



# IEC TC100 메타버스 국제표준화 동향 및 이슈

2024.10.30

고석주@경북대학교



# Agenda

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## TC 100 Audio, video and multimedia systems and equipment

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### TC 100 Subcommittee(s) and/or Working Group(s)

Label

Title

Technical Area

TA 1

Terminals for audio, video and data services and content

TA 2

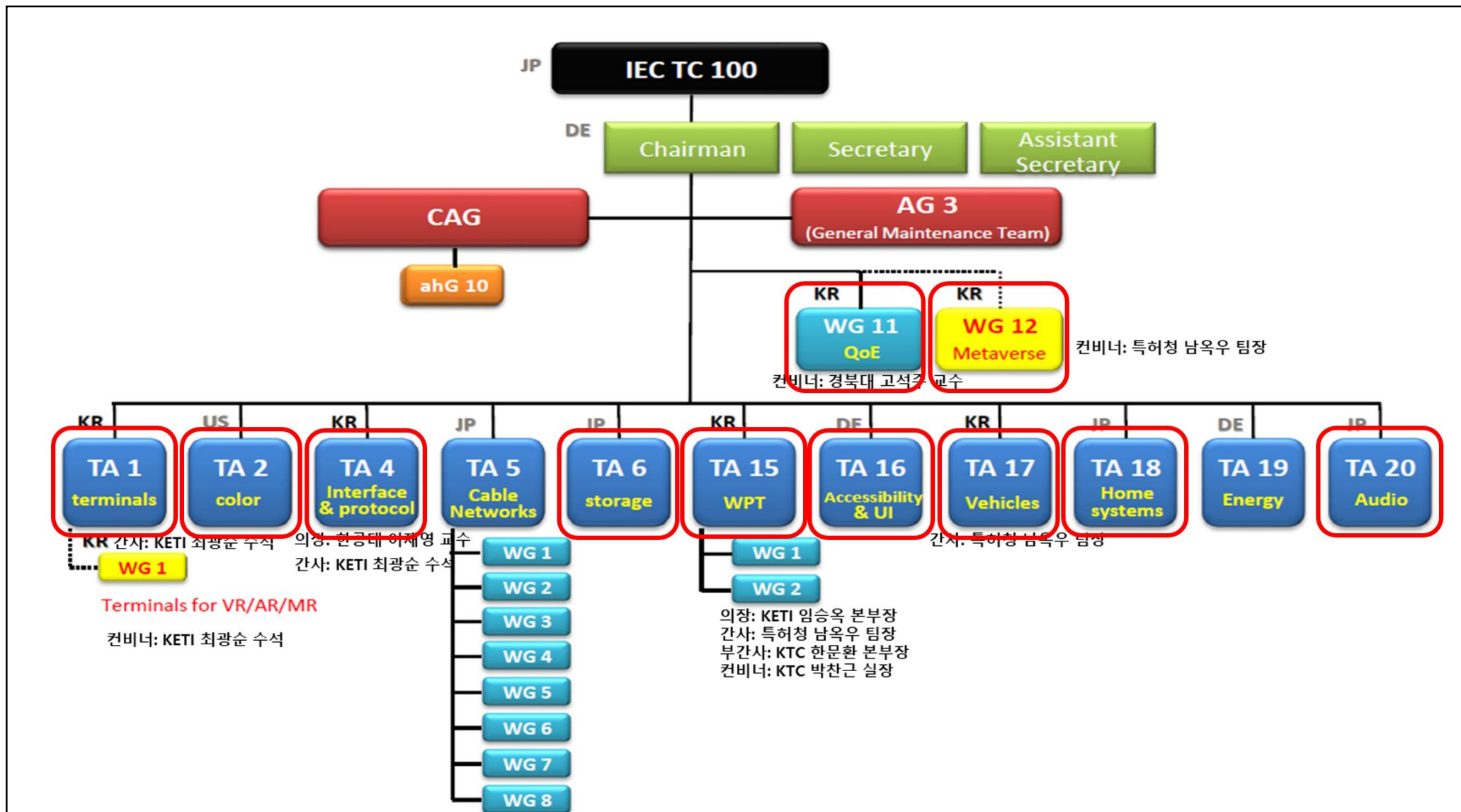
Colour measurement and management

TA 4

Digital system interfaces and protocols



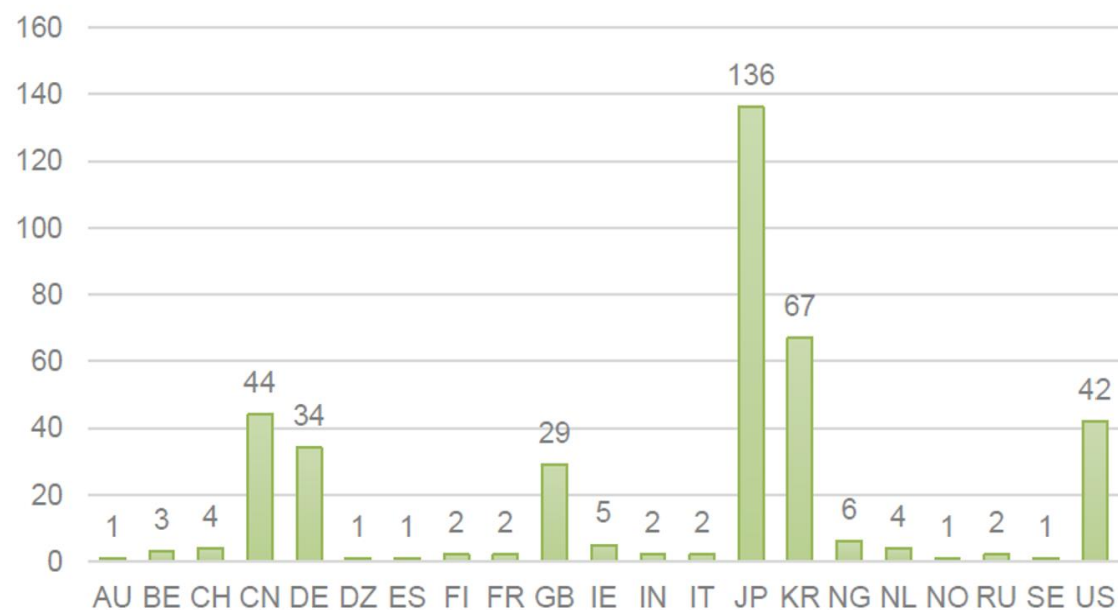
# IEC TC100





## Facts and figures

Experts per NC



- P-member countries **22**
- O-member counties **25**
- Number of sub-groups – TAs **11**
- Number of AG, ahG, PT, WG, MTs **123**
- Number of experts **397**
- Number of published standards **506**
- Number of ongoing projects **46**
- Number of NPs in 3 years **17**
- Number of publications in 5 years **85**



# TAs/WGs on Metaverse

- TA1/WG1: Terminals for VR/AR/MR (KR) **XR**
- TA2: Colour measurement and management (US)
- TA4: Digital system interfaces and protocols (KR)
- TA6: Storage media, storage data structures, storage systems and equipment (JP)
- TA15: Wireless Power Transfer (KR)
- TA16: Active Assisted Living (AAL), wearable electronic devices and technologies, accessibility and user interfaces (DE)
- TA17: Multimedia systems and equipment for vehicles
- TA18: Multimedia home systems and applications for end-user networks (JP) **Haptic**
