

Accessibility Standardization

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1. Introduction

It is finally less than two years until the Tokyo Olympics and Paralympics begin in 2020. The Olympics and Paralympics also bring increased attention on measures supporting persons with disabilities (PwDs) and specific needs.

ITU-T works with external organizations such as the World Health Organization (WHO) and the World Federation of the Deaf (WFD) to create ICT standards promoting health and security in society. This article gives an overview of standardization toward creating a barrier-free society, for the Olympics and Paralympics and beyond, for example supporting the daily activities of elderly and PwD as well as communication in times of emergency.

Accessibility is a general term for technologies, policies and measures designed to make various information more accessible to PwDs, elderly, or others who have specific needs. ITU-T SG16 deals with standardization of technologies that make multimedia information, in particular, more accessible.

The increasing importance of accessibility is manifest in the United Nations' Convention on the Rights of Persons with Disabilities (UN-CRPD). This convention was adopted by the UN General Assembly on December 13, 2006, and it came into effect in 2007. It imposes a duty on signatory countries to preserve the right of persons with disabilities to be treated equally with persons without disabilities. UN-CRPD was ratified by Japan in January 2014 and has been in force since February that year. A result has been the "Act for Eliminating Discrimination against Persons with Disabilities", which was enacted in April 2016.

Articles 3, 9, and 21 of UN-CRPD in particular are provisions directly related to maintaining access to information. The gist of these articles is as follows:

- Article 3: General Principle: Respect for inherent dignity, individual autonomy including the freedom to make one's own choices, and independence of persons "
- Article 9: "Ability to use facilities and services (Accessibility)": to ensure to persons with disabilities access to information and communications, including information and communications technologies and systems
- Article 21: "Freedom of expression and opinion, and access to information"

Article 9 in particular states: "States Parties shall also take appropriate measures to promote access for persons with disabilities to new information and communications technologies and systems, including the Internet," stipulating that the UN and each country must endeavor to promote participation in the

information society by PwDs.

These developments show that accessibility has become an important issue, especially at the ITU, which is the organization governing information and communications at the UN, and particularly the ITU-T, which recommends and promotes standardization of accessibility.

This standardization work is done mainly in ITU-T Q26/16. Below is a summary of the work items discussed in Q26/16.

2. H.702 "Accessibility profiles for IPTV systems" and related documents

This Recommendation was officially adopted on November 28, 2015, and it defines the basic accessibility functions for IPTV. Since then, further revisions have been made.

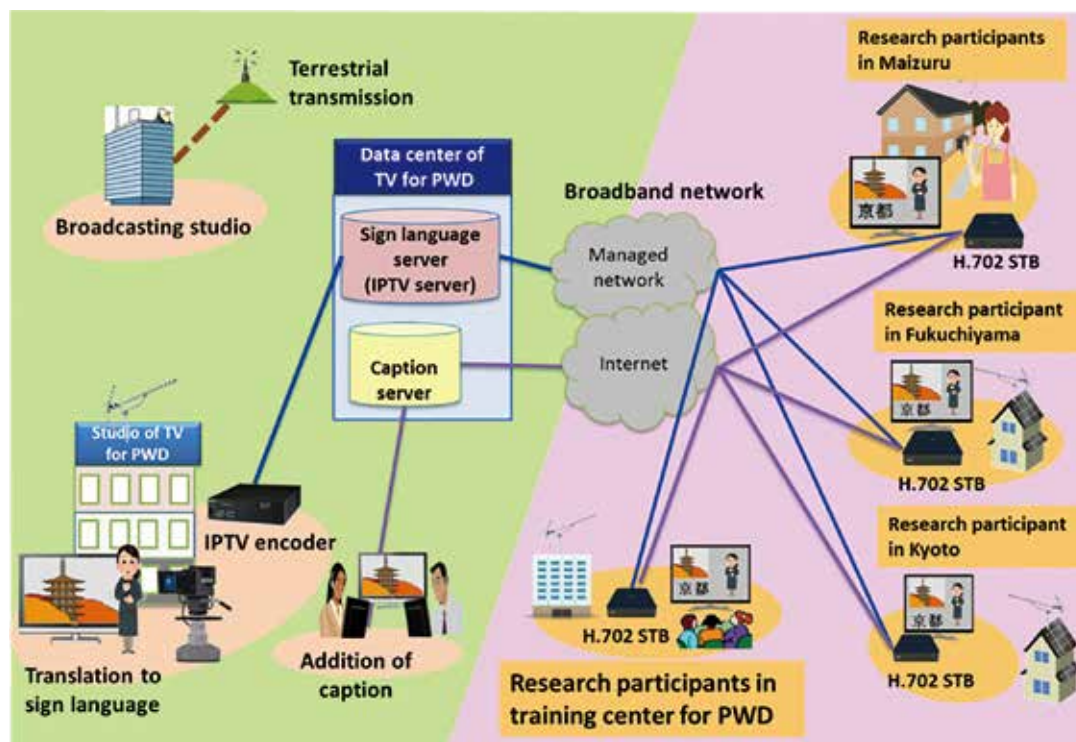
H.702 describes profiles of requirements on terminal devices for closed captioning, audio description (or descriptive audio), and display of sign language interpretation. It defines Basic Profile, Enhanced Profile, and Main Profile. It is hoped that ultimately, all televisions will implement Main Profile.

