The Accessibility Systems in ITU-T SG16 for IPTV and Internet delivery"

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IPTV

- Internet Protocol Television: Content delivered using IP (internet protocol)
  - but not necessarily over the Internet
- In ITU-T, defined as “multimedia services, such as Television; Video; Audio; Text; Graphics; Data, delivered over IP based networks managed to provide the required level of QoS/QoE, security, interactivity and reliability”.
- ITU-T H.721 standardizes a terminal for IPTV (but can be used for OTT as well)

Examples of IPTV services

- Channel service (as in conventional broadcasting or cable TV)
  - Supports High Definition as well as Ultra High Definition (4K, 8K) content
- Video on Demand (similar to what is seen on the Web)
  - Many variations e.g., catch-up, Start-over, Near On-Demand, Network PVR, etc.
- Interactive Service (various information seeking and multimedia services can be supported)
- And others..
  - Digital Signage
  - E-commerce
  - E-health
  - E-education

Some technical characteristics of IPTV

- Rich set of IP-based protocols
  - IPv4 and IPv6; Multicasting and unicasting
- Diversified means of delivery
  - Wired vs. wireless; fiber-optic vs LTE& 5G
  - Local vs. global
- Diversified codecs for audio and video
  - MPEG-2, H.264, H.265 (HEVC), etc. with HD, UHD (4K, 8K)
- Web-technology
  - Structured data like XML and HTML; Javascript (ECMA)
- Interactive
- Available on various devices
  - TV-set, STB, game-console, tablet, smartphone, smart-watch,..
- Up-to-date: IOT, Big data and AI

ITU IPTV for Tablets and Smartphones

- Since IPTV service is IP-based, it can be delivered to Smart phones and tablets
- Service migration is simple and easy

IPTV for Multi-screen service

- With ITU-T IPTV standard, IPTV service can be used with different terminals across rooms

Accessibility

- Accessibility can be defined as "designing products, devices, services, or environments for people with disabilities"
- Accessibility is strongly related to ***universal design,*** the process of creating products that are usable by people with the widest possible range of abilities, operating within the widest possible range of situations.
- It is also related to ***Inclusive Design,*** the design of an environment so that it can be accessed and used by as many people as possible, regardless of age, gender and disability.

IPTV and Accessibility

Accessibility Profiles for IPTV
ITU-T Rec. H.702

- Defines the 3 profiles (Main, Enhanced, and Basic) for captioning, sign-language, and audio description
- The world's first global standard for accessibility services for IPTV
- Basic profile defines the accessibility services that can immediately be provided by IPTV terminals available in the market

Accessibility features of H.702: Captioning

- Open as well as closed
- Can change the size, color, position, of captions;
- Providing multiple captions (e.g., Bengali and English; easy Bengali for the Intellectually challenged, etc.)

Accessibility features of H.702: Sign Language Interpretation

- Open as well as closed signing videos
- Signing video can be multi-sized
- Signing video can change its location on screen
- Signing video can be over the main content or outside

