploying standards

- Standards encouraged innovation through the diffusion of new knowledge

- Standards facilitate compliance with regulations (e.g. health and safety legislation)

Accessibility and disability – some facts
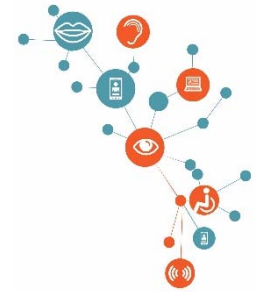
- Worldwide, some 1 billion persons with a disability (=**15%**)
- 80% of persons with disabilities live in low income countries
- Amongst people *below* the poverty level, 1 out of 5 is a PwD
- UN Convention on the Rights of Persons with Disabilities (UNCRPD) mandates signatories to provide public information in formats appropriate to different kinds of disabilities
- ICTs are a powerful equalizer of abilities, empowering persons with disabilities to fulfill their potential, dreams and ambitions

UN Convention on the Rights of Persons with Disabilities

- Signed: Dec. 2006; In-force: May 2008

- Two impressive aspects
  - Strong language
  - High level of adoption by countries

- Seven articles mentioning ICTs
  - Most relevant from an ICT standards perspective: Article 9

- **Convention***
  - 160 signatories
  - 175 ratifications

- **Optional protocol***
  - 92 signatories
  - 92 ratifications

* as of 2017-11-15

Definitions

- **PERSONS WITH DISABILITIES**
  Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments, which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others.

- **UNIVERSAL DESIGN**
  Design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

  "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.

UNCRPD Article 9 – Accessibility

- Identify and eliminate **obstacles and barriers** to accessibility, including information, communications and other services, such as electronic services and emergency services
  - Independent life and full participation in all aspects of life
- Develop, promulgate and monitor the implementation of **minimum standards and guidelines** for the accessibility of facilities and services open to the public
- Ensure that private entities offering services to the public **take into account** all aspects of accessibility
- Provide **training** for stakeholders on accessibility issues
- **Promote** appropriate forms of **assistance and support** to persons with disabilities to ensure their access to information
- **Promote access** to new information and communications technologies and systems, including the Internet
- Promote **universal design**: the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so they are accessible at minimum cost

Accessibility standardization in ITU

A sample of ITU standardization areas

Why standards for accessibility?

- Large number of persons affected
  - Disabilities touch **15%** of world population; **80%** live in low income countries
- Increasing **ratifications** of the UN Convention on Rights of Persons with Disabilities
  - Consequences in legislation & regulation
- **Accessibility is for all**, It goes beyond persons with disabilities
  - Children, functional illiterate, elderly, …
- **Mainstreaming** is important:
  - Human rights
  - Societal efficiency
  - Drives down cost, increases user base
- An unanswered question:
  How to provide accessible ICT services in a cost effective manner?
  - Standards!
  - Universal design

ITU-R Study Groups

ITU-R contributes to the **development of wireless technology** through the production of Recommendations, Reports, Questions and Handbooks relating to persons with disabilities and persons with specific needs, and, by so doing, to improve their accessibility and to reduce the overall Digital Disabilities Divide.

- [Study Group 1 (SG 1) Spectrum management](#)
- [Study Group 3 (SG 3) Radiowave propagation](#)
- [Study Group 4 (SG 4) Satellite services](#)
- [Study Group 5 (SG 5) Terrestrial services](#)
- [Study Group 6 (SG 6) Broadcasting service](#)
- [Study Group 7 (SG 7) Science services](#)

ITU-R Study Group 1 (Spectrum Management)

- ITU-R Study Group 1 (SG1) is carrying out studies in response to Resolution ITU-R 54-2 (revised at RA-15) to achieve **harmonization for Short Range Devices (SRDs)** (including definitions of categories for instance for **audio applications including aids for persons with impaired hearing**)

- ITU-R Recommendation and Report on SRDs, including in particular SRDs used for hearing aids or medical devices within SG1:

  – Recommendation ITU-R SM.1896 "Frequency ranges for global or regional harmonization of short-range devices (SRDs)" (SM.1896-0 (2011))

  – Report ITU-R SM.2153 "Technical and operating parameters and spectrum use for short-range radiocommunication devices" (SM.2153-5 (2015))

- Other studies on SRDs are available in relevant ITU-R Reports of the SM series (e.g. measurements, impact on radiocommunication services, specific applications and techniques)

ITU-R Study Group 5 (Terrestrial Services)

ITU-R Study Group 5 (SG5) is carrying out studies to identify the suitable technical and operational characteristics, and conditions that might allow **compatible operation of a short-range radiocommunication public access system supporting hearing aid** systems at ITU-R SG5 WP5A in response to Resolution ITU-R 67 (2015).

