

XR Standards in Health & Care

The status quo and path
ahead of us

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Why standards?

- save (manufacturing, information, transaction, shipping, distribution, change,...) costs
- simplify work
- increase market transparency
- concentrate on innovative aspects
- increase interoperability
- increase exchangeability
- intensify competition, price depression
- reversal of the burden of proof by using standards





Chris Kremidas-Courtney, senior fellow at Brussels think tank „Friends of Europe“ and Lecturer for Institute for Security Governance (ISG) in Monterey, California.

He said that China plans to “*be the world leader in metaverse development,*” a technology that dovetails with its plan for a state-controlled digital renminbi. Standard-setting is the natural first step in that roadmap.

“If you want to seize the future,
you set the standards for it”

Chris said.

POLITICO

Enter keyword



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POLITICO PRO

FROM POLITICO PRO

Beijing is coming for the metaverse

Proposals reviewed by POLITICO show China wants to assert state control over virtual environments.



Experts that reviewed the proposal at the request of POLITICO said it risks violating principles of privacy and freedom | Jade Gao/AFP via Getty Images

BY GIAN VOLPICELLI

AUGUST 20, 2023 | 4:00 PM CET | 5 MINUTES READ

Europe finds ourselves only at the sideline of a fight for global XR ecosystems.

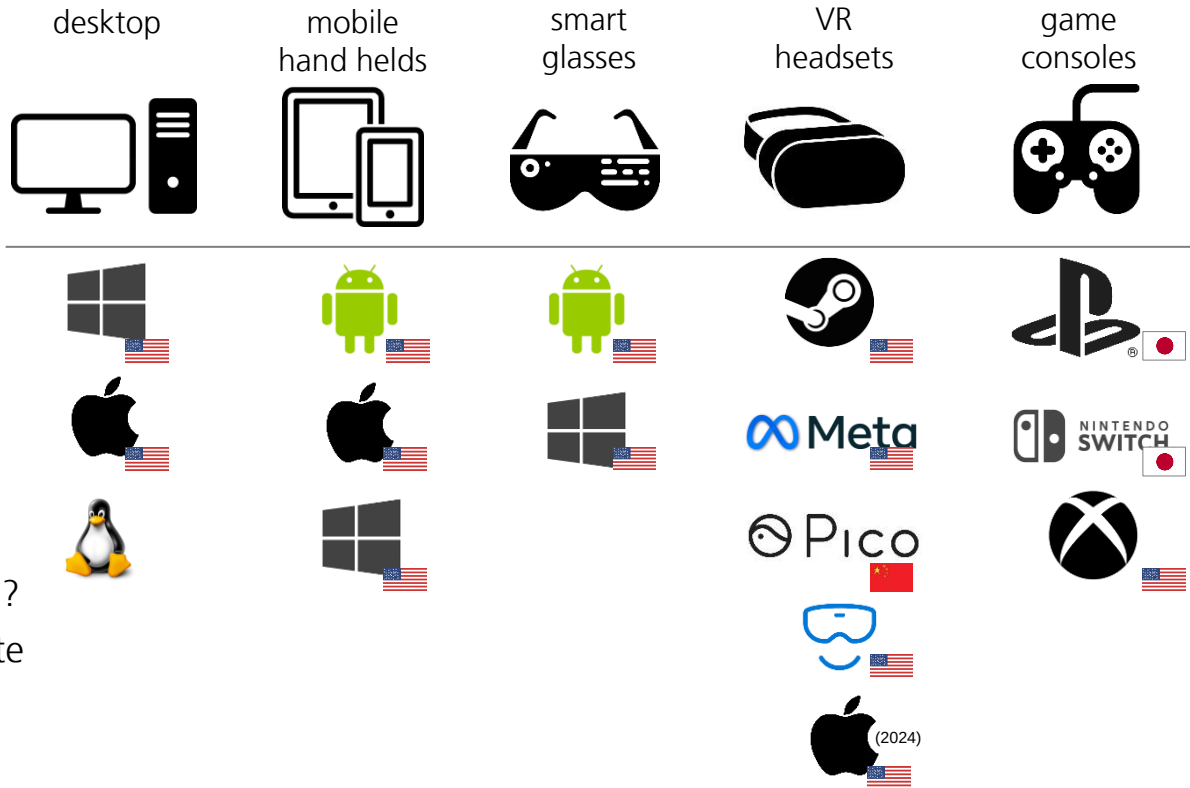
problem:

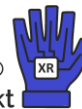
- Europe will probably not create a huge, global platform provider
- platform providers aim at vendor lock-in

questions:

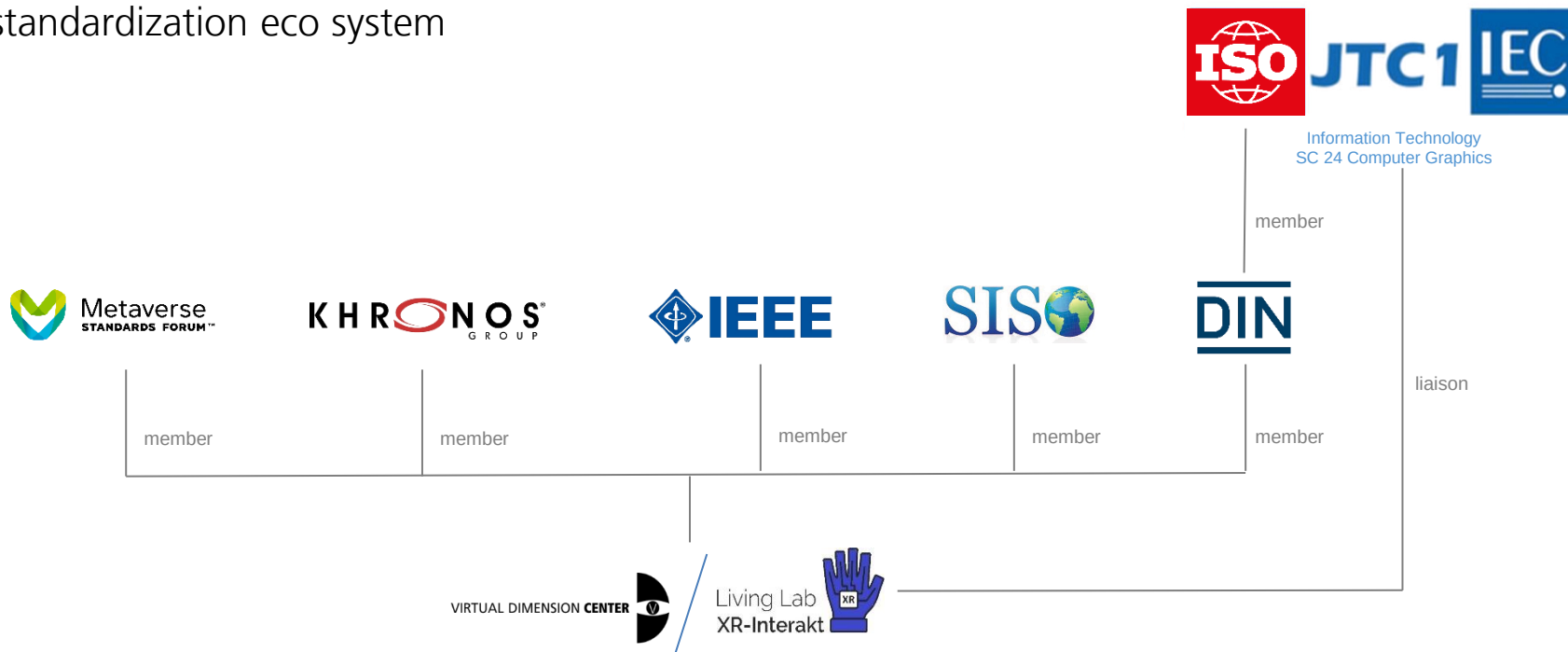
- what options for action do we have?
- what can be our future role to create added value and employment?

=> **standardization!**





We got involved in the
standardization eco system



We found:

XR norms,
XR standards,
XR recommendations,
XR guidelines:

- 600+ published
- 100+ being created right now
- by 75+ active initiatives actually working on them

The screenshot shows a web browser window with a Zotero library. The address bar shows the URL: <https://www.zotero.org/groups/5002494/var-normenbibliothek/items/3HFHLE32/library>. The Zotero logo is in the top left. A search bar on the right contains the text "Title, Creator, Year". Below the search bar, there is a table of publications. The table has columns for Publisher, Title, Year, and Lit. The selected row is highlighted in blue.

Publisher	Title	Year	Lit
-	A pattern approach to interaction design		
3GPP	Virtual Reality (VR) streaming audio; Characterization test results	2018	
3GPP	Extended Reality (XR) in 5G	2022	
3GPP	Immersive Teleconferencing and Telepresence for Remote Terminals (ITT4RT) Operation ...	2022	
3GPP	QoE parameters and metrics relevant to the Virtual Reality (VR) user experience	2022	
3GPP	Support of 5G glass-type Augmented Reality / Mixed Reality (AR/MR) devices	2022	

Below the table, there is a section for the selected document. It includes fields for Item Type, Title, Author, Publisher, Date, URL, and Extra. The details are as follows:

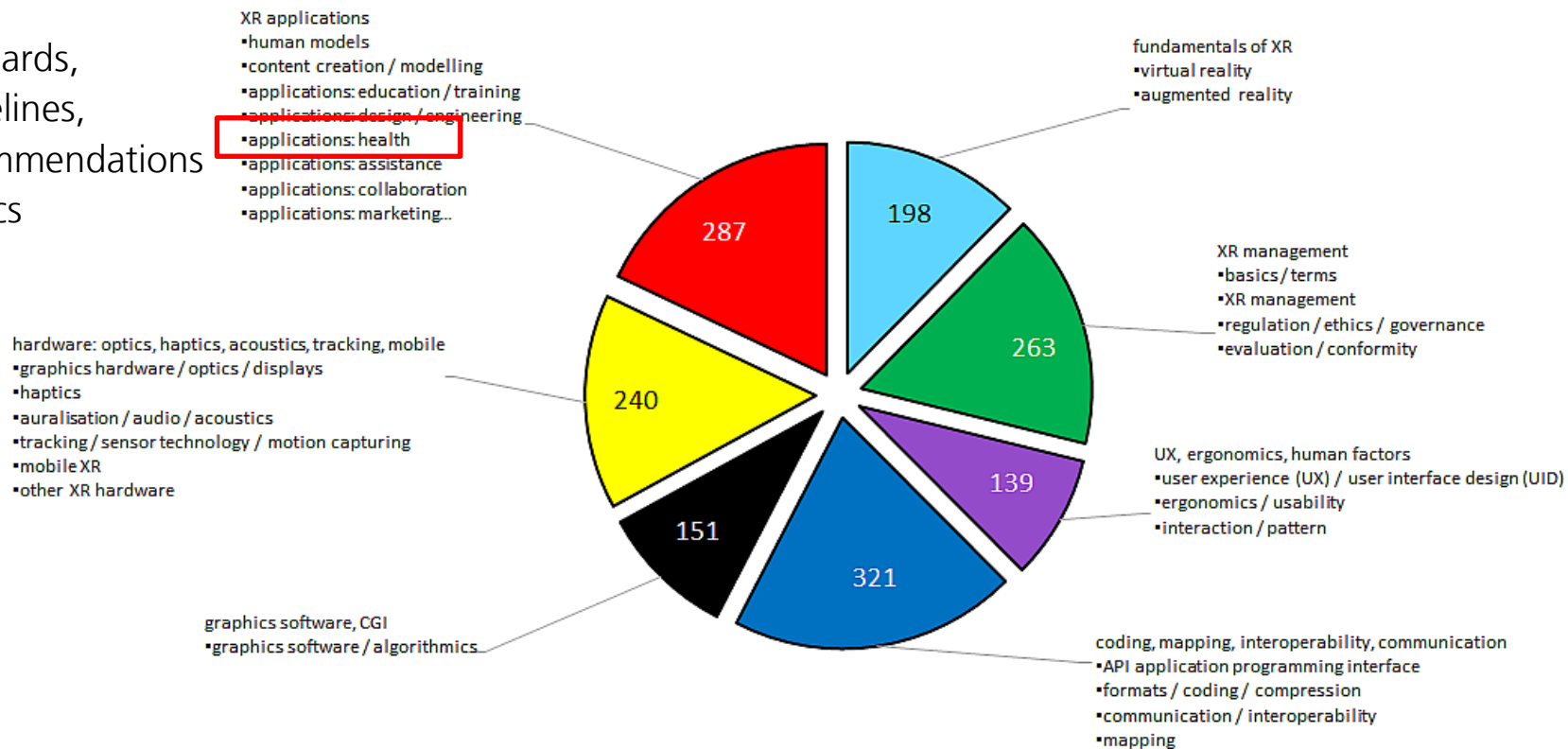
Field	Value
Item Type	Document
Title	Extended Reality (XR) in 5G
Author	3rd Generation Partnership Project (3GPP)
Publisher	3GPP
Date	2022
URL	https://portal.3gpp.org/desktopmodules/...
Extra	Issue: TR 26.928

On the right side of the document details, there is an "Abstract" section. The abstract text is: "The present document collects information on eXtended Reality (XR) in the context of 5G radio and network services. The primary scope of the present document is the documentation of the following aspects: - Introducing Extended Reality by providing definitions, core technology enablers, a summary of devices and form factors, as well as ongoing related work in 3GPP and elsewhere, - Collecting and documenting core use cases in the ..."



