



Standardisation as a Cluster Activity

A perspective from VDC

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

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

Chris said.

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.

POLITICO

Enter keyword



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NEWSLETTERS & PODCASTS ▾

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.

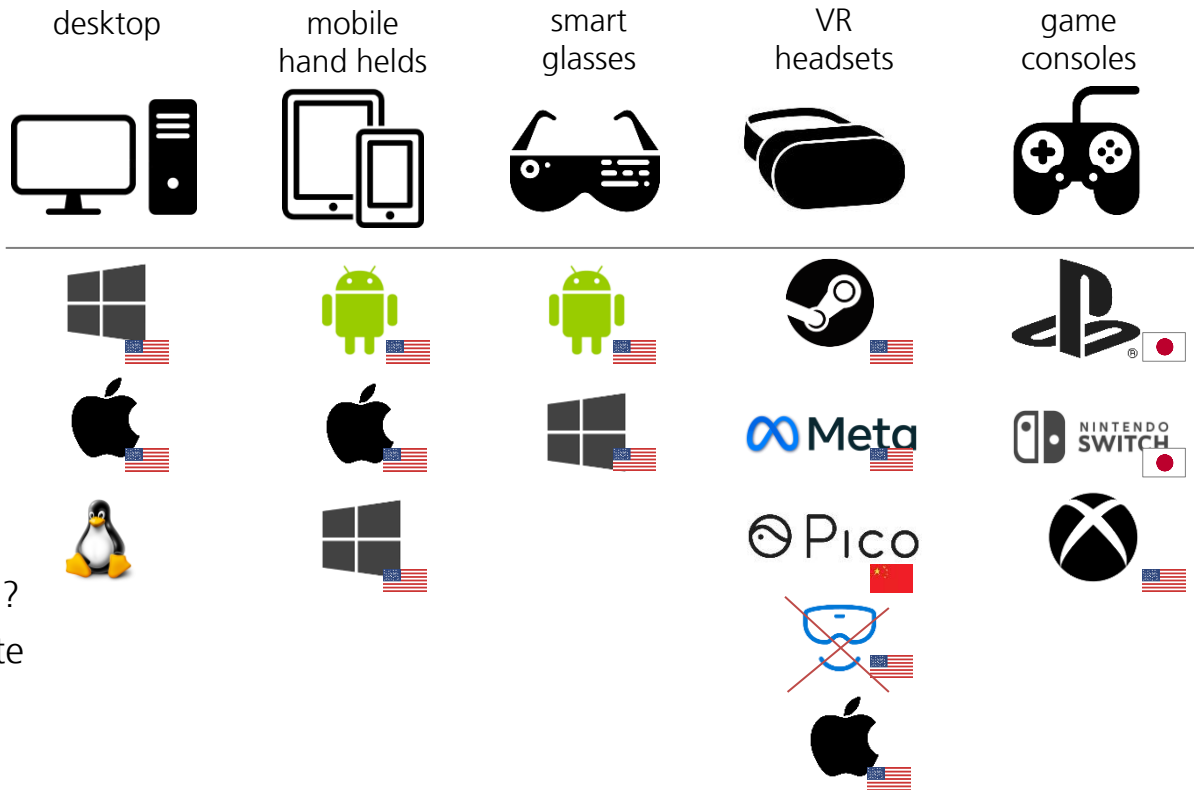
problem:

- 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?