The Recommendation is the first ever international technical standard on IPTV accessibility and was initiated with a liaison statement from the Japan Federation of the Deaf and the All Japan Association of Hard of Hearing and Late-Deafened People (Zennancho), requesting ITU-T to standardize such profiles to meet their immediate needs. Contributions were created and proposed through industry-academic cooperation involving Waseda University, Keio University, Oki Electric Co. Ltd., ASTEM, and others.

Implementation according to this Recommendation has already been done in Japan, already recognized by the government as well as among PwDs both in Japan and overseas, and wider deployment is anticipated. Currently, work has also begun to adopt it for cable TV and regular broadcasts through organizations such as the European Broadcasting Union. In Japan, the Telecommunication Technology Committee (TTC) took global leadership in issuing the TTC standard JT.H702, "Accessibility Profiles for IPTV Systems" in 2016, making it a Japanese standard.

Accompanying H.702, Technical Paper HSTP.CONF-H702 "Conformance testing specification for ITU-T H.702" has also been approved, describing tests for conformance to the requirements of H.702. Conformance testing for H.702 has also been done according to this document, and the *Eye-dragon 4*, an IPTV set-top-box from ASTEM Co. Ltd., has passed this conformance testing.

■ Figure 1: Outline of the experiment of guaranteeing information accessibility for the disabled in digital terrestrial broadcasts using H.702



The technical paper, HSTP.ACC-UC “Use cases for inclusive media access services”, is also currently being drafted, describing use-cases of H.702 implementations. This document describes examples of how systems implementing H.702 will be used, and how they provide accessibility, making it a reference for implementations. It describes the results of a joint experiment currently done with television broadcasters in Japan that provides information accessibility (specifically, signing video and closed captions) by using IPTV to complement digital terrestrial broadcasts (see Figure 1).

H.702 has become widely known among PwDs as an ITU international standard. As a result, it has also been adopted as a national standard by governments in several countries due to demand from PwDs. Besides Japan, Mongolia is planning to adopt H.702, and translation of the documents to Mongolian is currently in progress. Adoption in the legal system is expected within FY2018.

The Japan International Cooperation Agency (JICA) is conducting the “Project for Promoting Social Participation of Persons with Disabilities in Ulaanbaatar City,” in Ulaanbaatar, the capital of Mongolia, and H.702 is expected to be a powerful tool for the project. A group of PwDs in Mongolia have obtained a broadcasting license, are preparing a broadcasting service, and are expecting to start a local pilot service using H.702 during 2018.

