

# ISO work and potential directions forward in the field of ICT accessibility

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# Thank you for having me (again)

- I was here in 2016 speaking about
  - *Accessibility is Needed for All of Us*
    - I introduced the accessibility goals in ISO/IEC Guide 71 and some of the accompanying User accessibility needs
- This time I will
  1. start from that point (with a brief review of ISO/IEC Guide 71)
  2. introduce ISO/IEC 29138-1 that elaborates User accessibility needs
  3. go over the breadth of ICT related accessibility standards
  4. discuss potential future areas of ICT accessibility standardization

# ISO/IEC Guide 71 Goals

- Originally to better explain accessibility to users of Guide 71
  - to indicate the universal breadth of accessibility
- Since principles are conceptual
  - they frighten some people (who need things spelled out in greater detail)
  - they were renamed as “goals”
- Opposition to the evolving principles / goals
  - strengthened them through the rigor of international reviewing
  - led to their becoming an alternate approach to the old medical model approach
- ISO/IEC Guide 71 is freely available for download at:
  - <http://www.iso.org/guide71>

# Accessibility Goals/Principles

- ISO/IEC Guide 71:2014
  - identified 11 Accessibility Goals
  - that can be treated as high level principles of accessibility
  - User-focused goals / principles
    - emphasize the individual users who have accessibility needs
  - Interaction-focused goals / principles
    - emphasize the individual interactions
  - Task-focused goals / principles
    - emphasize the ability for interactions to achieve intended accomplishments
  - System-focused goals / principles
    - emphasize technical issues which could impact upon achieving accessibility

# User-Focused Principles

1. **Suitability for the widest range of users** (diversity)
  - *A system is suitable for the widest range of users if it meets the needs of diverse users in diverse contexts.*
2. **Conformity with user expectations** (individual & social/cultural)
  - *A system conforms to user expectations if it is predictable based on the user's past experience, the context of use, laws and standards, and/or commonly accepted conventions.*
3. **Support for individualization** (user-initiated or system-initiated)
  - *A system supports individualization if its components, functions or operations can be tailored to meet the needs of individual users.*

# Interaction-Focused Principles

## 4. **Approachability** (physical & psychological)

- A system is approachable if diverse users can overcome any physical or psychological barriers and physically or remotely access it to accomplish the task.

## 5. **Perceivability** (of information & functionalities)

- A system is perceivable if diverse users in diverse contexts can sense the information and functionalities it presents.

## 6. **Understandability** (of information & functionalities)

- A system is understandable if its information and functionalities are interpretable by diverse users.

## 7. **Controllability** (to initiate & to complete)

- A system is controllable if the user is able to initiate and complete the interaction(s) required to accomplish the task.

# Task-Focused Principles

## 8. **Usability** (effectiveness, efficiency, & satisfaction)

- A system is usable if it supports diverse users in their diverse contexts to accomplish their tasks with effectiveness, efficiency and satisfaction.

## 9. **Error tolerance** (minimal disruptions and extra work)

- A system has error tolerance if despite predictable errors, diverse users can complete the intended task or activity with either no, or minimal, corrective action or negative consequences.

# System-Focused Principles

## 10. **Equitable use** (identical vs equivalent)

- A system provides equitable use if it allows diverse users to accomplish tasks in an identical manner whenever possible or in an equivalent manner when an identical manner is not possible.

## 11. **Compatibility with other systems** (interoperability, back & forward)

- A system provides compatibility if it allows diverse users to use other systems as a means to interact with it to accomplish the task.



# ISO/IEC 29138-1:2018

- *Information technology – User Interface accessibility – User accessibility needs*
  - is the most comprehensive set of user accessibility needs and information about them
  - is organized based on the 11 ISO/IEC Guide 71 Accessibility Goals
  - is freely available for download at
    - [https://standards.iso.org/ittf/PubliclyAvailableStandards/c071953\\_ISO\\_IEC\\_29138\\_1\\_2019.zip](https://standards.iso.org/ittf/PubliclyAvailableStandards/c071953_ISO_IEC_29138_1_2019.zip)