- TA20: Analogue and digital audio (JP)
- WG11: User's Quality of Experience (QoE) on Multimedia Conferencing Services (KR)
- WG12: Multimedia systems and equipment for metaverse (KR) **MV**



# TA1/WG1

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- Title: Terminals for VR/AR/MR
- Scope: To develop international standards related to VR/AR/MR terminals, which include consumer devices, simulators, peripheral devices, and capturing devices.
- Convenor: Kwang-Soon Choi (KR)
- 31 experts from 7 member countries



# TA1/WG1

## TA 1 Terminals for audio, video and data services and content

Scope   Structure   **Projects / Publications**   Collaboration Platform

Work programme   Project Plans   Publications   Stability Dates   Project files

### TA 1 Work programme (5)

Project Reference	Document Reference	Init. Date	Current Stage	Next Stage	Working Group	Project Leader
<b>IEC TR 100-45 ED1</b> Augmented and Mixed Reality equipment and systems – Technology and standards requirements		2023-05	ACD 2023-05	CD	WG 1	Kwang-Soon Choi
<b>PWI 100-56</b> Terminals for VR/AR/MR - Test method - Part 1: Durability test for AR devices			PWI 2023-09	prePNW 2028-09		Dong-il Kim
<b>PNW 100-4189 ED1</b> Terminals for VR/AR/MR – Glossary of terms	100/4189/NP 299 kB	2024-08	PRVN 2024-10	2024-11	WG 1	Ockwoo Nam
<b>PNW 100-4191 ED1</b> Terminals for VR/AR/MR – Consumer VR/AR/MR devices - Part 1: Reference model	100/4191/NP 977 kB	2024-08	PRVN 2024-10	2024-11	WG 1	Yeseul Son