ITU-R SG5 Recommendation and Question on wireless hearing aid systems

- Recommendation ITU-R M.1076 "Wireless communication systems for persons with impaired hearing" (M.1076-1 (2015))

- Question ITU-R 254/5 "Operation of short-range radiocommunication public access system supporting hearing aid systems" (Q.254/5 (2014))

ITU-R Study Group 6 (Broadcasting Services)
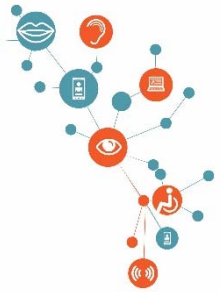
ITU-R SG6 develops Recommendations, Reports and Handbooks for radiocommunication broadcasting, including vision, sound, multimedia and data services principally intended for delivery to the general public.

Active participant in the ITU Intersector Rapporteur Group on Audiovisual Media Accessibility (IRG-AVA) (ITU-R SG6, ITU-T SG9 and SG16)
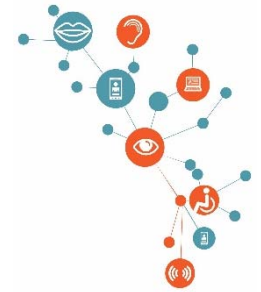
ITU-R Reports, Recommendations and Handbook on broadcasting service accessibility within SG6

- Report ITU-R BT.2267 "Integrated broadcast-broadband systems" (T.2267-5 (2015))

- Report ITU-R BT.2207 "Accessibility to broadcasting services for persons with disabilities" (BT.2207-2 (2012))

- Recommendation ITU-R BS.1698 "Evaluating fields from terrestrial broadcasting transmitting systems operating in any frequency band for assessing exposure to non-ionizing radiation" (BS.1698-0 (2005))

- Recommendation ITU-R BT.1702 "Guidance for the reduction of photosensitive epileptic seizures caused by television" (BT.1702-0 (2005))

- "Handbook on Digital Terrestrial Television Broadcasting networks and systems implementation" – Chapter 14 on Accessibility

ITU-T Study Groups
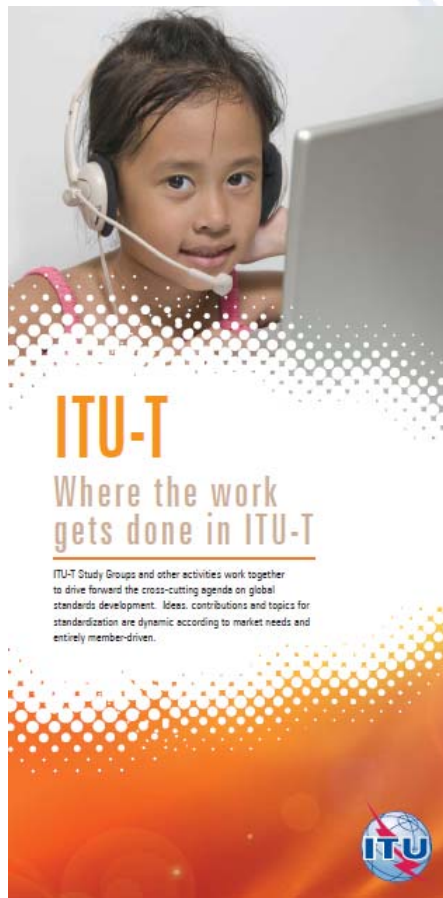
- SG2 Operational aspects
- SG3 Economic and policy issues
- SG5 Environment and climate change
- SG9 Broadband cable and TV
- SG11 Protocols and test specifications
- SG12 Performance, QoS and QoE
- SG13 Future networks
- SG15 Transport, access and home
- SG16 Multimedia
- SG17 Security
- SG20 IoT and Smart Cities

ITU-T
Where the work gets done in ITU-T

ITU-T Study Groups and other activities work together to drive forward the cross-cutting agenda on global standards development. Ideas, contributions and topics for standardization are dynamic according to market needs and entirely member-driven.