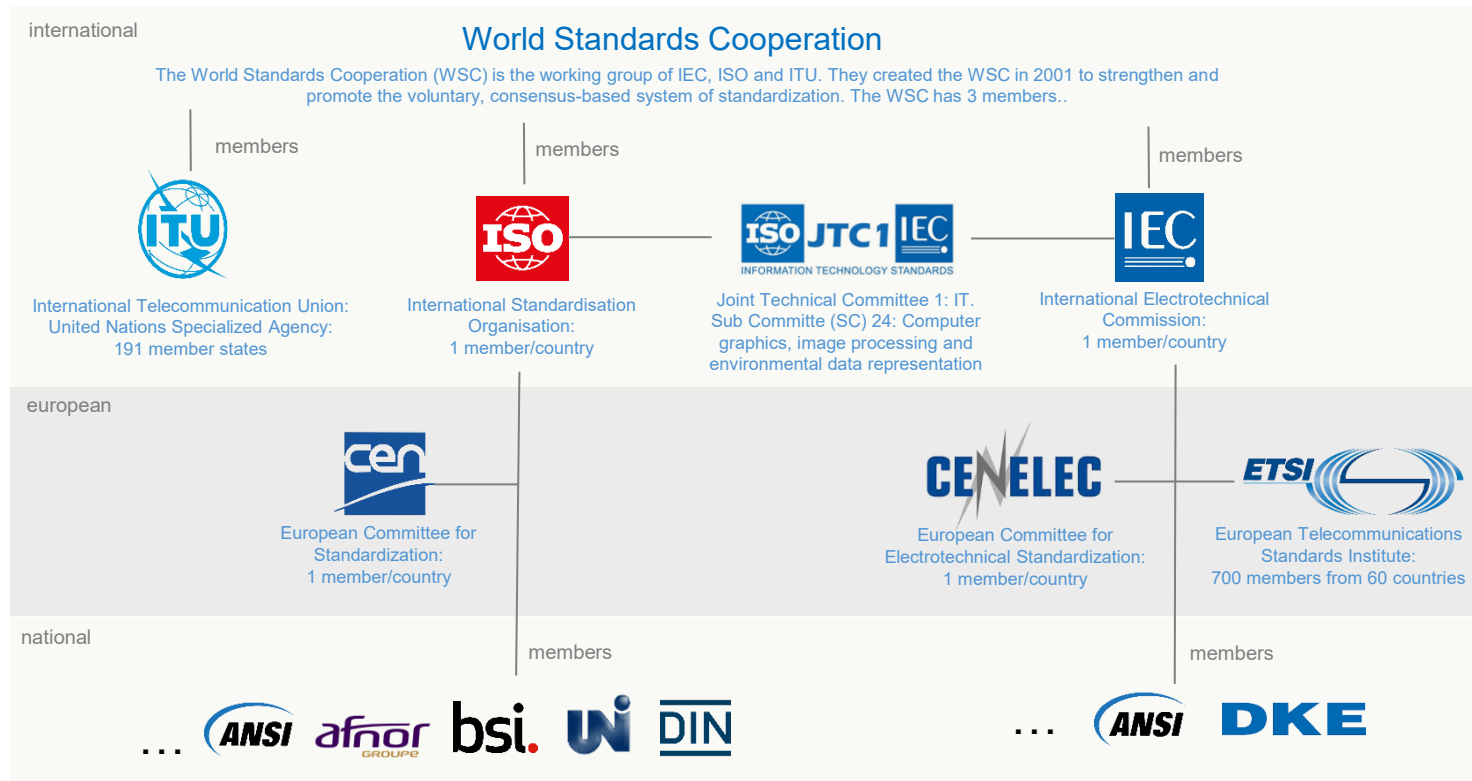
=> **standardization!**





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)



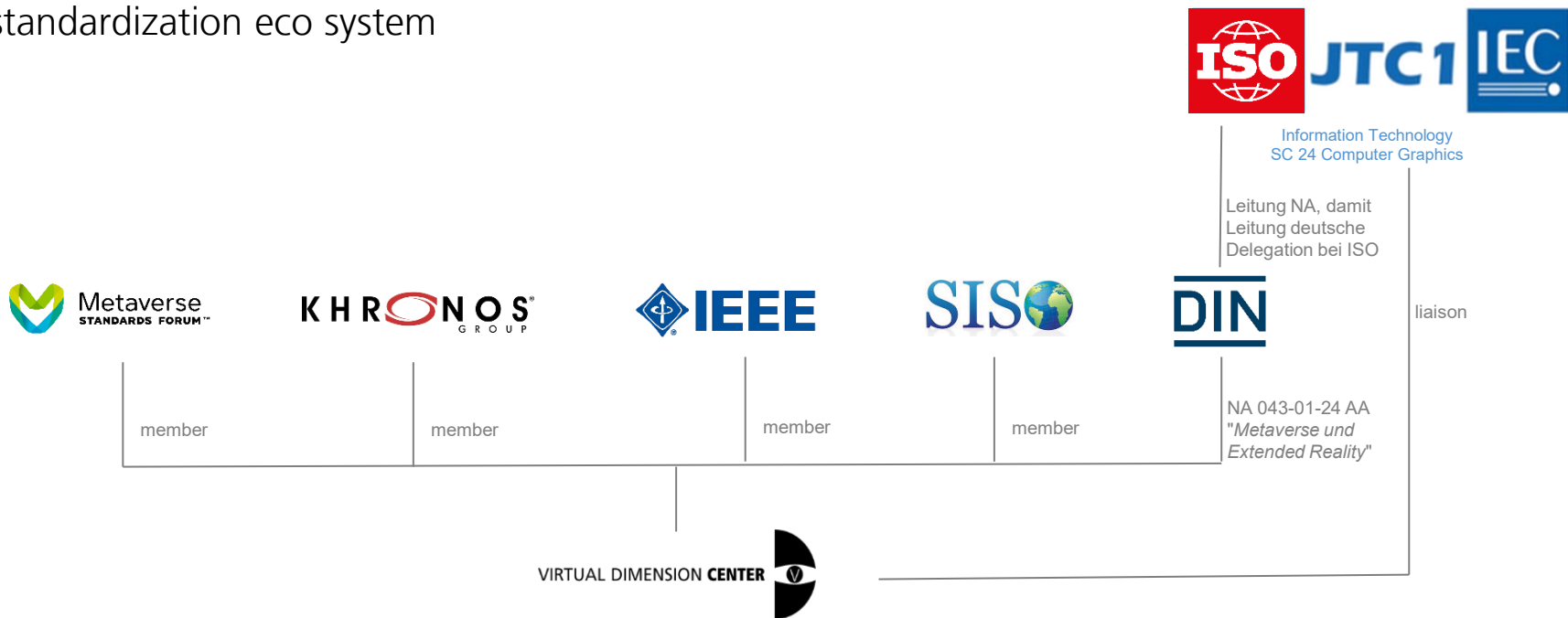
Not Recognized Organizations:

- 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.