Interest in H.702 is also increasing in the United Nations. December 3 has been designated International Day of Persons with Disabilities (IDPD) by the UN to commemorate adoption

of the World Programme of Action concerning Disabled Persons on December 3, 1982, with various events held around the world each year. In 2017, the United Nations Headquarters held an IDPD event on December 1, where a panel was held to discuss and promote the importance of the H.702 standard for access to information for PwDs, accompanied by an H.702 demo session.

Events to promote H.702 are also planned at general meetings of other organizations including the UN, the World Federation of the Deaf, the International Federation of Hard of Hearing People, and the European Federation of Hard of Hearing People.

■ Figure 2: A TV screen in Mongolia implementing H.702



3. ITU-T Rec. F.921 “Audio-based network navigation system for persons with vision impairment”

This Recommendation was approved in May 2017. This work item was based on a proposal from the WayFindr organization in the UK. It specifies a framework for providing audio-based navigation directions for persons with visual impairments.

The Recommendation is intended for use, not outdoors, but in spaces like large buildings and underground train stations, where GPS signals do not reach. It describes requirements for methods such as installing beacons and other devices that are able to give appropriate audible guidance to persons with visual disabilities.

■ Figure 3: A video of the experiment taken place in London



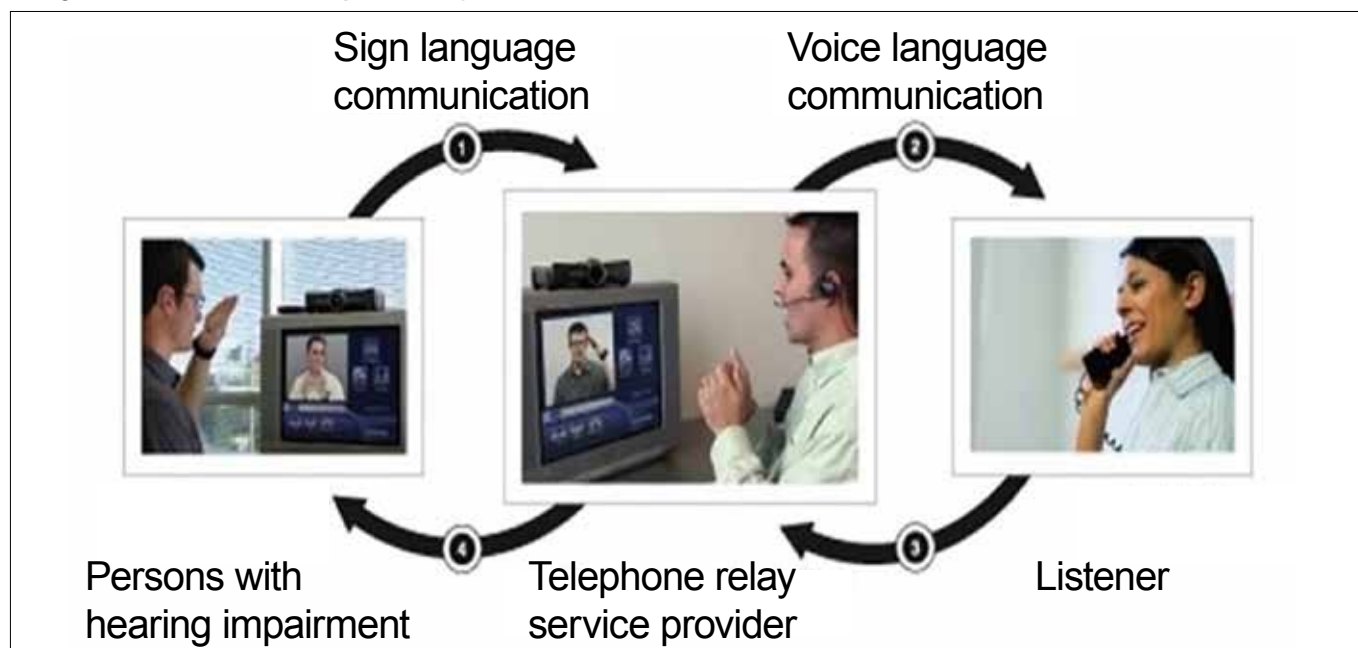
F.921 is a Recommendation regarding a framework and describes requirements. Detailed descriptions and compliance are described in “Compliance Protocol and Indicators for Audio-Based Network Navigation System for Persons with Vision Impairment” (FSTP-ANS-Checklist). F.921 and the WayFindr framework on which it is based are already being used in the London Underground, and demonstrations are about to begin in areas including Los Angeles and Sydney.