Long history – a small sample

- Mid 1990's – ITU-T V.18 text telephone
- ITU-T E.161 (1995) – the tactile identifier
- ITU-T F.703 (2000) introduces the concept "Total Communication"
- ITU-T T.140 (1998) real-time text for multimedia applications

ITU-T expert groups promoting accessible ICTs

- [ITU-T Study Group 16](#) – Multimedia
  - Lead SG for accessibility and for human factors
  - Question 24/16: human factors and related work items
    - Ex Q4/2 – moved by WTSA-16 (October 2016) from SG2 to SG16
  - Question 26/16: accessibility to telecom/ICT services and systems

Question 24/16
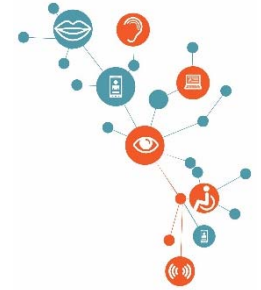
- Formerly under ITU-T SG2 (Q4/2)
    - "Human Factors related issues for the improvement of the quality of life through international telecommunications"
- *Usability for all* covers the needs of children and persons who may or may not have disability
- Human factors cover more than just the needs of persons with disabilities
- [Work programme](#)

Question 26/16

- Q26/16 is the group mandated to study accessibility to multimedia systems and services for persons with disabilities Develops (or assists in the development of) multimedia technical standards addressing accessibility needs of persons with disabilities

- It also reviews accessibility features included in telecom standards developed in other Study Groups
  - Agreed to strengthen collaboration with ISO/IEC JTC1 SC35 on "User interfaces"

- Work programme

(1) Recently completed work

- Accessible IPTV terminal devices:
  - Recommendation **ITU-T H.702** (2015-10)
    - Input from the community of persons with disabilities,
  - Three profiles for accessibility features in IPTV terminals:
    - Basic → Enhanced → Main
    - Basic profile: entry level of accessibility features
    - Main level: support by 2020 in all IPTV sets and set-top boxes
  - Conformance testing spec approved (2017-01): **HSTP-CONF-H702**

- Framework for audio-based indoor navigation by persons with vision impairments: **ITU-T F.921** "Wayfindr"
  - Prototypes already in use in metros in London and Sydney
  - Working on a compliance protocol and indicators (FSTP.ANS-Checklist)

(2) Institutional support for accessibility

- Terminology for ICT accessibility
  - Recommendation **ITU-T F.791** (2015-10)
  - Fixes basic and preferred terminology for international use
  - Currently being reviewed; target: 2018-07
- ITU-T technical papers for the organization of accessible meetings
  - **ITU-T FSTP-AM** (2015-10)
    - How to **organize** accessible meetings – planned revision (2018-07)
  - **ITU-T FSTP-ACC-REMPART** (2015-10)
    - Ensuring that **remote participation** in meetings is accessible for persons with disabilities
    - Complements the new ITU-T A-Series Supplement 4 on the organization of remote participation in meetings.

Some active work items (1/2)

- **Telecom relay services**: Architecture, user requirements and functionality – Completion expected 2018-02

- Guidelines for provision of **captions/subtitles, audio description and sign language** in audiovisual content
  - Studying adoption of ISO/IEC JTC1 specs as twin texts

- Use cases for **inclusive media access services**

- Specifications for improving **audio intelligibility**

- New work on **wearable audio augmenting devices** (like personal sound amplification devices) - F.WAAD
  - Unregulated devices that may pose severe risks to hearing

  Developed within the context of promotion of **WHO Safe Listening** initiative
  http://www.who.int/pbd/deafness/activities/MLS/en/

Some active work items (2/2)

- Emergency communications:
  - Interface for persons with hearing and speaking difficulties to request rescue services
  - Profile metadata for persons with specific needs for disability-inclusive disaster risk reduction
- Human factor specifications are being developed in various areas, for example:
  - User interface for face-to-face speech translation considering human factors
  - On-screen keyboards for ICT devices