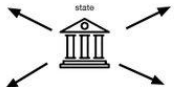
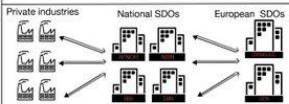


We got involved in the
standardization eco system



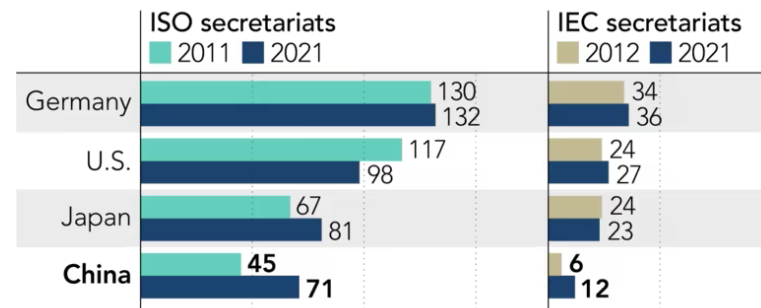


Setting standards in China, Europe and the US

 CHINA a state-driven process  Coordinated by the Standardization Administration of China (SAC), which lies under the State Administration for Market Regulation (SAMR), an arm of the State Council.	 EUROPE a structured, market-driven process  Private industry actors coordinate largely under the auspices of non-governmental standards development organizations (SDOs) at the national and European level. This process typically respects a clear hierarchy.	 UNITED STATES a loose, market-driven process  600 standards development organizations, mostly industry associations, set standards for their industries in the spirit of competition. The American National Standards Institute (ANSI) represents US interests at the international level but plays a comparatively limited role.
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Source: John Seaman, "China and the New Geopolitics of Technical Standardization", Notes de l'Ifrri, January 2020

China's growing clout in standardization organizations (Number of secretariat positions by country)



ISO stands for International Organization for Standardization, IEC for International Electrotechnical Commission; includes twinned ISO secretariats
Source: ISO, IEC, U.S. National Institute of Standards and Technology



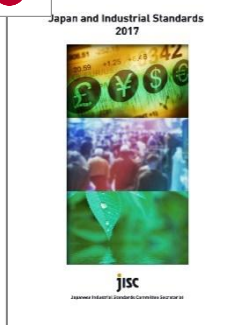
- Actively promote the consistent worldwide application of internationally recognized principles in the development of standards.
- work to prevent standards and their application from becoming technical trade barriers to U.S. products and services.
- Strengthen international outreach programs to promote understanding of how U.S. voluntary, consensus-based, market-driven standards can benefit businesses, consumers, and society as a whole.
- Respect diverse funding models for the U.S. standards system.
- Address the need for standards in support of emerging national priorities.



- supporting the EU's leading position as a forerunner in key technologies and promoting EU core values
- leveraging the European standardization system to deliver on the twin green and digital transition and support the resilience of the single market
- new High-Level Forum for Member States and European standardization organizations
- foster the development and deployment of international standards for a free, open, accessible and secure global internet
- establish an EU internet standards monitoring website
- monitor the effective implementation of existing commitments on standardization in EU trade agreements
- concerned about decision-making in ETSI



- 15-year plan to shape the future, to set the global standards for the next-generation of technologies.
- pushing domestic firms and experts to be part of the global effort to set standards
- research on China Standardization System, Method and Evaluation
- research on Supporting High-quality Development Standardization System
- research on Standardization Military-Civil Integration Development
- start with the national standards of **virtual reality technology**, integrated circuit design, intelligent health care and 5G key components, and gradually expand to the emerging areas of Internet of Things, photovoltaic, information equipment and other industries.



- Necessity of national standards
- Clarification of appropriate quality levels
- Revisions of the Industrial Standardization Law
- Observance of JIS standards and JIS markings
- Responses to Inappropriate ISO and IEC Standards
- Relationship with Standardization Organizations in Europe
- Support for Strategic Standard Proposal
- Active Contribution to Standardization Activities
- Programs for Developing Standardization Experts in Asia and the Pacific
- Standardization regarding Information Technology, environmental preservation, consumers, elderly people, and people with disabilities, manufacturing technology and industrial platform technology



- International and European trade is facilitated by standardization
- Standardization relieves the burden on government regulation and supports it
- Germany is driving forward standardization worldwide in future topics by networking stakeholders, establishing new processes and open platforms for coordination.
- Industry and society are the driving forces in standardization
- Standardization is used as a strategic and attractive tool, especially by companies.
- Standardization has a high status in the public perception

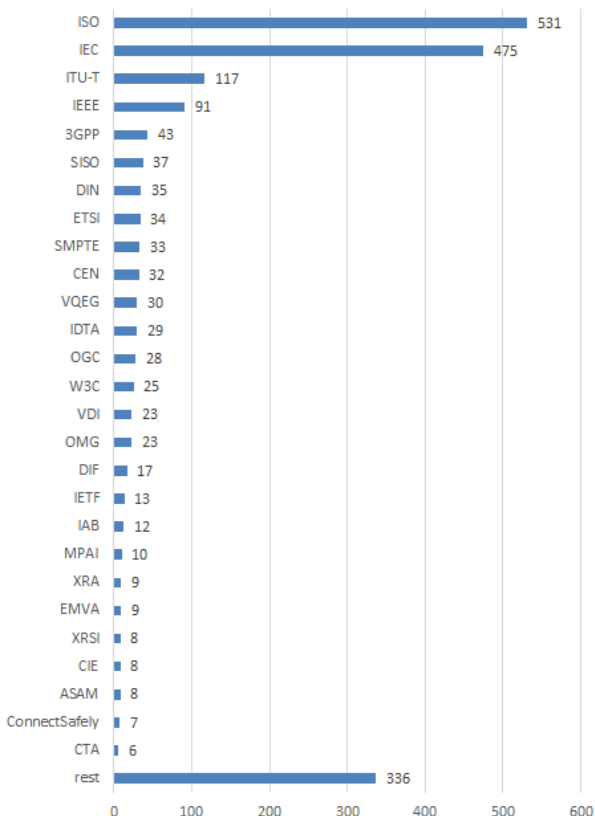


- advance national standards system
- innovate KS management system
- strengthen standard technology infrastructure
- advance measurement standards
- advance legal metrology system
- actively participate in international standardization activities
- lead the international de-jure standardization
- support international de-facto standardization
- address the technical barriers to trade (TBT)
- assist the private sector in increasing its capacity to develop standards
- foster standardization capacity of private sector
- promote standard development activity of producer group