clustering

- XR standards,
 - XR guidelines,
 - XR recommendations
- into 7 topics

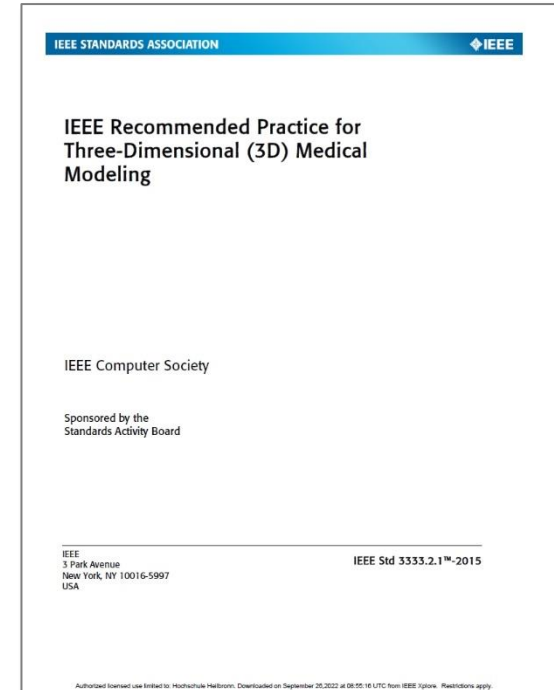


Examples of XR standards for healthcare



The generation and practical use of medical three-dimensional (3D) modeling for diagnostics and therapeutic applications is described in this standard.

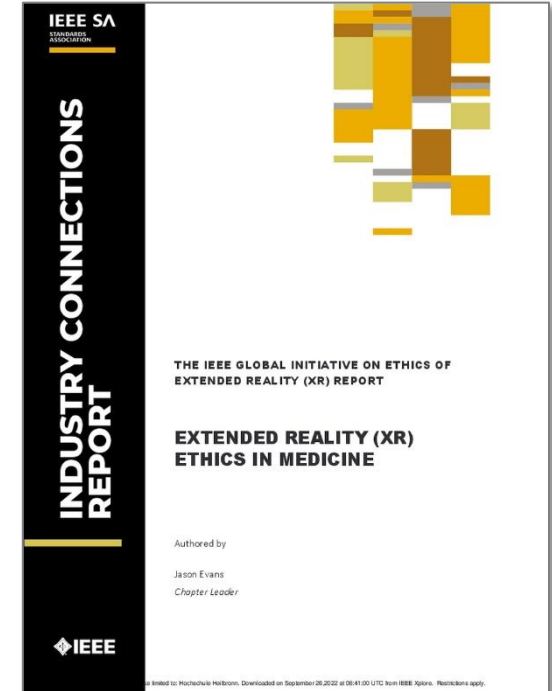
Volume rendering and surface rendering techniques for 3D reconstruction from two-dimensional (2D) medical images and a texturing method of 3D medical data for realistic visualization are included.



Examples of XR standards for healthcare



Extended Reality (XR) for medical use cases is proving to be beneficial to both patients and healthcare professionals as well as all other stakeholders throughout the healthcare industry. Some of the XR use-cases include helping surgeons better perform surgeries, immersing patients and healthcare professionals in medical information and education, and training all within XR environments. This report highlights the need for an ethical framework that is evolved from best practices throughout medical and technological fields to help ensure safe and equitable usage of the technology.



Examples of XR standards for healthcare



Immersive technology has provided new and enhanced healthcare solutions and treatments over recent decades. As the technology matures, there are great expectations of its potential to further promote the advancement of medicine through a wide range of new and enhanced devices and treatments. This IET document seeks to provide insight into key issues, views and recommendations given at the Think Big: Future Health and Life Sciences Unconference, jointly hosted by the IET, Immerse UK and Hatsumi VR in November 2019. It contains a summary of key recommendations from participants, data and ethical challenges and case studies.



The promise of immersive healthcare

How the UK can reap the benefits of the latest healthcare innovations that use immersive technology.



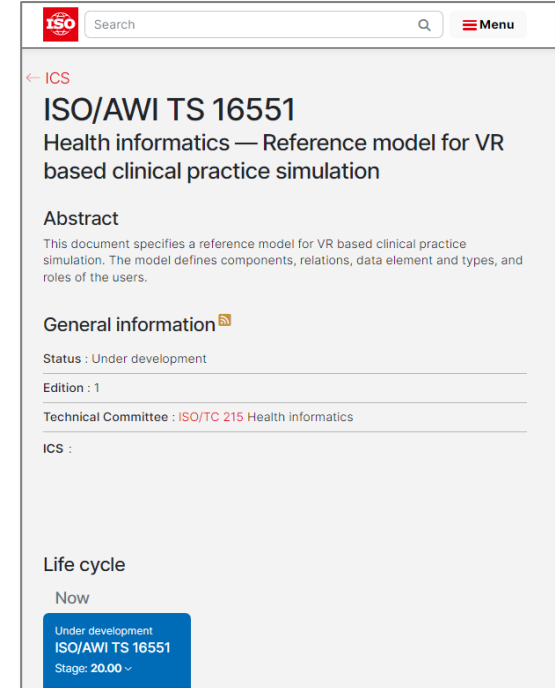
theiet.org/immersive-healthcare

Examples of XR standards for healthcare



[under development!]