# TA1/WG1:WD-TR 100-45

## IEC History

- ❖ 2019-10-14 : Proposal for establishment of a new SS on “AR technology” & SS16 on “AR technology” was established. **(100/AGS848)**
- ❖ 2019-12-23 : Call for members **(100/AGS856)**
- ❖ 2020-05-27 : SS16 report to AGS **(100/AGS(SS16)863)**
- ❖ 2020-09-23 : SS16 report to AGS **(100/AGS(SS16)907)**
- ❖ 2020-05-17 : **Circulation of WD (Rev.1)**
- ❖ 2021-05-19 : SS16 report to AGS **(100/AGS(SS16)920)**
- ❖ 2021-07-23 : **Circulation of WD (Rev.2)**
- ❖ 2021-09-13 : SS16 report to AGS **(100/AGS(SS16)941)**
- ❖ 2022-04-08 : **Circulation of WD (Rev.3)**
- ❖ 2022-05-23 : Proposal of 3 new work items related to XR **(100/AGS(KRNC)957)**  
Proposal for establishment of a new WG on “XR systems and equipment” based on the activities of SS 11, SS 16 and PT 100-45 **(100/AGS(KRNC)958)**
- ❖ 2022-11-04 : Approval of the establishment of TA 1/WG 1 and transfer of PT 100-45 to TA 1/WG 1 **(100/3845/DL)**
- ❖ 2023-05-15 : PT 100-45 report to TA 1/WG 1 **(100/TA1 WG1(Virtual/Choi)002)**
- ❖ 2023-05-30 : PT 100-45 report to TA 1 **(100/TA1(Okayama/Choi)71)**
- ❖ 2023-09-04 : PT 100-45 report to TA 1/WG 1 **(100/TA1 WG1(Frankfurt/Choi)010)**
- ❖ 2023-10-02 : PT 100-45 report to TA 1/WG 1 **(100/TA 1 WG1(LA/Choi)018)**
- ❖ 2023-12-07 : PT 100-45 report to TA 1/WG 1 **(100/TA 1 WG 1(Jeju/Choi)025)**
- ❖ 2024-03-07 : PT 100-45 report to TA 1/WG 1 **(100/TA 1 WG 1(Shenzhen/Choi)035)**  
**Introduction of WD (Rev. 4)**
- ❖ 2024-05-07 : **Introduction of WD (Rev. 5), request TA 1 to circulate WD (Rev. 5) as 1CD**



# TA1/WG1:WD-TR 100-45



## Summary of updates from WD (Rev.4) to WD (Rev.5)

### ❖ Correction based on a comment received in Shenzhen

- [Title and scope of WD (Rev.4)]  
“Survey on standardization opportunities in multimedia systems and equipment for Virtual Reality(VR), Augmented Reality(AR) and Mixed Reality(MR)”
- [Title and scope of WD (Rev.5)]  
“Survey on standardization opportunities in multimedia systems and equipment for Augmented Reality(AR) and Mixed Reality(MR)”
  - PT 100-45 → AR and MR
  - IEC TR 63308:2021, “Virtual reality equipment and systems – Market, technology and standards requirements” → VR

IEC stage(DDV,DIS...) 6XXXX © IEC:201X – 3 –

INTERNATIONAL ELECTROTECHNICAL COMMISSION

Survey on standardization opportunities in multimedia systems and equipment for ~~Virtual Reality(VR)~~, Augmented Reality(AR) and Mixed Reality(MR)

IEC stage(DDV,DIS...) 6XXXX © IEC:201X – 5 –

### INTRODUCTION

With the enhancement of technology including computing processing units, optical systems, sensors and computer graphics, ~~Virtual Reality(VR)~~, Augmented Reality (AR) and Mixed Reality (MR) technology has been reached to fulfil various requirements from consumers as well as various industries. Especially, certain industries, that were already equipped with IT-based infrastructures such as IoT, Cloud-based service, etc. and also in need of visualization of information gathered through those infrastructures while ensuring user's mobility as well as no direct manipulation of information devices for the visualization, have higher potential to adopt ~~VR/AR/MRAR and MR~~ technology for the improvement of efficiency and quality of work and for the convenience of users.

~~VR/AR/MRAR and MR~~ technology is computer-generated or digitally-created content overlaid on user's real-world environment, which may be superficially interacted with the digital content.



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# TA1/WG1: NP 100-4189

## TERMINALS FOR VR/AR/MR - GLOSSARY OF TERMS

77  
78  
79  
80

### 81 1 Scope

82 This document specifies terms that are used in the field of terminals, systems, equipment and  
83 their relating performance for virtual reality, augmented reality, and mixed reality.