Organizations related to or fostering MV / VW standardization



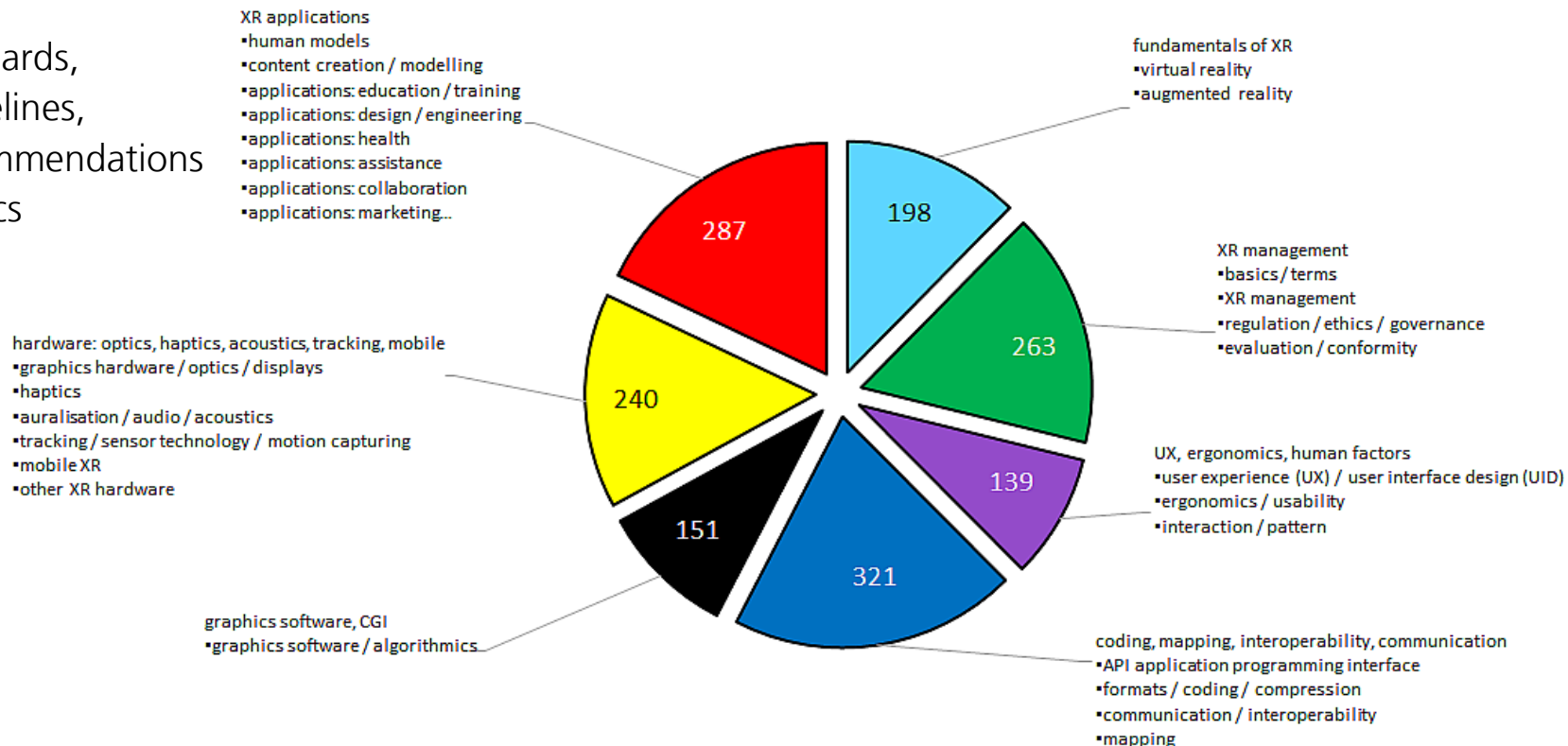
published standards, specs, recommendations





clustering

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





INTERNATIONAL STANDARD

**ISO
17901-1**

First edition
2015-07-01

Optics and photonics — Holography — Part 1: Methods of measuring diffraction efficiency and associated optical characteristics of holograms

*Optique et photonique — Holographie —
Partie 1: Méthodes de mesure de l'efficacité de diffraction et
caractéristiques optiques associées aux hologrammes*



Reference number
ISO 17901-1:2015(E)

© ISO 2015

ISO 17901-1:2015-07-01

INTERNATIONAL STANDARD

**ISO/IEC
23090-6**

First edition
2021-06

Information technology — Coded representation of immersive media — Part 6: Immersive media metrics



Reference number
ISO/IEC 23090-6:2021(E)

© ISO/IEC 2021

ISO/IEC 23090-6:2021-06



IEC 62908-13-10

Edition 1.0 2016-11

INTERNATIONAL STANDARD



**Touch and interactive displays –
Part 13-10: Reliability test methods of touch displays – Environmental durability
test methods**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.120

ISBN 978-2-6322-3795-3

Warning! Make sure that you obtained this publication from an authorized distributor.

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COLLADA – Digital Asset Schema Release 1.5.0

Specification

April 2008

Editors: Mark Barnes and Ellen Levy Finch, Sony Computer Entertainment Inc.