This document specifies a reference model for VR based clinical practice simulation. The model defines components, relations, data element and types, and roles of the users.



ISO Search Menu

← ICS

ISO/TC 215

Health informatics — Reference model for VR based clinical practice simulation

Abstract

This document specifies a reference model for VR based clinical practice simulation. The model defines components, relations, data element and types, and roles of the users.

General information

Status : Under development

Edition : 1

Technical Committee : ISO/TC 215 Health informatics

ICS :

Life cycle

Now

Under development
ISO/TC 215
Stage: 20.00 ~

Examples of XR standards working groups on medical/healthcare

3141 - 3D Body Processing

This group addresses the anthropometric and topo-physiological attributes that contribute to the quality of experience of 3D body processing, as well as identifying and analyzing metrics and other useful information, as well as data relating to these attributes.

<https://standards.ieee.org/industry-connections/3d/bodyprocessing/>

Standards	Products & Programs	Focuses	Get Involved	Resources	MAC ADDRESS	Q
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Industry Connections and Standards Group for 3D Body Processing (3DBP)

The motivations and goals of this program are to bring together diverse stakeholders from across technology, retail, research and standards development to build thought leadership around 3D body processing technology standards in areas such as 3D capture, processing, storage, sharing and (augmented) representation. Exploration of this activity may include:

- Identify and classify types of 3D body processing technologies
- Identify and classify use cases of 3D body processing
- Identify gaps in existing nascent standards and recommended practices as 3D body processing spreads beyond first adopters
- Identify need and propose PARs for new standards and best practices for 3D body processing and adjacent technologies (like 2D augmented reality)
- Identify guides & recommendations for consuming or using body measurements, to better understand the benefits and limitations of this type of data

Please help the 3D Body Processing Industry Connections group understand the advantages and challenges with 3D Technology in the Retail industry by taking a short survey. The survey will be anonymous and should only take about 10 minutes of your time.

[Take the Survey](#)

[3DRC Collaboration](#)

[Events](#)

[White Papers](#)

[Get Involved](#)

Resources and Links

[ICAID](#)

[How Can the Internet of Clothing Benefit Our Wellbeing and Environment?](#)

[P3141 - Standard for 3D Body Processing](#)

[3DBP Member Area](#)

Examples of XR standards working groups on medical/healthcare

Neurotechnologies for Brain-Machine Interfacing

The goal of this program is to bring together diverse stakeholders across neurotechnologies, research institutions, industry and government agencies to identify and address gaps in the existing standards for Brain-Machine Interfacing (BMI)/Brain Computer Interface (BCI) based solutions.

<https://standards.ieee.org/industry-connections/neurotechnologies-for-brain-machine-interfacing/>

IEEE SA
STANDARDS
ASSOCIATION

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Standards

Products & Programs

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Get Involved

Resources

MAC ADDRESS

Q

NEUROTECHNOLOGIES FOR BRAIN-MACHINE INTERFACING

[Home](#) > [Industry Connections](#) > Neurotechnologies for Brain-Machine Interfacing

About

The goal of this program is to bring together diverse stakeholders across neurotechnologies, research institutions, industry and government agencies to identify and address gaps in the existing standards for Brain-Machine Interfacing (BMI)/Brain Computer Interface (BCI) based solutions.

Neurotechnologies for Brain-Machine Interface Standards Roadmap Now Available!

This roadmap provides an overview of the existing and developing standards in the field of neurotechnologies for brain-machine interfacing. The focus is on systems that provide a closed-loop interaction with artificial devices based on information extracted from measurements of activity in the nervous system. The document also includes recommendations on the priorities for standardization. Please [download the standards roadmap \(PDF\)](#).

Interest in BMI/BCI is consistently growing and state-of-the-art research is currently being tested on its intended end-users. Translation from laboratory proof-of-concepts to viable clinical and assistive solutions, as well as consumer applications entails a large set of challenges.



3D

+

Activities

+

[African Standardization Strategy and Roadmap for the Fourth Industrial Revolution](#)[AI-Driven Innovation for Cities and People](#)[Association for Digital Transformation](#)[Best Practice Guide to Developing Ethically Aligned Standards](#)[Closed Activities](#)

Examples of XR standards working groups on medical / healthcare



Consumer Healthcare Alliance (CHA) is a community of global industry and academic leaders dedicated to improve consumers' daily health life with innovations in healthcare electronics. As technology advanced in the past years, more and more healthcare electronics has been developed and shipped directly to consumers. It is important that this trend be standardized, documented and systematically improved with cooperation among industry and academic leaders in the area. .