### 84 2 Normative references

85 There are no normative references in this document.

### 86 3 Terms and definitions

#### 87 3.1 General

88 For the purposes of this document, the following terms and definitions apply.

89 ISO and IEC maintain terminological databases for use in standardization at the following  
90 addresses:

- 91 • IEC Electropedia: available at <http://www.electropedia.org/>
- 92 • ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 93 3.2 Classification of terms

94 Terms of terminals for VR/AR/MR are classified as follows:

- 95 • General terms (clause 3.3)
- 96 • Consumer VR/AR/MR devices (clause 3.4)
- 97 • Peripheral devices (clause 3.5)
- 98 • Capturing devices (clause 3.6)
- 99 • Performance related terms (clause 3.7)

#### 100 3.3 General terms

## Background

- 2023-07-07: NP submission (100/3971/NP)
- 2023-09-28: Closing (duplication issue with IEC 63145-1-2)
- 2023-10-06: TC 110, Report to the SMB (SMB/8013/R)
- 2023-10-18: CRM and discussion with TC100 officers
- 2023-11-07: Discussion b/w IEC TO and TC 100 officers
- 2023-11-24: NP rejection (100/4084/RVN)
- 2023-12-07: 4<sup>th</sup> TA1/WG1 meeting (Jeju island , KR)
  - TC100 provides a result of Nov.'s discussion

- 2024-03-07: 5<sup>th</sup> TA1/WG1 meeting (Shenzhen, CN)
    - ACTION 6: Convenor will suggest modification directions on the current version of W
    - ACTION 7: Dr. Nam will circulate the modified draft by Apr. 7 in consideration of a 1
- from experts before the Singapore meeting.



# TA1/WG1: NP 100-4189

## Follow-up actions

- To avoid duplication issues, the category of terms has been changed based on the TA 1/WG 1 roadmap and current project (PNW 100-57)
- Comparison b/w v2 and v3

V2 (71 terms)	V3 (37 terms)
10 general terms	5 general terms
7 device terms	14 consumer VR/AR/MR devices
15 tracking terms	2 peripheral devices
20 interaction terms	5 capturing devices
4 platform terms	11 performance related terms
6 content terms	
9 rendering terms	



# TA1/WG1: NP 100-4191

## TERMINALS FOR VR/AR/MR – CONSUMER VR/AR/MR DEVICES

### Part 1: Reference model

#### 1 Scope

This part of IEC 6XXXX specifies classifications of consumer VR/AR/MR devices, as well as types based on the connection method with the processing resource module required for the operation of consumer VR/AR/MR devices. It also specifies a reference model for consumer VR/AR/MR devices.

#### 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 6XXXX:202X, *Terminals for VR/AR/MR – Glossary of terms*

#### 3 Terms and definitions

##### 3.1 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

##### 3.2 Abbreviated terms

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# TA1/WG1 (Roadmap)

Rev. 1.3 (Updated 2024-05-07)

VR/AR/MR terminals (IEC 6xxxx)			Target	Proposer	2023	2024	2025	2026	2027	2028	2029	2030	2031
General	PT 100-45 (IEC 6□□□□□)		TR	Dr. Choi (KR)		CD	DTR						
Terminals for VR/AR/MR (IEC 6XXXX)	Glossary of terms (IEC 6△△△△△)		IS	Dr. Nam (KR)		NP	CD	CDV	IS				
	Consumer VR/AR/MR devices (IEC 6XXXX-1-n)	Part 1: Reference model	IS	Ms. Son (KR)	PWI	NP/CD	CDV	IS					
		Part 2: Functional requirements	TS	Ms. Son (KR)		PWI	NP	CD	CDV	IS			
	Simulators (IEC 6XXXX-2-n)	Part n: TBD											
	Peripheral devices (IEC 6XXXX-3-n)	Part n: TBD											
	Capturing devices (IEC 6XXXX-4-n)	Part n: TBD											
	Test method (IEC 6XXXX-5-n)	Part 1: Durability test for AR devices	IS	Mr. Kim (KR)	PWI	NP	CD	CDV	IS				
		Part 2: Thermal shock											
		Part n: TBD											
	Measurement method (IEC 6XXXX-6-n)	Part 1: MTP latency	IS	Mr. Lehtioksa (FI) Mr. Song (CN)		PWI	NP	CD	CDV	IS			
		Part 2: Colour blending of AR devices		Mr. Jeong (KR)									
		Part n: TBD											
	Interface and interoperability (IEC 6XXXX-7-n)	Part n: TBD											
	Others (IEC 6ZZZZ-m-n)	Part m-n: TBD											



## Title & Task

## WG 12

### Multimedia systems and equipment for metaverse

To define and analyse metaverse for future multimedia systems and equipment from a technical and standardization point of view, and find out new work items within the scope of TC 100.