ANSI/CTA Standard

Definitions and Characteristics for VR Video and
VR Images

ANSI/CTA-2085

November 2019



Consumer
Technology
Association™

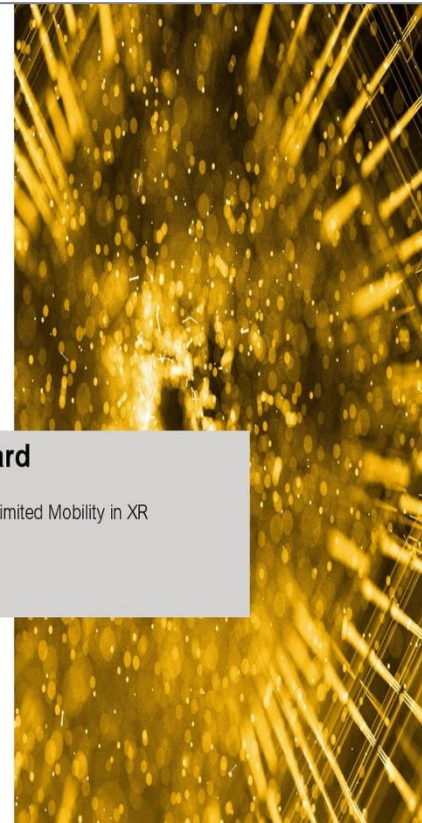
Consumer
Technology
Association™

CTA Standard

Best Practices for Limited Mobility in XR

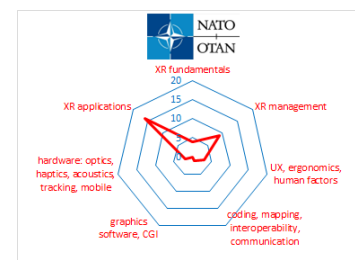
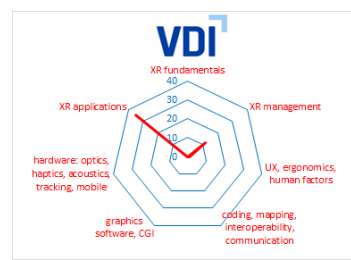
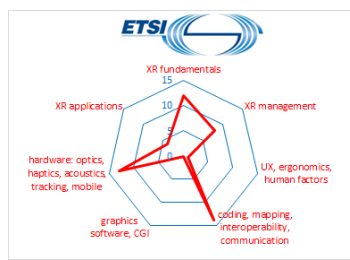
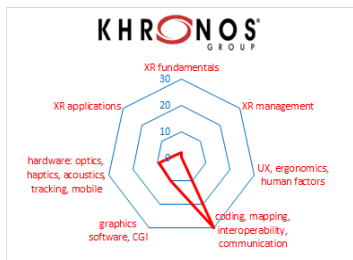
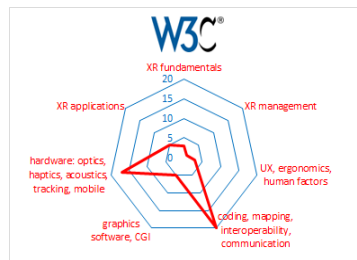
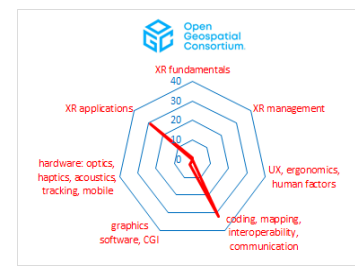
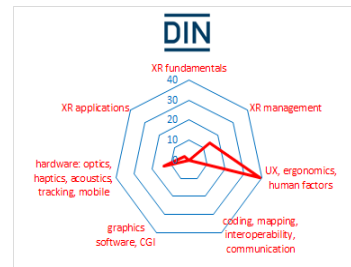
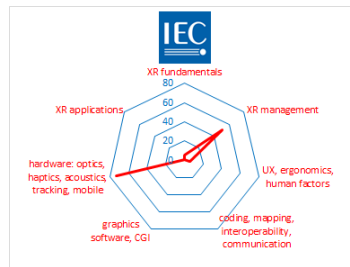
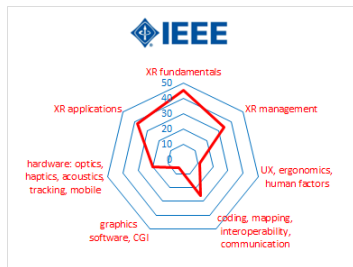
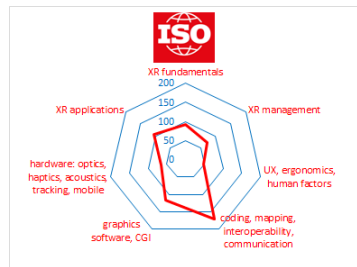
CTA-2095