IEEE STANDARDS ASSOCIATION

IEEE

Consumer Healthcare Alliance
Industry Connections Activity Initiation Document (ICAID)
Version: 2.0, 25 May 2018
IC16-005-03 Approved by the IEEE-SA SB 14 June 2018

Instructions

- Instructions on how to fill out this form are shown in red. It is recommended to leave the instructions in the final document and simply add the requested information where indicated.
- Shaded text indicates a placeholder that should be replaced with information specific to this ICAID, and the shading removed.
- Completed forms, in Word format, or any questions should be sent to the IEEE Standards Association (IEEE-SA) Industry Connections Committee (ICCom) Administrator at the following address: industryconnections@ieee.org.
- The version number above, along with the date, may be used by the submitter to distinguish successive updates of this document. A separate, unique Industry Connections (IC) Activity Number will be assigned when the document is submitted to the ICCom Administrator.

1. Contact

Provide the name and contact information of the primary contact person for this IC activity. Affiliation is any entity that provides the person financial or other substantive support, for which the person may feel an obligation. If necessary, a second/alternate contact person's information may also be provided.

Name: Xiache Chen
Email Address: chen.xh@siat.ac.cn
Employer: Chinese Academy of Sciences
Affiliation: Chinese Academy of Sciences

2. Participation and Voting Model

Specify whether this activity will be entity-based (participants are entities, which may have multiple representatives, one-entity-one-vote), or individual-based (participants represent themselves, one-person-one-vote).

Entity-Based

Examples of XR standards working groups on medical/healthcare



ISO-IEC JTC 1 IT /SC 24
WG 11:
Health, safety, security,
and usability of augmented
and virtual reality
<https://www.iso.org/committee/45252.html>
(internal!)

The screenshot displays the ISO-IEC JTC 1 IT /SC 24 WG 11 search interface. On the left, the 'Search Filters' panel includes options for 'Full Text', 'Title', 'Number range/Expected action', and 'Document type' (with checkboxes for 'Meeting (6)' and 'Ballot (4)'). Below these are dropdowns for 'Meeting doc. metadata', 'Ballot doc. metadata', 'Decision doc. metadata', and 'Modification/Creation date'. A 'Reset' button is at the bottom of the filters. The main 'Search Results' panel shows 10 results. The table below lists these results:

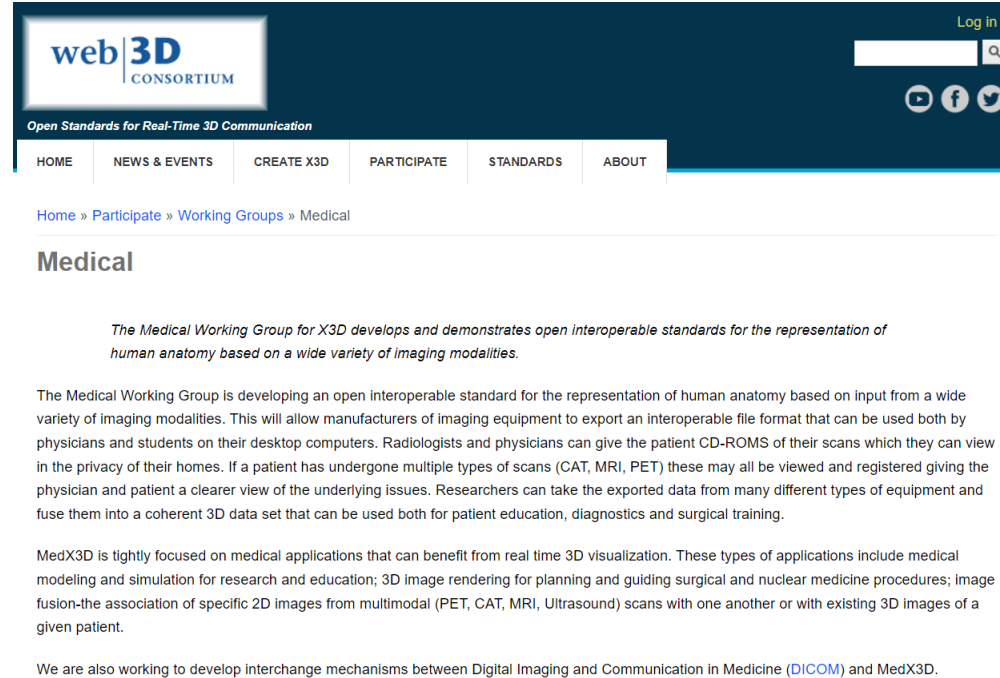
	N ↑	Title ↑	Type ↑	Subtype	Workspace	Modified ↑
☐	4746	Result of voting on ISO/IEC 3892: Health Information Modeling and This NWIP has not been approved. The reason it has failed is because	Ballot	Result of voting	ISO/IEC JTC 1/SC 24	2022-07-01
☐	4718	Form 4 (annex) - Health_Information_for_VR_Smart_Cities_211210	Ballot	Reference document	ISO/IEC JTC 1/SC 24	2022-04-13
☐	4688	Form 4 (annex) - Health_Information_for_VR_Smart_Cities_211210	Ballot	Reference document	ISO/IEC JTC 1/SC 24	2021-12-13
☐	4422	N 4422 ISO-IEC-JTC1-WG9-WorkSession-20200804-WG_Proposa	Meeting	Presentation	ISO/IEC JTC 1/SC 24	2020-08-14
☐	4403	N 4403 Draft Resolution to Establish a new WG - Health Safety Se	Meeting	Working documents for discussion	ISO/IEC JTC 1/SC 24	2020-08-06
☐	4386	N 4386 Proposed WG Health and Safety ToR and future standards	Meeting	Presentation	ISO/IEC JTC 1/SC 24	2020-08-03
☐	4373	N 4373 ISO-IEC.JTC1-SC24-AG1_Health_Information_Systems_200	Meeting	Presentation	ISO/IEC JTC 1/SC 24	2020-07-29
☐	4299	N 4299 HealthCareInformation 190819	Meeting	Minutes	ISO/IEC JTC 1/SC 24	2019-10-09
☐	4297	Health_Information_for_VR_Smart_Cities_191008	Ballot	Form	ISO/IEC JTC 1/SC 24	2019-10-09
☐	4144	N 4144 10 Health Care Information Systems Integration 180806	Meeting	Minutes	ISO/IEC JTC 1/SC 24	2018-10-18