## WG 12 Convenor & Members

Convenor	National Committee
Ms Veronica A. Lancaster Term of office : 2027-03	US
Mr Ockwoo Nam Term of office : 2025-12	KR
Member	National Committee
Mr Felix ADEGBOYE	NG
Mr Byoung-Ho Ahn	KR
Mr Kiyoharu AIZAWA	JP
Mr Kwang-Soon Choi	KR
Mr Dongkyu Choi	KR
Mr Guohua Dai	CN





# IEC TC100/WG12

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- Establishment: 2022.10, TC100 SFO Plenary meeting
- Title: Multimedia systems and equipment for metaverse
- Convenors:
  - Ockwoo Nam (KR)
  - Veronica Lancaster (US)
- 38 experts from 8 member countries



## TC 100 Audio, video and multimedia systems and equipment

Scope Structure **Projects / Publications** Documents Votes Meetings Collaboration Platform

Work programme Up-to-date Project Plans Publications Stability Dates Project files

### TC 100 Work programme (11)

Project Reference	Document Reference	Init. Date	Current Stage	Next Stage	Working Group	Project Leader
<b>PWI TR 100-49</b> Multimedia Systems and Equipment for Metaverse - Part 1: General			<b>PWI</b> 2024-06	2027-06		Ockwoo Nam
<b>PWI 100-58</b> Multimedia Systems and Equipment for Metaverse - Part 2: Classification			<b>PWI</b> 2024-06	<b>prePNW</b> 2027-06	<b>WG 12</b>	Ockwoo Nam
<b>PWI TR 100-59</b> Multimedia Systems and Equipment for Metaverse - Part 3: Gap Analysis			<b>PWI</b> 2023-09	2027-06	<b>WG 12</b>	Dongkyu Choi



# WG12:WD-TR 100-49 (General)

## MULTIMEDIA SYSTEMS AND EQUIPMENT FOR METAVERSE –

### Part 1: General

#### 1 Scope

This document describes general considerations to be taken for standardization on multimedia systems and equipment for metaverse, which include the concept of metaverse and the impacts of metaverse on multimedia systems and equipment.

#### 2 Normative references

There are no normative references in this document.

TBD

#### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

TBD

1

#### <Version history>

Version	Date (Meeting)	Description
0-1	30 October 2022	TC100 San Francisco Plenary meeting
0-2	1 June 2023 (1 <sup>st</sup> WG 12)	100/WG12(Okayama)03
0-3	7 September 2023 (2 <sup>nd</sup> WG 12)	100/WG12(Frankfurt)14
0-4	3 October 2023 (3 <sup>rd</sup> WG 12)	100/WG12(LA)31
0-5	28 January, 2024	- 1 <sup>st</sup> WD circulated
0-6	8 March 2024 (4 <sup>th</sup> WG 12)	100/WG12(Shenzhen)48
1-1	11 April 2024 (PT meeting)	100/WG12/PT(online)03
1-2	09 May 2024 (5 <sup>th</sup> WG 12)	100/WG12(Singapore)60

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# WG12:WD-TR 100-58 (Classification)

## MULTIMEDIA SYSTEMS AND EQUIPMENT FOR METAVERSE –

### Part 2: Classification

#### 1 Scope

This document describes the classifications and technical challenging issues to be considered for standardization on multimedia systems and equipment for metaverse in the perspectives of content, platform, network, and device.

#### 2 Normative references

There are no normative references in this document.

TBD

#### 3 Terms and definitions

##### 3.1 Definition

##### 3.1.1

##### **metaverse**

A virtual space or a space that combines the virtual and the real that is organized to enable various social, economic, and cultural activities through an avatar based on technology that extends the user's five senses into virtual space or blends it with real space to enable interaction between humans and digital information

Note 1 to entry: the term "metaverse" has other definitions in IEC/TC100/TA1/WG1 (PNW 100-3971, ED1:2024, Terminals for VR/AR/MR – Glossary of terms and definitions - virtual world enabling people to work, entertain and communicate with each other as they do it in the real world, using XR technology), IEC/ISO JSEG 15 (WS 1 N1 - Metaverse — Vocabulary – metaverse - virtual world (3.1.16) experienced through immersive (3.1.12) technologies.

Note: 3.1.12 immersive - creating the illusion of being inside a computer-generated scene [SOURCE: ISO/IEC 19775-1:2022, 3.1.12]

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## MULTIMEDIA SYSTEMS AND EQUIPMENT FOR METAVERSE –

### PART 3: GAP ANALYSIS

#### 1 Scope

This document describes the gap analysis for metaverse systems and equipment, including examination of existing standards and services/applications within the metaverse domain. The analysis includes a comprehensive review of developments in various Standards Development Organizations (SDOs) and the relevant industry.

#### 2 Normative references

There are no normative references in this document.

#### 3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

For the purposes of this document, the following terms and definitions apply.

##### 3.1 Definitions

There are no definitions in this document.