May 2021



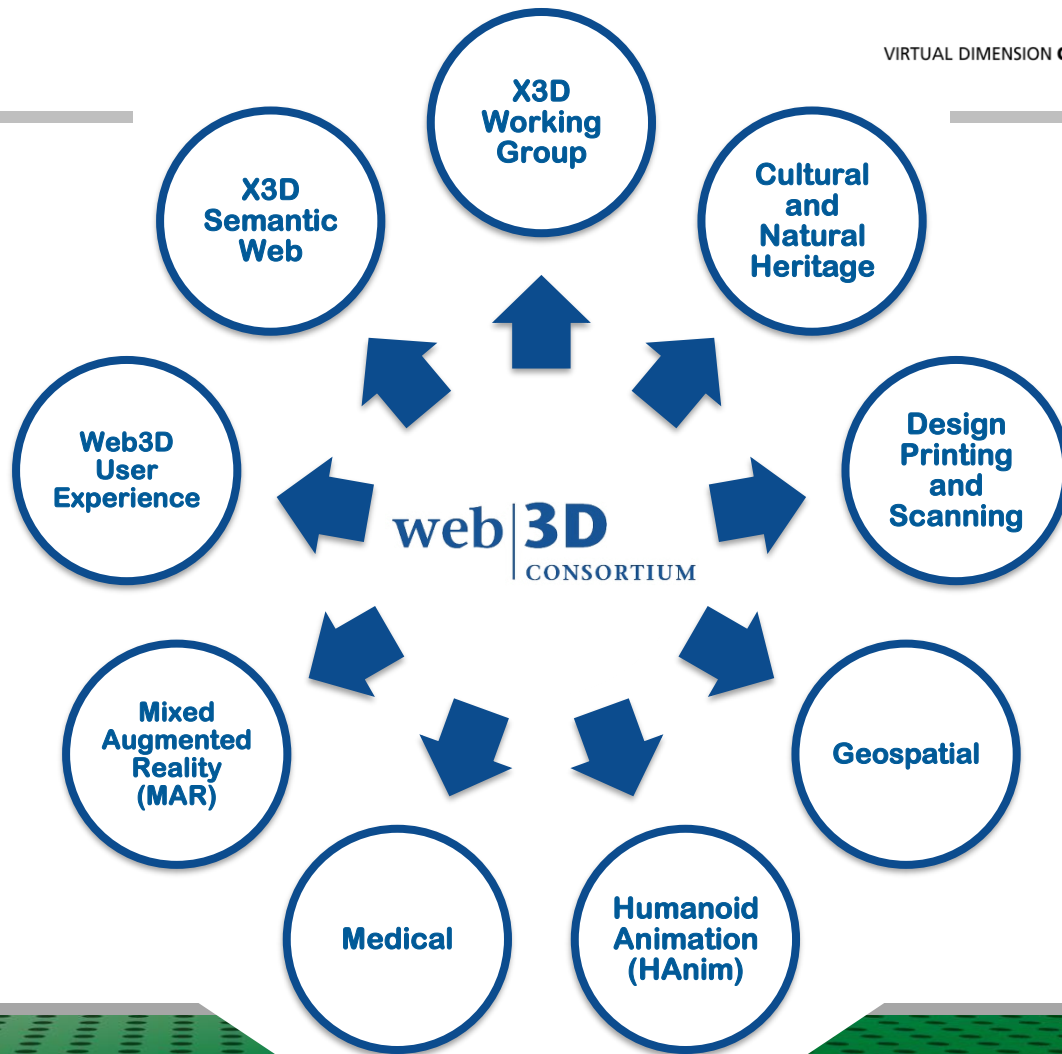


Focuses of XR standardization organizations varying





The **Web3D Consortium** is an international, non-profit, member-funded, industry organization dedicated to the development of standards (SDO) established in 1997. The Web3D Consortium champions the deployment of ISO-ratified X3D standards for communicating interactive 3D scenes across various applications, use cases, platforms, and industries. It provides robust web-based 3D capabilities and long-term stability for enterprise solutions, as well as interoperability with other standards. Members collaboratively work on the development of the X3D standards and tools to ensure their broad dissemination across various markets, catering to academia, government, industry, and individual users. Today, the Web3D Consortium leverages its extensive industry backing to continue the evolution of the X3D specification..





Example here: the OGC (Open Geospatial Consortium) roadmap

OGC Standards Roadmap

Progress of Official OGC Standards **OGC** & **Community Standards** **Community** 2021-05-27

	SWG Work / Work Item	OAB Review	OGC-NA Review	Public Review	TC Approval to Prepare	TC Vote	PC Vote	Public Release
Proposed Standards								
OGC Abstract Spec Topic 0 04-004		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 2 - Referencing by Coordinates 16-005		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 20 - Observations, Measurements and Samples 20-002		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 21 - DGGS v. 2.0 20-040		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 22 - Tiling 19-014		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 6 - Schema for coverage geometry and functions		✓	✓	✓	✓	✓	✓	✓
OGC CDB 1.2		✓	✓	✓	✓	✓	✓	✓
OGC CDB 2.0		✓	✓	✓	✓	✓	✓	✓
OGC CityGML 3.0		✓	✓	✓	✓	✓	✓	✓
Community CityJSON		✓	✓	✓	✓	✓	✓	✓
OGC Common Object Model Container SWG		✓	✓	✓	✓	✓	✓	✓
OGC Coverage Implementation Schema - ReferenceableGridCoverage Extension 1.1 16-003b		✓	✓	✓	✓	✓	✓	✓
OGC EO Extension for OpenSearch 13-029b		✓	✓	✓	✓	✓	✓	✓
OGC EO Product Metadata GeoJSON/JSON-LD Encoding 17-003		✓	✓	✓	✓	✓	✓	✓
OGC GeoAPI 09-003d		✓	✓	✓	✓	✓	✓	✓
OGC GeoPackage 1.3 12-120b16		✓	✓	✓	✓	✓	✓	✓
OGC GeoPose		✓	✓	✓	✓	✓	✓	✓
OGC GeoTIFF 19-000		✓	✓	✓	✓	✓	✓	✓
OGC GroundwaterML2 v2.3 19-013		✓	✓	✓	✓	✓	✓	✓
OGC HDF5 Core 18-043		✓	✓	✓	✓	✓	✓	✓
Community IMDF 19-009		✓	✓	✓	✓	✓	✓	✓
OGC IndoorGML 1.1 19-011		✓	✓	✓	✓	✓	✓	✓
OGC MetOcean Profile and Extensions to WCS 2.1 15-045, 15		✓	✓	✓	✓	✓	✓	✓
OGC Moving Features Encoding Extension - JSON 19-045		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Common 18-072		✓	✓	✓	✓	✓	✓	✓