Examples of XR standards working groups on medical/healthcare

Web3D Consortium “Medical”

The Medical Working Group for X3D develops and demonstrates open interoperable standards for the representation of human anatomy based on a wide variety of imaging modalities.

<https://www.web3d.org/working-groups/medical>



The screenshot shows the Web3D Consortium website. The header features the 'web3D CONSORTIUM' logo and the tagline 'Open Standards for Real-Time 3D Communication'. A navigation menu includes links for HOME, NEWS & EVENTS, CREATE X3D, PARTICIPATE, STANDARDS, and ABOUT. A search bar and social media icons (YouTube, Facebook, Twitter) are also present. The main content area is titled 'Medical' and contains a paragraph describing the Medical Working Group for X3D, which develops open interoperable standards for human anatomy representation. It mentions that this will allow manufacturers to export interoperable file formats for use by physicians and students. The text also notes that the group is developing a standard for representing human anatomy based on input from various imaging modalities (CAT, MRI, PET) and that researchers can fuse 2D images from multimodal scans with existing 3D images. A final sentence states that the group is working on interchange mechanisms between Digital Imaging and Communication in Medicine (DICOM) and MedX3D.

Log in

web3D
CONSORTIUM

Open Standards for Real-Time 3D Communication

HOME NEWS & EVENTS CREATE X3D PARTICIPATE STANDARDS ABOUT

Home » Participate » Working Groups » Medical

Medical

The Medical Working Group for X3D develops and demonstrates open interoperable standards for the representation of human anatomy based on a wide variety of imaging modalities.