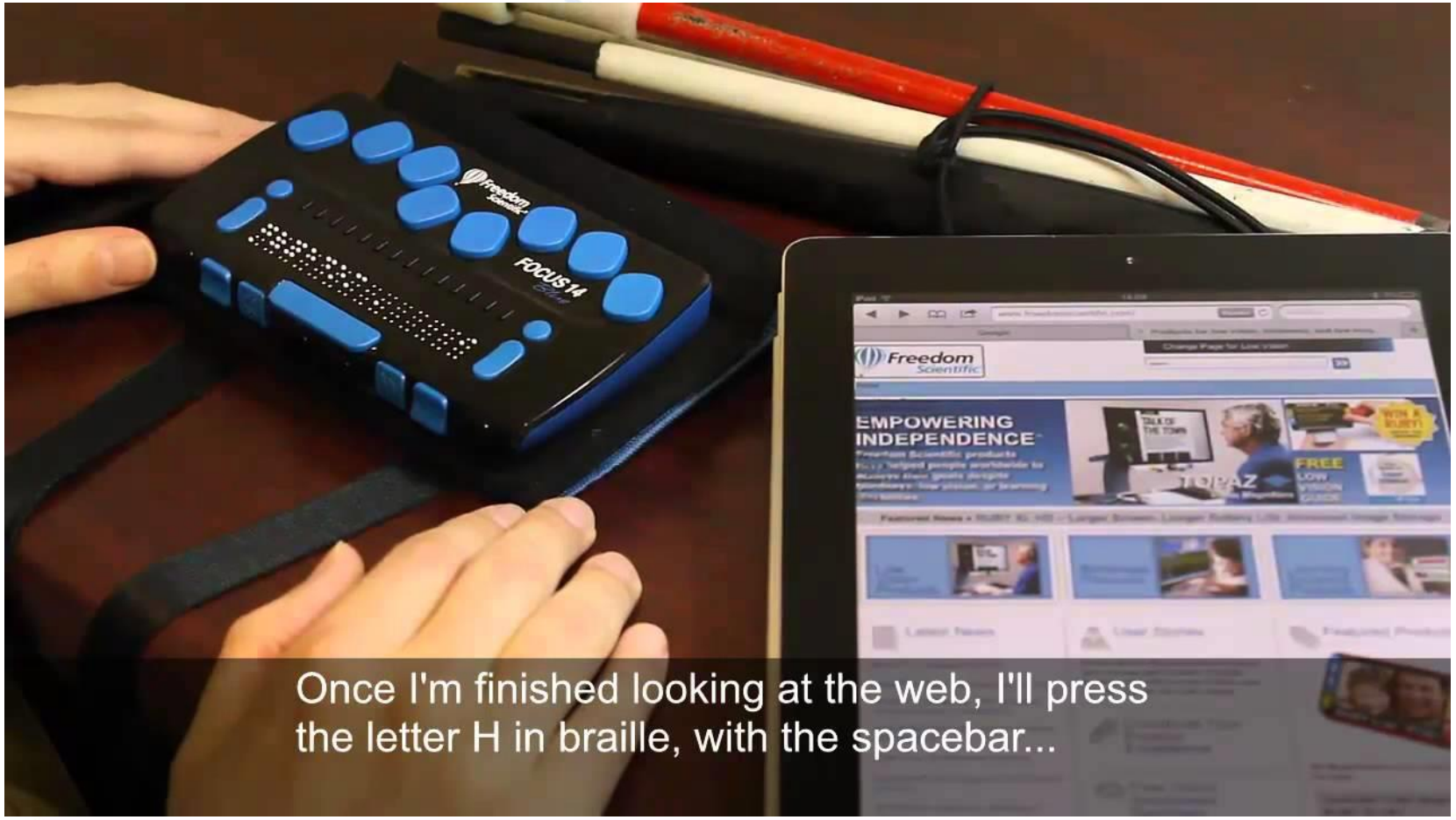
Accessibility features of H.702: Audio Description

- H.702 defines basic requirements of audio description, but currently it does not recommend any particular implementation
- It can be either streamed as an independent channel or can be retrieved as pre-recorded audio
- Web-based standard like TTML is a good candidate