	SWG Work / Work Item	OAB Review	OGC-NA Review	Public Review	TC Approval to Prepare	TC Vote	PC Vote	Public Release
OGC OGC API - Coverages		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Environmental Data Retrieval 18-006		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 1: Core 17-069		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 2: Coordinate Reference System by Reference 18-050		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 3: Filtering and the Common Query Language (CQL) 19-079		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 4: Create, Replace, Update and Delete 20-002		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 5: OpenAPI 3.1		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Maps		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Processes		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Records		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Styles		✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Tiles		✓	✓	✓	✓	✓	✓	✓
Community OpenFlight 16.0		✓	✓	✓	✓	✓	✓	✓
OGC OpenSearch GeoJSON/JSON-LD Response Encoding 17-047		✓	✓	✓	✓	✓	✓	✓
OGC PipelineML 18-073		✓	✓	✓	✓	✓	✓	✓
OGC Semantic Sensor Network Ontology 18-079		✓	✓	✓	✓	✓	✓	✓
OGC SensorML 2.1 12-000d1		✓	✓	✓	✓	✓	✓	✓
OGC SensorThings API 1.1 - Part 1 18-008		✓	✓	✓	✓	✓	✓	✓
OGC Symbology Conceptual Model: Core 18-067		✓	✓	✓	✓	✓	✓	✓
OGC Time Ontology in OWL 18-071		✓	✓	✓	✓	✓	✓	✓
OGC TimeseriesML 1.3 15-042b		✓	✓	✓	✓	✓	✓	✓
OGC Two Dimensional Tile Matrix Set 17-003		✓	✓	✓	✓	✓	✓	✓
OGC Well Known Text Representation of Coordinate Reference Systems 18-010		✓	✓	✓	✓	✓	✓	✓
Community Zarr		✓	✓	✓	✓	✓	✓	✓



A free, online accessible database for the entire XR community with references to

- 1.600 XR standards, specifications, guidelines and recommendations
- 350 standardization working groups
- 140 SDOs

They are qualified (by tags) and with a searchable description. The group's entry further comprises the organizing/leading SDO and a link to this resource in the WWW.

Please support by adding standards and SDOs.

We may offer database as an iFrame for interested organizations' websites.

The screenshot shows a web application for a standards database. At the top is a search bar labeled 'search database'. Below it are several filter buttons: 'type', 'SDO', 'status', 'year', 'tags', and a 'Default or...' button. A row of active filters shows 'standard (industry)', 'specification', '3GPP', and 'published'. The main content area is a table with columns for 'identifier', 'title English', and 'Properties'. It lists four 3GPP TR standards. A 'tags' dropdown menu is open on the right, showing a list of categories like 'applications: geo & construction', 'applications: health', 'applications: marketing', 'applications: others', 'augmented reality', 'auralisation / audio / acoustics', and 'basics / terms'. The first two tags are selected. The table entries include details like 'type: specification', 'status: published', and 'year: 2022'.

identifier	title English	Properties
3GPP TR 26.118	Virtual Reality (VR) profiles for streaming applications	type: specification status: published year: 2022 tags: applications: geo & construction, applications: health, applications: marketing, applications: others, augmented reality, auralisation / audio / acoustics, basics / terms
3GPP TR 26.818	Virtual Reality (VR) streaming audio; Characterization test results	type: specification status: published year: 2022 tags: communication / interoperability, virtual reality, auralisation / audio / acoustics, mobile XR
3GPP TR 26.905	Mobile stereoscopic 3D video	type: specification status: published year: 2022 tags: graphics software / algorithms, mobile XR
3GPP TR 26.918	Virtual Reality (VR) media services over 3GPP	type: specification status: published year: 2022 tags: communication / interoperability, virtual reality, mobile XR



search for actual standards

- example: search for published standard from ANSI and CTA

search database

type SDO status tags Default order

standard (industry) standard (official) technical report ANSI CTA published Reset all

identifier	title English	Properties	
ANSI/CTA 2085	Definitions and Characteristics for VR Video and VR Images	type: standard (official) status: published year: 2019 tags: basics / terms, virtual reality, graphics software / algorithms	Details
ANSI/CTA 2087	Recommendations and Best Practices for Connection and Use of Accessories for XR Technologies	type: standard (official) status: published year: 2019 tags: XR management, virtual reality, augmented reality, ergonomics / usability, other XR hardware, applications: others	Details
ANSI/HFES 100-2007	Human Factors Engineering of Computer Workstations	type: standard (official) status: published year: 2007 tags: evaluation / conformity, ergonomics / usability, graphics hardware / optics / displays	Details
CTA 2095	Best Practices for Limited Mobility in XR	type: standard (industry) status: published year: 2021 tags: XR management, regulation / ethics / governance, virtual reality, augmented reality, user experience (UX) / user interface design (UID)	Details
CTA 2103	Best Practices for Diversity in XR	type: standard (industry) status: published	Details