##### 3.2 Abbreviations

For the purposes of this document, the following abbreviations apply:

##### 3.2.1

**AI**  
Artificial Intelligence

##### 3.2.2

**AR**  
Augmented Reality





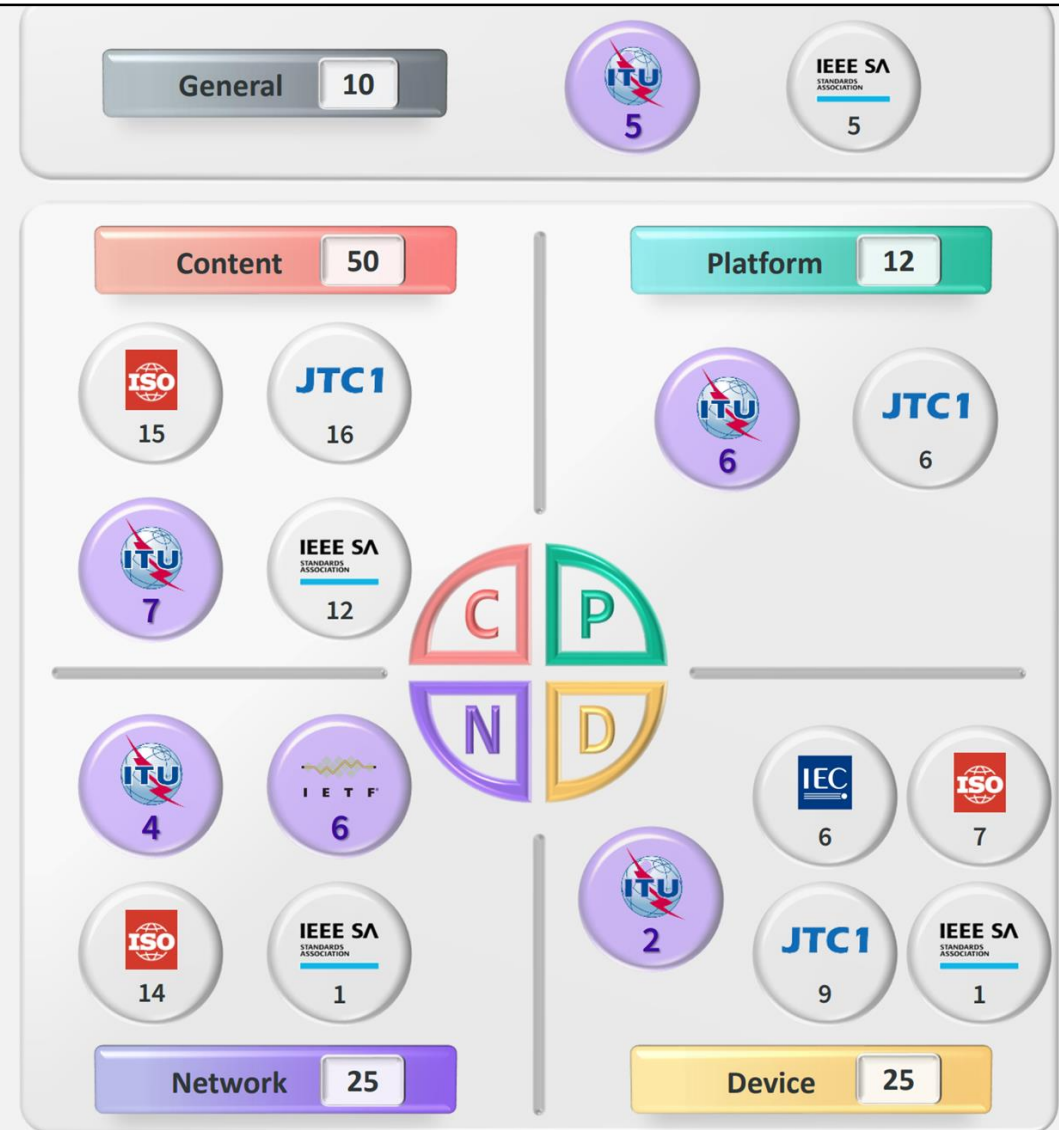
# Gap Analysis: Existing Standards

Analysis of existing standards on  
metaverse systems and equipment

We have reviewed

**122** standards

that are related to this standard  
which include





# Gap Analysis: Existing Standards

Table 1 – Standards on metaverse content in ISO

No	WG	Standard No.	Title
1	TC 8/SC 1	ISO 5476	Ships and marine technology — Virtual reality and simulation training systems for lifesaving appliances and arrangements
2	TC 22/SC 36	ISO/TR 21934-1	Road vehicles — Prospective safety performance assessment of pre-crash technology by virtual simulation — Part 1: State-of-the-art and general method overview
3	TC 133	ISO 18163	Clothing — Digital fittings — Vocabulary and terminology used for the virtual garment
4	TC 133	ISO 18825-1	Clothing — Digital fittings — Part 1: Vocabulary and terminology used for the virtual human body
5	TC 133	ISO 18831	Clothing — Digital fittings — Attributes of virtual garments
6	TC 133	ISO/TS 3736-1	Digital fitting — Service process — Part 1: Ready-to-wear clothing online and offline
7	TC 133	ISO/TS 3736-2	Digital fitting — Service process — Part 2: Customized clothing online and offline
8	TC 133	ISO 20947-1	Performance evaluation protocol for digital fitting systems — Part 1: Accuracy of virtual human body representation
9	TC 133	ISO 20947-2	Performance evaluation protocol for digital fitting systems — Part 2: Virtual garment
10	TC 133	ISO 20947-3	Performance evaluation protocol for digital fitting systems — Part 3: Digital fitting performance - Gap
11	TC 184/SC 4	ISO 23247-1	Automation systems and integration — Digital twin framework for manufacturing — Part 1: Overview and general principles
12	TC 184/SC 4	ISO 23247-2	Automation systems and integration — Digital twin framework for manufacturing — Part 2: Reference architecture
13	TC 184/SC 4	ISO 23247-3	Automation systems and integration — Digital twin framework for manufacturing — Part 3: Digital representation of manufacturing elements
14	TC 184/SC 4	ISO 23247-4	Automation systems and integration — Digital twin framework for manufacturing — Part 4: Information exchange

Table 2 – Standards on metaverse content in JTC1

No	WG	Standard No.	Title
1	JTC 1/SC 24	ISO/IEC 3721	Information technology — Computer graphics, image processing and environmental data representation — Information model for mixed and augmented reality content — Core objects and attributes
2	JTC 1/SC 24	ISO/IEC 9234	Information technology — Information modelling for VR/AR/MR based education and training systems
3	JTC 1/SC 24	ISO/IEC 18520	Information technology — Computer graphics, image processing and environmental data representation — Benchmarking of vision-based spatial registration and tracking methods for mixed and augmented reality (MAR)