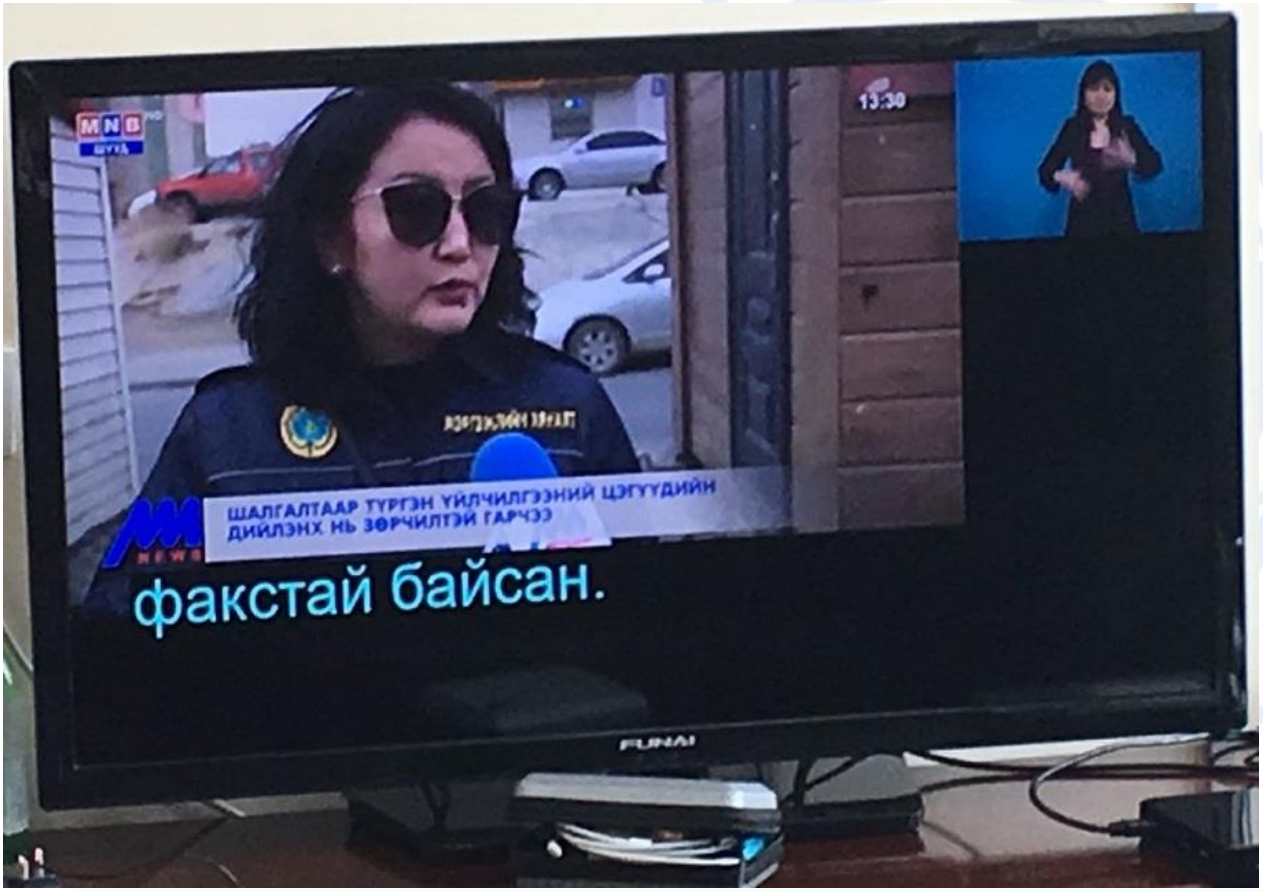
IPTV for All

- Blind people often rely on TV for information
- H.702 supports audio-based navigation of Electronic Program Guide (without TTS)
- IPTV can provide accessibility features for both deaf and blind
- With ICT and IP, new interfaces for deaf-blind is already available (e.g., text-to-braille)

IPTV and Braille



STB for H.702



- H.702 requires closed signing and IPTV enables this
- Mongolia government has decided to adopt H.702
- Test service is expected to start early 2018

Standard IPTV on Ubiquitous Devices

- Traditional fixed-type IPTV is controlled by a remote, friendly to both deaf and blind
- Other devices, e.g., smart phones and tablets, etc. are also available for IPTV services

IPTV and Video Relay Service (VRS)