Don't only preach…

- ITU takes implementation of the UNCRPD at heart
  - Not just standards, case studies, kits, …
- Plenipotentiary Conference Res.175
    - "Telecommunication/ICT accessibility for persons with disabilities, including age related disabilities"
- ITU Accessibility Policy: remove accessibility barriers in all ITU services
- Efforts to make website and publications accessible
- Providing accessibility accommodation at meetings
  - Sign language interpretation
  - Real-time captioning
- Encourage participation of persons with disabilities
  - ITU Accessibility Fund with contributions from donors
- Lead the use of ICTs for accessible meetings in the UN system

Conclusion

- ITU has been a pioneer in ICT standards for accessibility and human factors
- International standards are necessary for affordable, inclusive, accessible services
- Useful specifications being produced
  - Next priority: Telecoms relay services
- ITU has embraced accessibility also at institutional level

We are connecting the world by working on making technology accessible to all and by including persons with disabilities.

Help us in this valuable work by joining us at the ITU.

Extra slides

Mandates on ICTs for persons with disabilities

- WSIS Phase 1 (2003) – Declaration of Principles & Plan of Action
- WSIS Phase 2 (2005) – Tunis Agenda & Commitment
- UN Convention on the Rights of Persons with Disabilities (UNGA-06)
- WTSA-12 Resolution 70 – Telecommunication/ICT accessibility for persons with disabilities
- WTDC-14 Resolution 56 (Dubai) – Telecommunication/ICT accessibility for persons with disabilities, including persons with age-related disabilities
- PP-14 Resolution 175 – Telecommunication/ICT accessibility for persons with disabilities and persons with specific needs
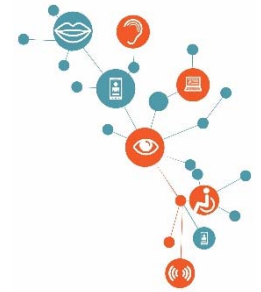
Highlights on the UN Convention on the rights of persons with disabilities

Contents

- Background

- Principles of the Convention

- Articles with accessible ICT implications

- Current status

Antecedents

- UN World Programme of Action (WPA) concerning Disabled Persons, December 1982
  - Guiding instrument for the UN Decade of Disabled Persons (1982-1993)
  - First international instrument to attempt to articulate both a developmental and a rights-based approach to disability
  - Established the foundation for international monitoring
  - One of its major outcomes: Standard Rules

- Standard Rules on the Equalization of Opportunities for Persons with Disabilities, December 1993
  - Instrument for policy-making as well as a basis for technical and economic cooperation
  - A set of 22 rules addressing all aspects of life of persons with disabilities
  - Provide for a continuum of interventions that are critical to the equalization of opportunities for all persons with disabilities
  - Significant contribution to the advancement of legislation and regulations around the world and the establishing the Convention

Definitions

- **Persons with disabilities**

  Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments, which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others.

- **Universal design**

  Design of products, environments, programmes and services to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design.

  "Universal design" shall not exclude assistive devices for particular groups of persons with disabilities where this is needed.

Principles of the Convention

1. Respect for inherent dignity, individual autonomy including the freedom to make one's own choices, and independence of persons

2. Non-discrimination

3. Full and effective participation and inclusion in society

4. Respect for difference and acceptance of persons with disabilities as part of human diversity and humanity

5. Equality of opportunity

6. Accessibility

7. Equality between men and women

8. Respect for the evolving capacities of children with disabilities and respect for the right of children with disabilities to preserve their identities

Main features

- Main obligations to States Parties
  - Remove any discriminatory legislations, policies, practices, etc.
  - Enact new legislations, policies, practices to promote an independent life and full participation in society of persons with disabilities

- Main part plus optional protocol
  - Assessment by the Committee on the Rights of Persons with Disabilities of claims of violation of the Convention

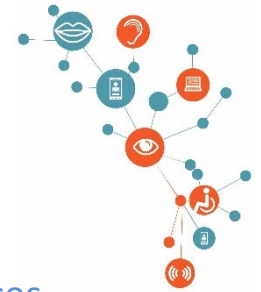- Framework to help States Parties to plan next steps towards meeting the convention goals

Articles mentioning ICTs

- Article 9 – Accessibility
- Article 21 – Freedom of expression and access to information

- Article 29 – Participation in political and public life
- Article 30 – Participation in cultural life, recreation, leisure and sport