# ISO/IEC 29138-1:2018

- includes for each of its user accessibility needs
  - statement of the need
    - “User accessibility needs have been worded to focus on what is needed, without prescribing in detail how the need is to be met.”
  - description of the need
    - “While the wording of individual needs has been made as clear as possible, most needs are provided with a further discussion (labelled “Description”) to help clarify their intent and scope.”
  - instances of the need
    - “An instance is a refinement of a need. Typically a need can have several instances. In some cases those instances will identify contexts in which the need might apply. The set of instances associated with a need is not necessarily all of the instances that could be associated with that need.”
- examples

# ISO/IEC 29138-1:2018

ISO/IEC Guide 71 Accessibility goal	needs	instances
1. Suitability for the widest range of users	3	15
2. Conformity with user expectations	4	21
3. Support for individualization	9	33
4. Approachability	8	30
5. Perceivability	28	98
6. Understandability	22	84
7. Controllability	18	61
8. Usability	9	19
9. Error tolerance	7	22
10. Equitable use	3	7
11. Compatibility with other systems	3	11

ISO work and potential directions  
for ICT accessibility

# ISO/IEC 29138-1:2018.

- 6.5.3 To have visual information available in other modalities
  - **Description:** This need focuses on the importance of ensuring that users for whom the visual modality is not appropriate or optimal are able to perceive relevant information provided by the system.
  - Users might have to access information in different modalities (e.g. audio (sounds, vocals), tactile (vibration, heat, pressure, electric), kinaesthetic, smell or taste).
  - If this is not the case, users for whom the visual modality is not appropriate or optimal will not be able to perceive the information they need when interacting with system.

- 6.5.3 To have visual information available in other modalities
  - **Instances** include:
    - a) to have visual content also available in audio form;
    - b) to have visual interaction cues also available in audio form;
    - c) to have visual content also available in tactile form;
    - d) to have visual controls, such as buttons, also available in tactile form;
    - e) to have visual interaction cues also available in tactile form.

# ISO Accessibility Standards for ICT

- While ISO/IEC 29138-1 identifies the needs, and is freely available,
  - there are an increasing number of ISO and ISO/IEC standards relevant to ICT Accessibility
    - most ICT accessibility standards come from ISO/IEC JTC1/SC35/WG6 Information Technology – **User Interface Accessibility**
    - other come from a variety of other committees within ISO and ISO/IEC, including:
      - ISO TC159/SC4 Ergonomics of human-system interaction
      - ISO TC 173 Assistive Products
    - others come from domain specific ISO and ISO/IEC committees, e.g.:
      - ISO/IEC JTC 1/SC 36 Information technology for learning, education and training

# ISO Accessibility Standards for ICT

- The following ISO and ISO/IEC standards have broad applicability:
  - **ISO/IEC 30071-1:2019** Information technology — Development of user interface accessibility — Part 1: Code of practice for **creating accessible ICT products and services**
  - **ISO 9241-171:2008** Ergonomics of human-system interaction — Guidance on **software accessibility**
  - **ISO/IEC 13066-1:2011** Information technology — Interoperability with assistive technology (AT) — Requirements and recommendations for **interoperability**
  - **ISO/IEC 29136:2012** Information technology — User interfaces — **Accessibility of personal computer hardware**
  - **ISO/IEC 40500:2013** Information technology — W3C **Web Content Accessibility Guidelines (WCAG) 2.0**
  - **ISO 21801-1:2020 Cognitive accessibility** — General guidelines

# ISO Accessibility Standards for ICT

- The following ISO/IEC standards in the ISO/IEC 20071 series focus on the accessibility of specific ICT components:
  - **ISO/IEC 20071-5:2022 Accessible user interfaces for accessibility settings on information devices**
  - **ISO/IEC 20071-11:2019 Guidance on text alternatives for images**
  - **ISO/IEC 20071-15:2017 Part 15: Guidance on scanning visual information for presentation as text in various modalities**
  - **ISO/IEC TS 20071-21:2015 Guidance on audio descriptions**
  - **ISO/IEC 20071-23:2018 Visual presentation of audio information (including captions and subtitles)**
  - **ISO/IEC TS 20071-25:2017 Guidance on the audio presentation of text in videos (including captions, subtitles, and other on-screen text)**