4	JTC 1/SC 24	ISO/IEC AWI 20538	Human Information Data Model for 3D Virtual Smart Cities
5	JTC 1/SC 24	ISO/IEC 21145	Information technology — Computer graphics, image processing and environmental data representation — Style representation for mixed and augmented reality
6	JTC 1/SC 24	ISO/IEC 23488	Information technology — Computer graphics, image processing and environment data representation — Object/environmental representation for image-based rendering in virtual/mixed and augmented reality (VR/MAR)
7	JTC 1/SC 29	ISO/IEC 23000-13	Information technology - Multimedia application format (MPEG-A) — Part 13: Augmented reality application format
8	JTC 1/SC 29	ISO/IEC 23090-14	Information technology — Coded representation of immersive media — Part 14: Scene description — Amendment 2: Support for haptics, augmented reality, avatars, Interactivity, MPEG-I audio, and lighting
9	JTC 1/SC 29	ISO/IEC 23090-24	Information technology — Coded representation of immersive media — Part 24: Conformance and reference software for scene description — Amendment 1: Conformance and reference software for scene description on haptics, augmented reality, avatars, interactivity and lighting
10	JTC 1/SC 36	ISO/IEC TR 18121	Information technology — Learning, education and training — Virtual experiment framework
11	JTC 1/SC 36	ISO/IEC TR 23842-1	Information technology for learning, education and training — Human factor guidelines for virtual reality content — Part 1: Considerations when using VR content



# Gap Analysis: Existing Standards

Table 3 – ITU-T FG-MV structure

WG	Title	Scope
WG1	General	Roadmap, overall concepts, service model, related technologies of metaverse platforms and services
WG2	Applications & Services	Use cases and high-level requirements for supporting related use cases for specific applications and services
WG3	Architecture & infrastructure	Architectures, functionalities, interfaces, intelligent management mechanisms, connectivity technologies, APIs, and QoS/QoE, performance
WG4	Virtual/Real World Integration	Applications and services integration between virtual and real worlds
WG5	Interoperability	Functional architecture and interfaces for cross-platform interoperability
WG6	Security, Data & Personally identifiable information (PII) Protection	Security of networks and technology underpinning the metaverse platform, including cybersecurity and identity management
WG7	Economic, regulatory & competition aspects	Metaverse value chain: main agents' role and interactions
WG8	Sustainability, Accessibility & Inclusion	Impact on the climate changes, Environmental Sustainability related issues, Accessibility related issues, Social considerations, Diversity, equity and inclusion
WG9	Collaboration	Promote more active collaboration with other SDOs by setting up a close liaison relationship, including the appointment of an FG-MV liaison rapporteur to other relevant SDOs