- Article 31 – Statistics and data collection
- Article 32 – International cooperation

- Article 22 – Respect for privacy

Article 9 – Accessibility

- Identify and eliminate obstacles and barriers to accessibility, including information, communications and other services, such as electronic services and emergency services
  - Independent life and full participation in all aspects of life
- Develop, promulgate and monitor the implementation of minimum standards and guidelines for the accessibility of facilities and services open to the public
- Ensure that private entities offering services to the public take into account all aspects of accessibility
- Provide training for stakeholders on accessibility issues
- Promote appropriate forms of assistance and support to persons with disabilities to ensure their access to information
- Promote access to new information and communications technologies and systems, including the Internet
- Promote the design, development, production and distribution of accessible information and communications technologies and systems at an early stage, so they are accessible at minimum cost.

Article 21 – Freedom of Expression and Access to Information

- States Parties to ensure that persons with disabilities can seek, receive and share information and ideas on an equal basis with others and through all forms of communication of their choice, including accessible ICT

- Timely and affordable availability of content in accessible formats and using technologies appropriate to different kinds of disabilities

- In official interactions, accept and facilitate the use of sign language, Braille, augmentative and alternative communication, and all accessible means, modes and formats of communication of their choice by persons with disabilities

- Urge private entities to provide information and services in accessible and usable formats, including services to the general public through the Internet

- Encourage mass media, including providers of information through the Internet, to make their services accessible to persons with disabilities

Article 29 – Participation in political and public life

- Guarantee to persons with disabilities political rights and the opportunity to enjoy them on an equal basis with others.

- Facilitate the use of assistive and new technologies where appropriate when protecting the right to vote by secret ballot, and the right to stand for elections, to hold office and to perform all public functions at all levels of government.

Article 31 – Statistics and data collection

- Collect appropriate information, including statistical and research data to enable them to formulate and implement policies to carry out the Convention.
- Information must be disaggregated, as appropriate, and used to assess the implementation of obligations under the Convention and to identify barriers faced by persons with disabilities
- Make statistics accessible to persons with disabilities
- Used for reporting progress in States Parties on the implementation of the Convention (CRPwD)

Other Articles

Article 22 – Respect for privacy

- Issues of data protection in ICTs (e.g. cybersecurity)

Article 30- Participation in cultural life, recreation, leisure and sport

- Take measures to ensure that cultural materials, television programmes, films, theatre and other cultural activities are available in accessible formats

Article 32- International Cooperation

- Facilitate cooperation in research and access to scientific and technical knowledge
- Provide technical and economic assistance, including the facilitation of technology transfer and of access to and sharing of accessible and assistive technologies
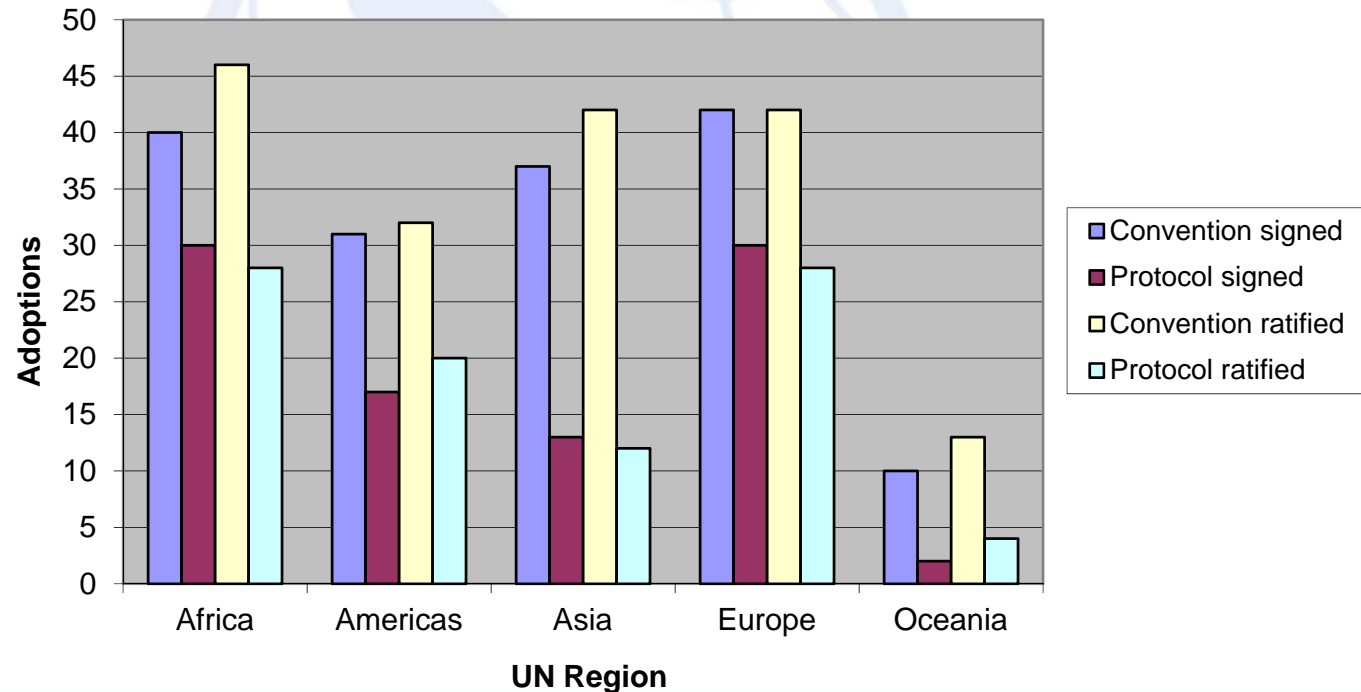
Current status*