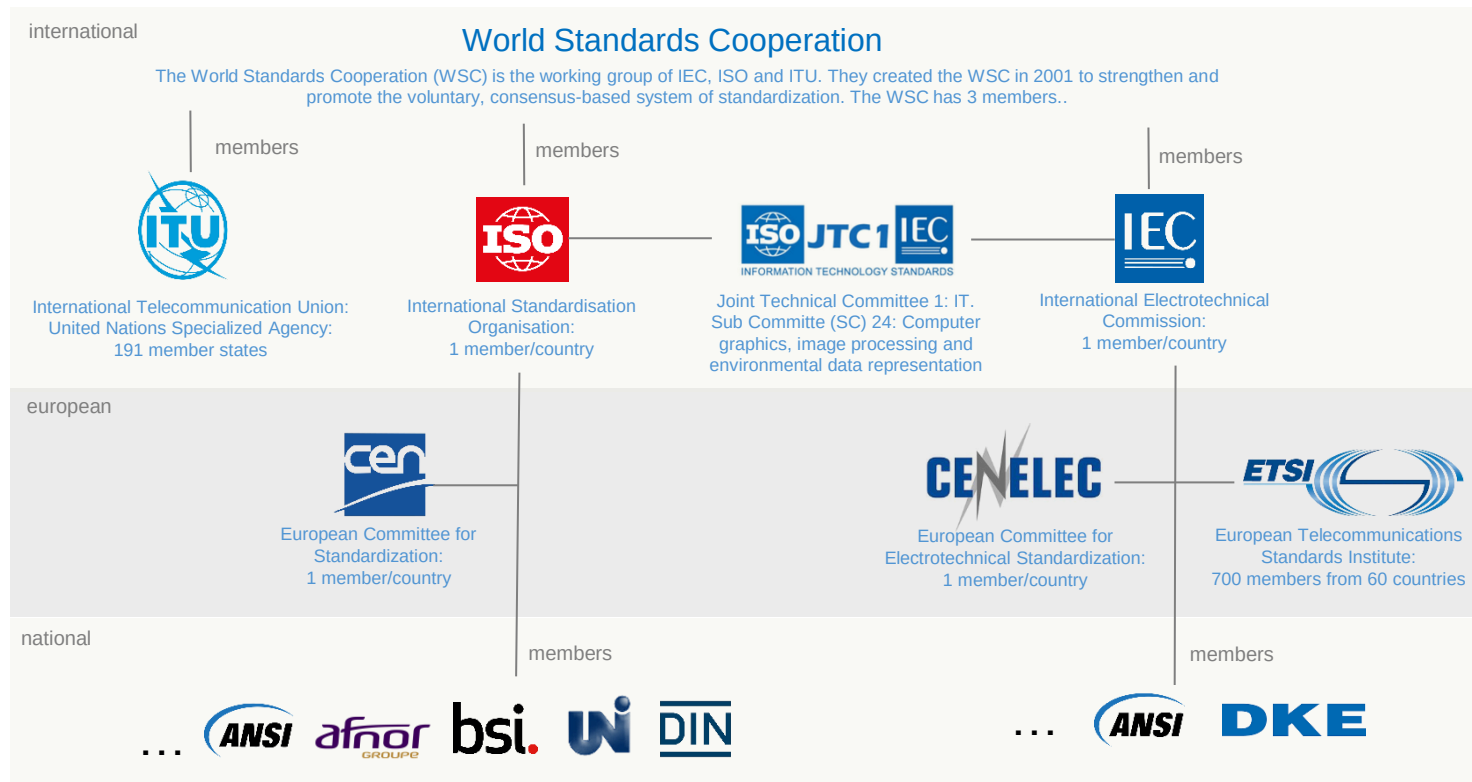
The Medical Working Group is developing an open interoperable standard for the representation of human anatomy based on input from a wide variety of imaging modalities. This will allow manufacturers of imaging equipment to export an interoperable file format that can be used both by physicians and students on their desktop computers. Radiologists and physicians can give the patient CD-ROMS of their scans which they can view in the privacy of their homes. If a patient has undergone multiple types of scans (CAT, MRI, PET) these may all be viewed and registered giving the physician and patient a clearer view of the underlying issues. Researchers can take the exported data from many different types of equipment and fuse them into a coherent 3D data set that can be used both for patient education, diagnostics and surgical training.

MedX3D is tightly focused on medical applications that can benefit from real time 3D visualization. These types of applications include medical modeling and simulation for research and education; 3D image rendering for planning and guiding surgical and nuclear medicine procedures; image fusion-the association of specific 2D images from multimodal (PET, CAT, MRI, Ultrasound) scans with one another or with existing 3D images of a given patient.

We are also working to develop interchange mechanisms between Digital Imaging and Communication in Medicine (DICOM) and MedX3D.

Structure of International Standardization

National SDOs organize so-called "mirror committees" to ISO and IEC committees. They represent national input and interests in ISO and IEC and feed information from ISO and IEC back to their homeland.



Recognized SDOs:

- These are officially recognized by regulation systems or political bodies
- ITU, UN specialized agency for information and communication
- UE regulation 1025/2012 rules the standardization at an European level and lists a set of reference SDOs with either an international (ISO, IEC, and ITU) or European scope (CEN, CENELEC, and ETSI)



Not Recognized Organizations:

- These are not recognized by any political bodies
- IEEE is a primary SDO with a large number of active technical standards, ranging from wireless communications and digital health to cloud computing, power and energy, 3D video, electrical vehicle standards, and the Internet of Things. It was created by the Institute of Electrical and Electronics Engineers (IEEE), the American association of Electrical and Electronics Engineers and it brings together and organizes members from all over the world.





*„Without standards,
there can be no improvement.“*

Ōno Taiichi

(* 29 February 1912 in Manchuria; † 28 May 1990) was the inventor of the Toyota production system. He developed today's basic logistics methods, the Kanban system and just-in-time production, between 1950 and 1982. The Japanese management concept Kaizen is also based on his ideas.

Thank you for your attention.

XR Standards in Health & Care. The status quo and path ahead of us.



Bundesministerium
für Bildung
und Forschung

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This project is funded by the Federal Ministry of Education and Research under the
funding code 16SV8827.

XR
EXPO
2024



3rd - 4th April 2024 - Stuttgart