Telephone with video sign

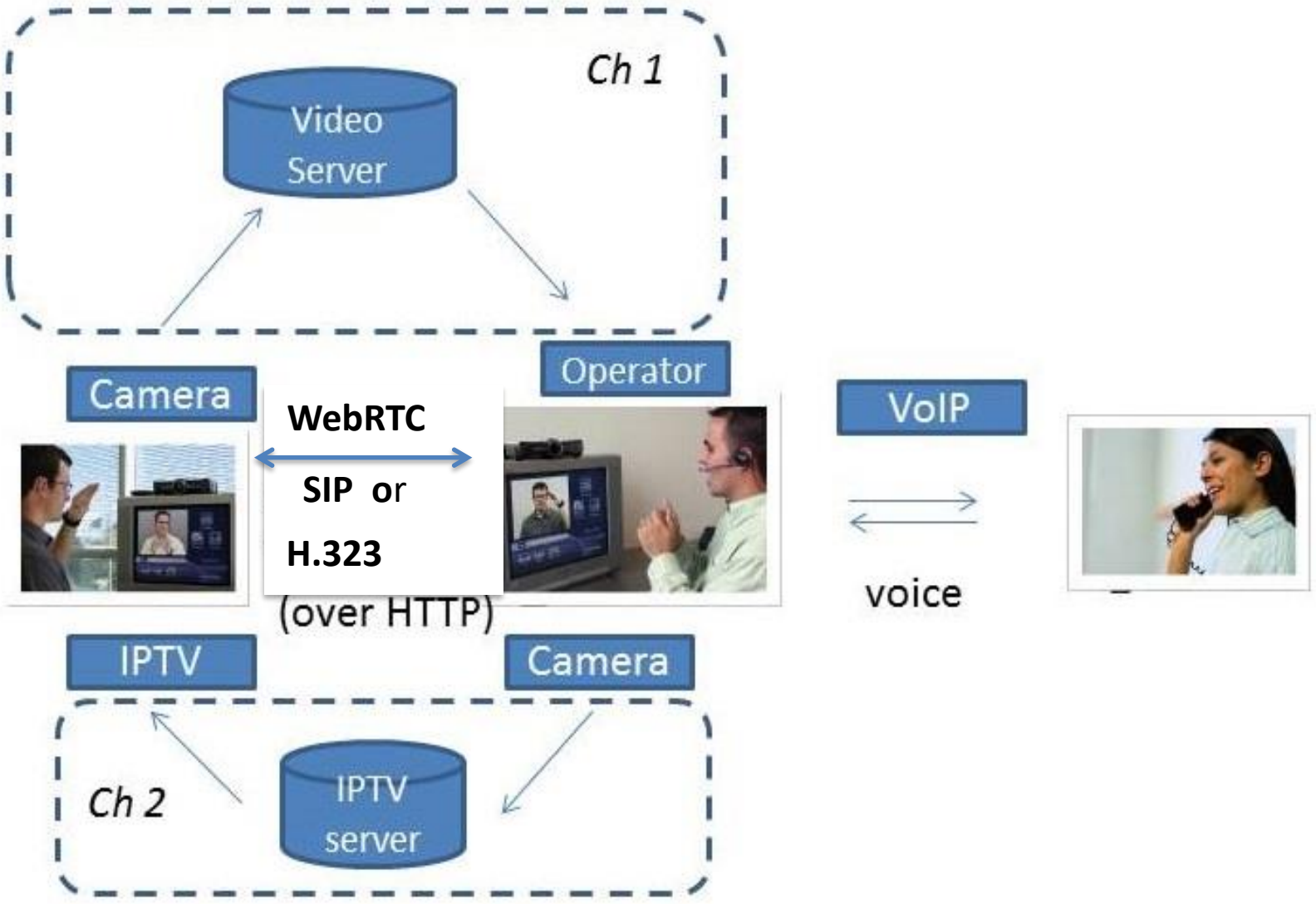
CA

Voice

D/HOH caller with sign language

Hearing caller

IPTV for Video Relay Service



Video surveillance and IPTV

- IPTV can be combined with an input device like a video camera to provide the information about the viewer
- Good for monitoring, surveillance and recognition, persons with disabilities as well as the elderly

IOT and IPTV:
E-Health System with IPTV

- IP-connected IPTV can communicate with various (healthcare) devices to monitor health
- IPTV can provide accessible Interface for health information
- This is a good way for chronic patients
- Standards make it possible to create such a system and service at reasonable cost