- **Convention**
  - 160 signatories
  - 174 ratifications

- **Optional protocol**
  - 92 signatories
  - 92 ratifications

Adoption of the convention

Chart: Adoptions vs UN Region (Africa, Americas, Asia, Europe, Oceania)

Legend:
- Convention signed
- Protocol signed
- Convention ratified
- Protocol ratified

Y-axis: Adoptions (0–50)
X-axis: UN Region
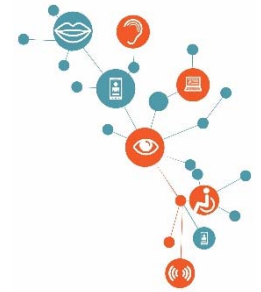
NB - *Signing* does not commit states; *Ratification* does

* Updated: 2017-11-15
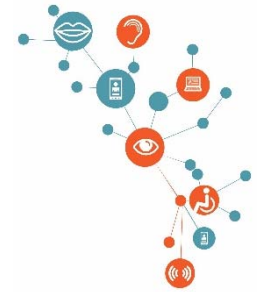
Web resources

- UN Convention – UN Enable initiative
  → www.un.org/esa/socdev/enable

- G3ict - the Global Initiative for Inclusive ICTs
  → www.g3ict.com

- Testing the accessibility of a web page
  → www.cynthiasays.com

Open standards promote a "network externality effect"
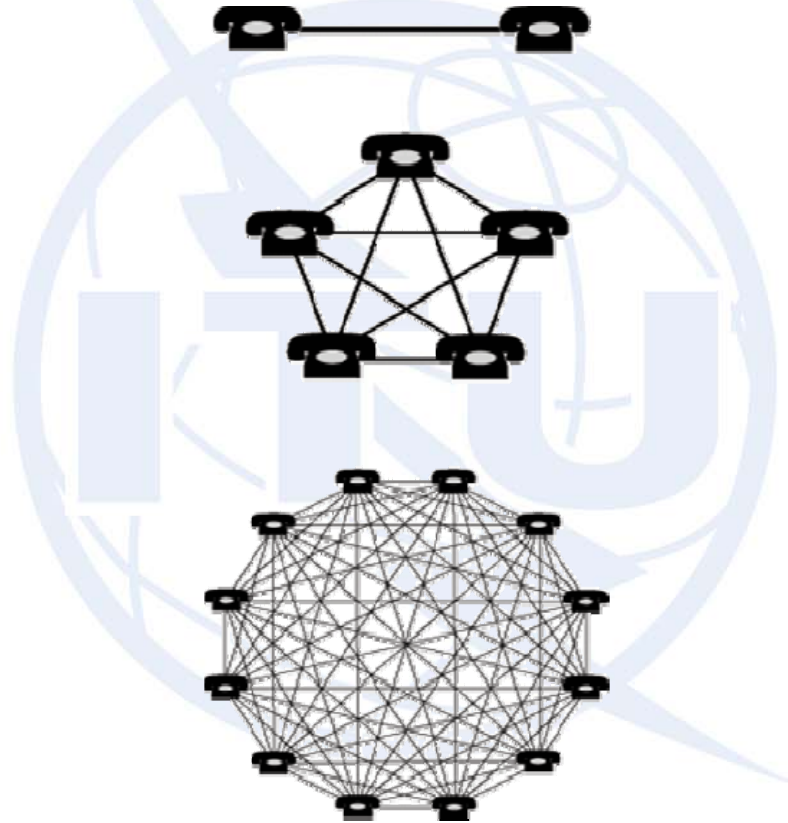
Technical compatibility (interoperability) fostering a growing number of users