# Potential additions to ISO/IEC 20071

- Parts 21, 23, and 25 deal with the accessibility of specific components of audio-visual content
- Part 24 *Visual presentation of audio information in sign languages*
  - is just starting to be developed
- There is a need for a higher level part on:
  - *Developing accessible audio-visual content*, that would
    - combine common information on development of all forms of accessible content
    - reference parts 21, 23, 24, and 25 and other applicable standards (e.g. MPEG)
    - add additional guidance not contained in parts 21, 23, 24, and 25

# Potential additions to ISO/IEC 20071

- The 1-9 sub sub-series deals with controls
- The 10-19 sub-series deals with standard content
- The 20-29 sub-series deals with video content
- The 30-39 sub-series is to deal with **immersive environments**
- While early investigations into immersive environments have been started, there is insufficient information to proceed at this time
  - Work is just beginning in ISO TC159/SC4/WG5 on **ISO 9241-820** *Ergonomic guidance on interactions in immersive environments, augmented reality, and virtual reality*
  - When that is completed, there will be a suitable basis for developing accessibility guidance that goes beyond the general ergonomic guidance

# Potential additions to ISO/IEC 20071

- Most parts deal with general components relevant to all types of ICT systems,
- Part 15 on scanning visual information focuses on a component that is only applicable to a limited set of specialized applications
- There are many other possible types of specialized applications that could use accessibility guidance, including:
  - Kiosks
  - Internet of Things
  - Robotic, intelligent and autonomous systems
  - The Metaverse

# Potential additions to ISO/IEC 20071

- Kiosks
  - Kiosks have been around for a long time, but still lack any specific international ergonomic or accessibility guidance
  - There are a very wide range of kiosks, including
    - Automatic teller machines
      - (which would belong to ISO TC68 Financial services)
    - Ticket machines
    - Information kiosks
    - Vending machines
  - While there is a need for accessibility guidance, it would require a well researched description of the range of functions that are involved, to provide a basis for accessibility guidance on each function

# Potential additions to ISO/IEC 20071

- Internet of Things
  - ISO/IEC JTC1/SC41 *Internet of things & related technologies*
    - is collecting use cases that can form the basis for identifying the range of IoT functions that need to be made accessible
  - ISO/IEC JTC1/SC35 has established an ad hoc on *Accessibility of the Internet of Things user interfaces*
    - which is in liaison with ISO/IEC JTC1/SC41
    - that will be making recommendations on possible standardization projects to the next plenary meeting of ISO/IEC JTC1/SC35 in February 2023

# Potential additions to ISO/IEC 20071

- Robotic, intelligent and autonomous systems
  - ISO/IEC JTC 1/SC 42 *Artificial intelligence* is dealing with various aspects of artificial intelligence, including:
    - ISO/IEC AWI TR 24030 *Use cases*
    - ISO/IEC CD 5339 *Guidelines for AI applications*
    - ISO/IEC DTR 5469 *Functional safety and AI systems*
    - ISO/IEC FDIS 23894 *Guidance on risk management*
  - ISO TC159/SC4/WG6
    - ISO/TR 9241-810:2020 *Robotic, intelligent and autonomous systems*
    - is developing ergonomic guidance that applies to autonomous systems
- Work on accessibility of systems involving AI has not started, but would have to take into account these & other standards

# Potential additions to ISO/IEC 20071

- The Metaverse
  - is an evolving and very abstract concept
    - making it too early to consider standardization
  - is extremely diverse
    - including many systems that are unlikely to conform to any available standards
  - for the time being can best be dealt with via the 20071 standards that apply to all systems and any of the other standards that are anticipated above

# Conclusion

- ISO/IEC Guide 71 and ISO/IEC 29138-1
  - provide a framework for identifying ICT accessibility needs
- There is a good set of ISO and ISO/IEC standards
  - that have broad applicability
- The ISO/IEC 20071 series on *User interface component accessibility*
  - is increasingly addressing more specific ICT accessibility issues
- There are a number of further topics identified above that provide potential directions for further standardization
  - some can be started soon
  - others will take more time to be ready for development



# Questions?

Thanks for your interest  
in this important issue!

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