Demonstrations are also planned in Asia, including Japan, the Philippines, and Mongolia. It is anticipated that further technical Recommendations and conformance test documents will be created in the future, mainly by WayFindr, and will become international standards for audio guidance. An accessibility advisor to the President of the US has also shown interest in adopting it as a standard in the USA, as it is attracting attention from many governments as a global standard. Also related to this, the Zero Project decided to recognize F.921 as an excellent technology policy providing audio guidance to persons with visual disabilities at the 2018 Zero Project Conference. The Zero Project is an effort, headquartered in Vienna, to find and introduce the most advanced initiatives, from around the world that will improve the lives of PwDs, through collaboration with over 3,000 experts on issues of PwDs from around the world.

In Japan, the TTC plans to begin efforts toward localizing the standard quickly.

This Recommendation is very significant for ensuring safe freedom-of-mobility for persons with visual impairment, and the Tokyo Olympics and Paralympics, in particular, is a good opportunity for it to be deployed widely.

■ Figure 4: Mechanism of telephone relay services



4. F.Relay Telecommunication Relay Services

Telephone relay services are a mechanism for Deaf and hard-of-hearing people to use the telephone. They provide support for real-time two-way communication between hearing and non-hearing persons by having a Communication Assistant (CA) mediating between spoken voice language and sign language or text.

Deaf and hard-of-hearing people cannot make use of audio-only telephone services. This presents various obstacles that limit freedom in daily life for Deaf and hard-of-hearing people. One particular issue is the inability to make emergency calls (like 911 in the USA) in the event of disasters or crime.

During the 2020 Olympics and Paralympics, Japan expects to receive many PwDs from foreign countries, and the question of how to provide emergency services to these guests will be an extremely important one.

Telephone relay services can support such circumstances by enabling telephone conversation between persons with and without hearing disabilities.

In a telephone relay service, the service provider puts a person as a Communication Assistant between the callers, as shown in Figure 4. The Communication Assistant converts spoken words to sign language or text, and sign language or text to spoken words so the two parties can understand each other.

Telephone relay services have already been in operation in many countries. However, since there has been no standard, policies and technologies in each country are different and the resulting lack of interoperability has posed a great inconvenience for users, particularly with current advances in globalization. This applies especially during international events such as the Olympics.

This draft Recommendation is expected to change the situation by specifying a framework for such telephone relay services. It has been progressing based on proposals from Gallaudet University in the USA, which is well known for education for the Deaf and hard of hearing, and companies like Sprint, who are actually offering telephone relay services.

For these and other reasons, this draft Recommendation is much anticipated by Deaf and hard-of-hearing communities, receiving active contribution from them.

The draft Recommendation is expected to be completed and to enter the approval process during 2018. A telephone relay

service utilizing IPTV is also described in an appendix.

In parallel with F.Relay, a service similar to, but different from, telephone relay services are dealt with in the draft Recommendation in the next section, regarding accessibility to public services.

5. F.ACC-TCPS: Total Conversation System for Public Services

Recently, more and more companies are providing customer service to PwDs using telephone relay services or remote video sign-language interpretation (VRI). For example, Barclays Bank in the UK are providing reception services in British Sign Language (BSL) to BarclayCard customers.