ICTs and rights of persons with disabilities

ITU Study Group jargon
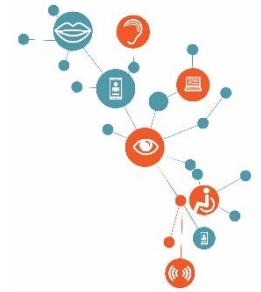
- **Study Group** – Broad area of studies
  - E.g. multimedia or access / transport networks
  - Equivalent of a TC (ISO or IEC) or SC (JTC1)
  - There are 11 in ITU-T, six in ITU-R
- **Question** – Narrow area of studies aiming at specific topics
  - E.g. video compression
- **Working Party** – Group of similar Questions
  - Facilitate management of technical fork
  - E.g. Media coding and immersive environments (audio, video, ILE)
- Sub-groups of an ISO/IEC TC or JTC1 SC may be equivalent to an ITU-T Question or a Working Party, depending on their scope or size

Examples of ITU standards in use in the world today by persons with disabilities

ITU-T V.18: ITU's first accessibility standard for deaf telecommunications

- Approved in 1995 and unified five different types of text telephones so that they would work back to back

- Text Telephones:
  - Convert typed characters into tones that are sent through the telephone lines so that deaf people can read them in real time
  - Used with a "relay" service enabling deaf people to communicate with hearing people (an operator reads what a deaf person types and types back to the deaf person what a hearing person says)

ITU-T E.161: The Tactile Identifier

- To help people who are blind & visually impaired to use the telephone keypad

  – The "Bump" on key "5" is the tactile identifier

ITU-T F.703: Total Conversation

- Puts user in the **center** of the communication society

- Is an audiovisual conversation service providing real-time transfer of video, text and voice between users

Users with Total Conversation Real-time text devices

Text, sign & captioned relay services

Emergency Service Outreach 112 , 911,...

ITU-T H.702 – IPTV device accessibility

- Specifies profiles that IPTV terminal devices – such as TV sets and set top boxes – should support to provide accessibility

- Three levels are defined

  o Basic → Enhanced → Main

  o **Basic profile:** entry level of accessibility features

  o **Main level:**

    o most complete set of features;
    o support by 2020 in all IPTV TV sets and set-top boxes

How a deaf-blind person uses multimedia communication?

Example: A deaf-blind woman in a Total Conversation call, producing sign-language and receiving text by using assistive technology/Refreshable Braille Display

Video/Text Relay Services

Video/Text relay service Operator translating sign language, voice, text

3-party

Signing User

Talking, Voice and Text
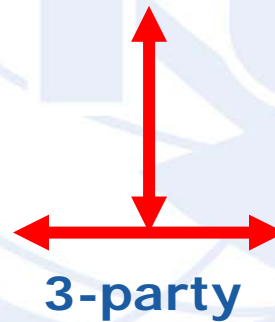
ITU-T Y.1901: Making IPTV accessible
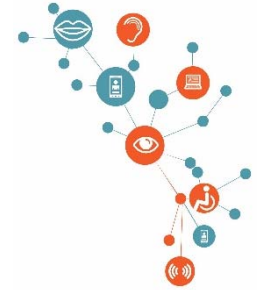
- Audio description describing to the blind the visual action on the screen
- Captions enabling people with hearing loss to understand the dialogue
- Supplementary video to display sign language interpretation
- Many other tools such as the ability of the user to record accessibility features