search for recommendations

- example: search for recommendations on regulation / ethics / governance

search database

type SDO status tags Default order

recommendation / guideline regulation / ethics / governance Reset all

identifier	title English	Properties	
ConnectSafe MV & Parents	Metaverse and Virtual Reality Safety Tips for Parents	type: recommendation / guideline status: published tags: regulation / ethics / governance, applications: entertainment / culture	Details
Council of the European Union Metaverse	Metaverse - Virtual World, Real Challenges	type: recommendation / guideline status: published year: 2022 tags: XR management, regulation / ethics / governance, virtual reality, augmented reality	Details
Cyber-XR Coalition Cyber XR-2020-1.0	Immersive Technology Standards for accessibility, inclusion, ethics, and safety	type: recommendation / guideline status: published year: 2020 tags: regulation / ethics / governance	Details
European Parliament Metaverse	Metaverse Opportunities, risks and policy implications	type: recommendation / guideline status: published year: 2022 tags: XR management, regulation / ethics / governance, virtual reality,	Details



search for upcoming standards

- example: search for standards with status "draft" or "work in progress" in the field of graphics hardware / optics / displays

search database

type SDO status tags % Default order

specification X standard (industry) X standard (official) X draft X work in progress X

graphics hardware / optics / displays X Reset all

identifier	title English	Properties
 IEC 62629-1-3	future IEC/TR 62629-1-3 ED1: 3D display devices - Part 1-3: Depth perception and determination of the position of 3D object on the non-physical screen	type: standard (official) status: work in progress tags: interaction / patterns, graphics hardware / optics / displays Details
 IEC 62629-1-3 ED1	3D display devices - Part 1-3: Depth perception and determination of the position of 3D object on the non-physical screen	type: standard (official) status: work in progress tags: graphics hardware / optics / displays Details
 IEC 62629-502-1	3D Display devices - Measurement method of plane-symmetrical real-image-forming optics for aerial display	type: standard (official) status: work in progress year: 2023 tags: evaluation / conformity, graphics hardware / optics / displays Details
 IEC 62629-52-1 ED1	3D Display devices - Part 52-1: Fundamental measurement methods of aerial display - Optical	type: standard (official) status: work in progress year: 2024 tags: evaluation / conformity, graphics hardware / optics / displays Details
 IEC 62629-62-12 ED1	3D display devices - Measurement methods for virtual-image type - Image Quality	type: standard (official) status: work in progress year: 2024 Details

search for SDOs and working groups

- example: search for standards development organizations (SDOs) and working groups in the field of education and engineering

search database

type SDO status tags % Default order

SDO X working group X applications: education / training X applications: design / engineering X Reset all

identifier	title English	Properties
 AREA	Interoperability and Standards program	type: SDO year: 2013 tags: XR management, evaluation / conformity, augmented reality, applications: education / training, applications: design / engineering, applications: assistance, applications: others Details
 ASAM	Association for Standardization of Automation and Measuring Systems	type: SDO year: 1998 tags: evaluation / conformity, communication / interoperability, applications: design / engineering Details
 BDSV	Simulation and Training Working Group	type: working group tags: applications: education / training Details
 DIN	Innovative world of work	type: working group tags: applications: education / training, applications: design / engineering, applications: collaboration, applications: others Details
 DIN	Industry 4.0	type: working group tags: applications: design / engineering, applications: others Details
 DIN	Information Technology and Applications (NIA)	type: working group tags: applications: education / training, applications: design / engineering, applications: health, applications: assistance, applications: collaboration, applications: marketing, applications: entertainment / culture, applications: geo & construction, applications: others Details
ETSI ISG-ARF	Industry Specification Group (ISG)	type: working group Details

standICT.eu: calls each 3 months



StandICT.eu will provide € 2,925,000 of crucial funding to support the participation of European standardisation specialists in key international and global SDOs. Through nine open calls this funding will enable the specialists to contribute to and help create a fully integrated European Standardisation Ecosystem, thereby strengthening Europe's position in global standardisation initiatives.

...

Topics list:

- ...
- **Web 4.0 and virtual worlds**

Three types of proposals can be funded under the StandICT.eu 2026 Open Calls, as shown below

Proposal type: LT – Long term contribution (with travel option)

Description: Contribution to ongoing standards development as a chair, convener, rapporteur or member of an SDO WG. E.g. comments on standards development and drafts, attending meetings also as an observer, paying membership fees.

Maximum Contract Duration: 6 months

Funding Range: Up to €10,000

Proposal type: ST – Short-Term contributions (with travel option)

Description: Contribution to standards documentation e.g. liaison to WG, comments on standards drafts, participation at meeting paying membership or registration fees.

Maximum Contract Duration: 3 months

Funding Range: Up to €5,000

Proposal type: OS – One-Shot contributions

Description: Support to ensure participation at workshop or event (e.g., participant, observer, presentation)

Maximum Contract Duration: 3 months

Funding Range: Up to €3,000

Please do note that the maximum funding requested per proposal cannot exceed that indicated for the respective type of application (LT, ST, OT), nor can the duration exceed that indicated.

- as cross-cutting technology, XR standardization is scattered among many organizations: thus hard to get an overview.
- individuals and companies are apparently not totally aware of what's on the table; lack of tech transfer
- state support could be an idea, the national approaches worldwide are different anyhow
- there is a already vast number of XR standards out there.
- they provide an excellent basis to build on, avoiding to re-invent the wheel and ensuring to concentrate on the real innovative aspects of one's work
- standards pave the way for today's and future markets

=> let's use them and extend them, engage!





*„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 Standardization