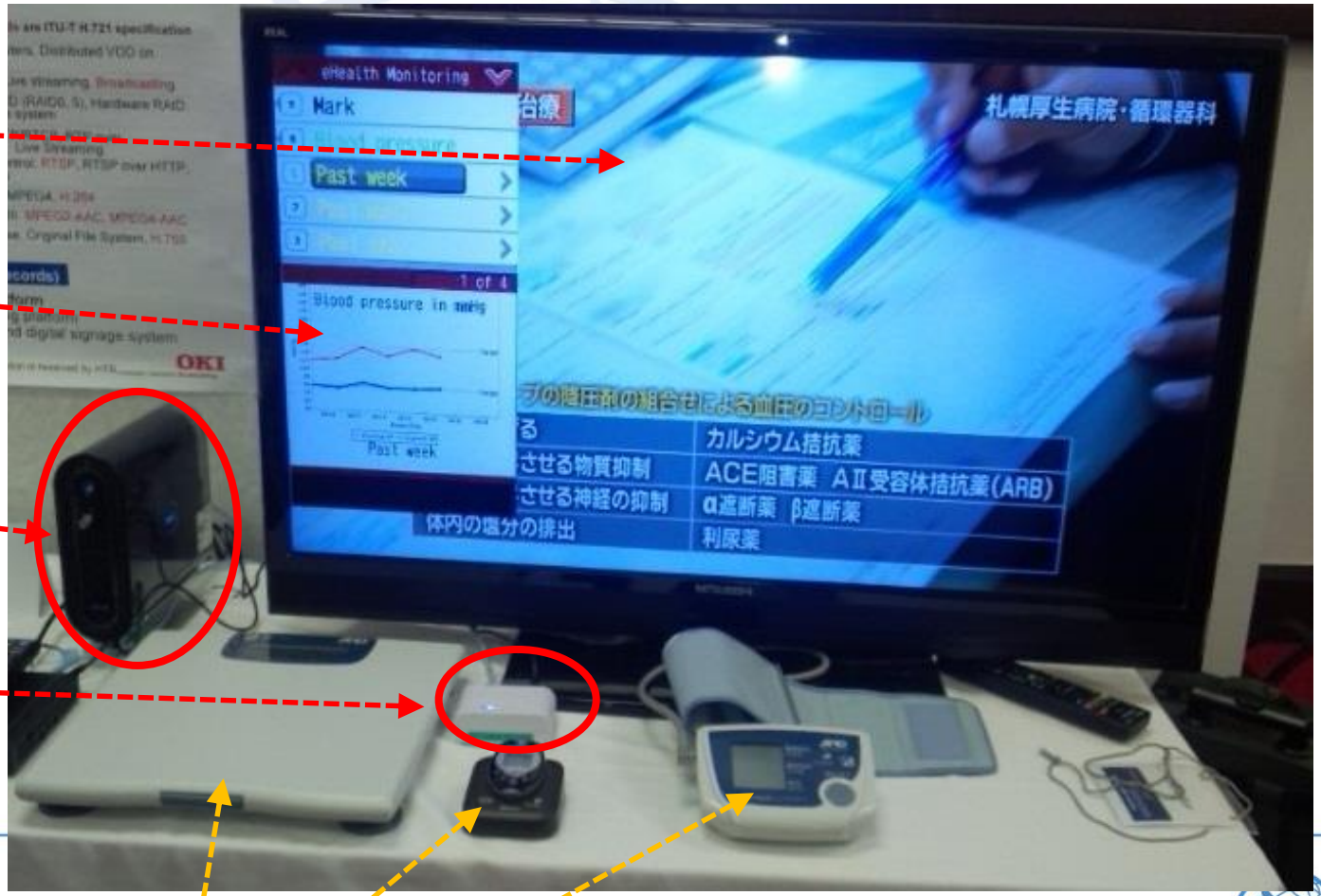
Implemented e-Health System

Standard Smart IPTV

IPTV e-health Application (run on TV)

E-Health Server

Standardized Wireless Gateway



Standardized monitoring devices

FSTP.ACC-AI
Guidelines on the use of AI for ICT accessibility

- This technical paper describes the use of AI for ICT accessibility.
- AI technologies such as automatic speech recognition for captioning are described, with their pros and cons.
- It also describes some parameters and criteria for objective, quantitative assessment and measurement the quality of service using these technologies.
- The initial emphasis is on the use of Automatic Speech Recognition (ASR)

IPTV for Accessibility Now

- IPTV and IP content delivery can provide good accessibility features for Persons with Disabilities
- Now is the time for accessibility services to be in place rather than under discussion
- IPTV can make accessibility “a matter of course” *now*