Sign language and lip-reading via video

- Supplement 1 to the ITU-T H-series of Recs (1999)
  - A usable sign language and lip-reading communication requires a frame rate of at least 25 frames per second

Real-time captioning (CART)

- Real-time transcript of speakers on screen
- Mandatory for hearing impaired participants
- Useful for persons whose native language is not being spoken
- Captioning service can be provided on site or remotely
- Allows remote participation as captioning can be viewed on an URL on the web

Some ITU-T Standards on Accessibility

- ITU-T V.18 for text telephony
- ITU-T T.140 as the general presentation protocol for text conversation
- ITU-T T.134 for text conversation in the ITU-T T.120 data conferencing environment
- Annex G to ITU-T H.323 for text conversation in ITU-T H.323 packet multimedia environment
- Annex L to ITU-T H.324 for text conversation in low bit-rate multimedia applications
- ITU-T F.703 – Multimedia conversation service description. Includes definitions of the accessible conversational services
- H-series Supplement 1 – Application profile – Sign language and lip reading real time conversation using low bit rate video communication
- ITU-T F.790 – Telecommunications accessibility guidelines for older persons and persons with disabilities
- ITU-T Y.1901, Requirements for the support of IPTV services
- Technical Paper ITU-T FSTP-TACL (2006), Telecommunications Accessibility Checklist

ITU-T's Accessibility Landmarks

- 1991: ITU is first international standards body to address accessibility issues
- 1994: the international text telephone standard, Recommendation ITU-T V.18, is published
  - A major landmark tying together text telephone protocols allowing different - previously incompatible – text phones in different countries to communicate
- 2008: World Telecommunication Standardization Assembly (WTSA-08): First ITU Resolution 70 to address accessibility
- 2010: World Telecommunication Development Assembly (WTDA-10): Accessibility Resolutions 58 and 70
- 14 October 2010: World Standards Day:
  "Standards make the world accessible for all"
- October 2010: First Plenipotentiary PP10 Accessibility Resolution 175; Addressing Accessibility for All of ITU

Other experts groups

- Joint Coordination Activity on Accessibility and Human Factors (JCA-AHF)
  - Under TSAG

- Dynamic Coalition on Accessibility and Disability (DCAD)
  - Part of the Internet Governance Forum (IGF), sponsored by ITU-T

Intersector Rapporteur Group on Audiovisual Media Accessibility (IRG-AVA)

- Harmonized development of standards for audiovisual media accessibility across ITU-T and ITU-R
  - Progression of FG AVA deliverables; accessibility with IBB
  - Cooperation with ISO/IEC JTC1 SC35

- ITU-R and ITU-T working together on making audiovisual media accessible
  - ITU-R Study Groups 6 (Broadcasting service)
  - ITU-T SG16 (Multimedia)
  - ITU-T SG9 (Broadband cable and TV)

- Home page: http://itu.int/en/irg/ava

How to contribute?

- Work progresses on the basis of written technical proposals (="contributions") received

- Provide experts to attend meetings and to submit contributions at ITU study group meetings
  - Members submit written technical proposals to create standards No contributions, no international standards (Recommendations); → no proposals = no progress

- Participate in the ITU-T JCA-AHF, the group responsible for coordinating the accessibility work

- Attend workshops and related activities

ITU-R's activities on ICT Accessibility

- ITU-R Sector contributes to the wireless technological development through the production of Recommendations, Reports, Questions and Handbooks relating to persons with disabilities and persons with specific needs, and by so doing, to improve their accessibility and to reduce the overall Digital Disabilities Divide.

- For the ITU-R meetings, in line with Resolution 175 (Guadalajara, 2010), an English **live captioning service for specific ITU-R events** including WRC, RA, RAG and ITU-R Study Group meetings has been provided since late 2013.

- In addition to live captioning, since RA/WRC-15 in 2015, the captioning transcript archives are also available. ITU Members can also access these archives shortly after a session for which captioning is provided.

For more information

- http://itu.int/en/ITU-T/accessibility
- http://itu.int/en/ITU-T/studygroups/com16/accessibility

- http://itu.int/interop
- http://itu.int/en/ITU-T/challenges

- http://itu.int/go/tsg16

- http://itu.int/en/ITU-T/jca/ahf
- http://itu.int/en/irg/ava