Reception services like this, using remote video, are technically quite similar to video telephone relay services (VRS), but differ in that they do not connect the person with hearing disability to any customer, but only to the reception of the party providing the service. These services are currently provided according to the needs of each enterprise.

However, unlike services by private enterprises, services by the public sector, such as fire brigade and policing, should be made available equally to all citizens, so the public sector has a duty to make their services accessible to all, including PwDs.

In light of this, F.ACC-TCPS describes technical background and requirements for public service reception guidance.

At international events like the Tokyo Olympics and Paralympics, where many PwDs are expected to attend, handling of emergency information is extremely important, so it is desirable that this draft Recommendation be approved and disseminated quickly.

6. H.ACC-MMSIGN: “Abstract language for multimedia signing”

This draft Recommendation was originally a work item arising from a proposal by Tunisia University in 2014, but there were no contributions after that. The work has now been restarted, because topics related to sign language have begun to be treated as part of natural language translation.

In the past, there have been many proposals for languages that describe sign language to be used for computer graphics (CG), but none of them were really able to describe it adequately. A language for describing sign language is needed not just for

generating sign language using CG and animation; use with captured video as well as for machine learning databases for sign-language recognition is also important. As such, a standard language for encoding sign language is needed.

This draft Recommendation uses the term “Multimedia Sign”. While it does not provide a clear definition for this term, simply put, it refers broadly to “sign language expressed using multimedia,” which includes sign language using a CG avatar, but also captured video.

There are many conflicting opinions on whether real communication is possible using sign language generated with CG avatars, but since Deaf people that have real experience with CG in particular have expressed strong concerns and opposition, this draft Recommendation avoids any mention of CG as much as possible.

7. F.WAAD: “Safety requirements for wearable audio augmenting devices”

Recently, devices generally referred to as Personal Sound Amplifier Products (PSAPs), which are different from hearing aids used for medical purposes, are becoming widely available on the market. Prices are not high, in the range from 10 to 1,000 US dollars, and they can be purchased on Amazon and other Web sites, so they are rather easy to use.

PSAPs are intended to be used to help people with healthy hearing hear better, but it has recently been found that these products are actually often promoted and purchased as an inexpensive alternative to hearing aids (See Figure 5). The problem with this situation is that since these products are not intended to be used as hearing aids, they do not provide functions that hearing aids are required to have, such as mechanisms to suppress feedback and limit volume. If they are used by people with poor hearing, there is a danger that they could cause further

■ Figure 5: Example of PSAP



hearing damage.

This draft Recommendation describes safety requirements for PSAP devices based on proposals for the EU by members of the European Association of Hearing Aid Professionals.

8. HSTP.AEHH: Audio enhancement for the hard-of-hearing

This Technical Paper describes various technologies for helping people who are hard of hearing to hear better. It was created based on a proposal originally from Japan Broadcasting Corporation (NHK). It describes technologies that make hearing easier for those that are hard of hearing, using methods that augment sound without increasing the volume, or change the speed of sound playback.

9. FSTP-RCSO: Overview of remote captioning services

Remote captioning services use a remote operator to provide caption text for, for example, a meeting as it progresses. This sort of services is extremely useful for Deaf and hard-of-hearing persons and also for foreigners, and offering it remotely helps to improve efficiency. This document gives a technical overview and requirements for these sorts of remote captioning services. This work is being done by the European Federation of the Hard-of-Hearing People and includes quite practical content such as educational methods and operations. It also refers to an important type of captioning service, which uses automatic speech recognition technology.

As captioning services are expected to be needed in many situations at the Tokyo Olympics and Paralympics, this document should be a valuable reference providing guidance for services that provide captions remotely.

10. Conclusion

This article has described the standardization work on accessibility at ITU-T Q26/16. This standardization of accessibility in cooperation with other UN related organizations is becoming a mainstream activity around the world, and standards that have been made into Recommendations are already being adopted in many countries. We hope that they will also come into general use in Japan as the Tokyo Olympics and Paralympics approach.