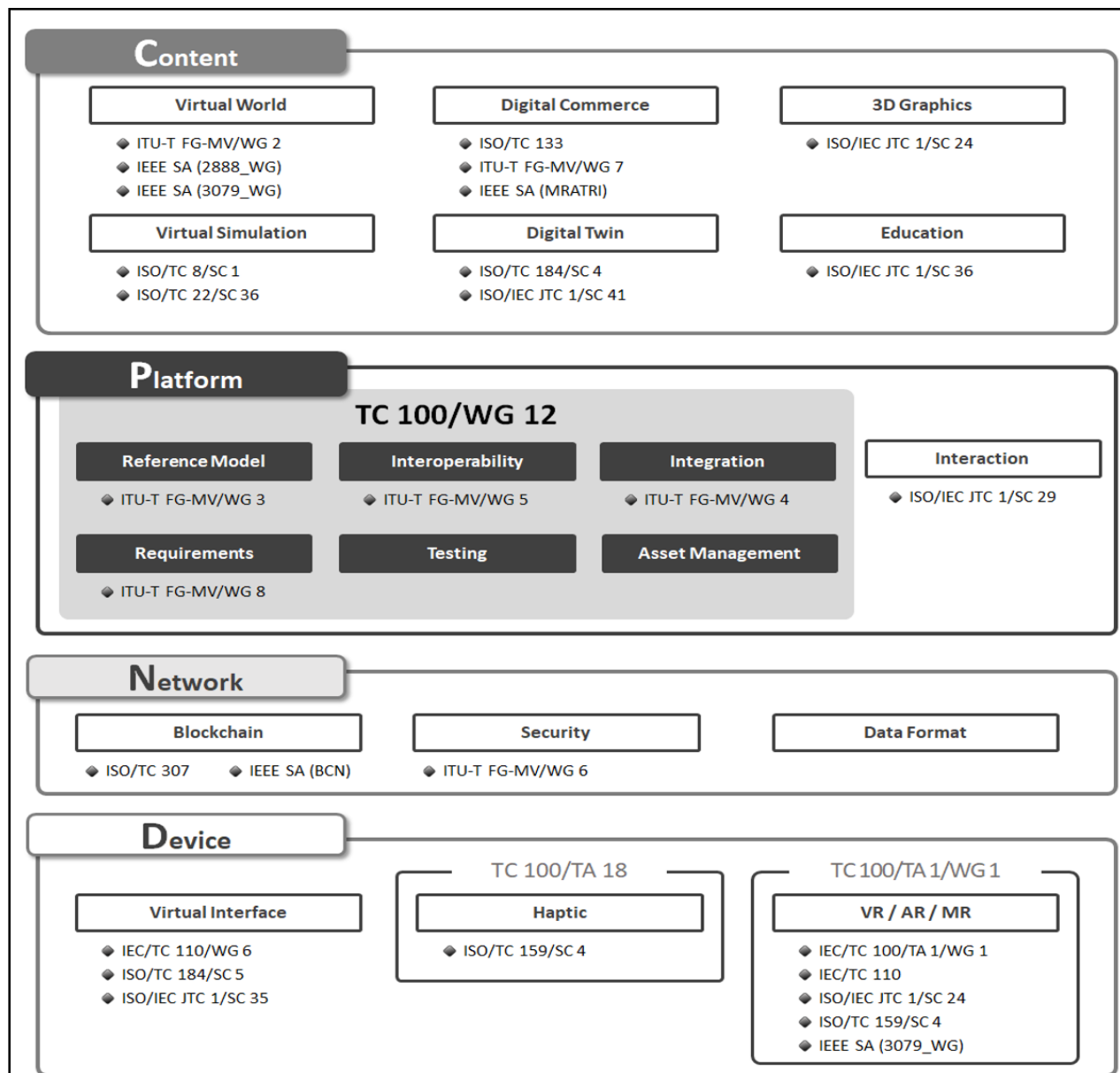
Table 4 – Standards on metaverse content in IEEE

No	WG	Standard No.	Title
1	3079_WG	IEEE P3079.1	Motion to Photon (MTP) Latency in Virtual Environments
2	3079_WG	IEEE P3079.2.1	Standard for a Basic Framework for Motion Training Systems
3	3079_WG	IEEE P3079.2.2	Standard for UI (User Interface)/UX (User Experience) Framework for Motion Training
4	3079_WG	IEEE P3079.3	Standard for a Framework for Evaluating the Quality of Digital Humans
5	3079_WG	IEEE P3079.3.1	Standard for Service Application Programming Interfaces (APIs) for Digital Human Authoring and Visualization
6	2888_WG	IEEE P2888.1	IEEE Draft Specification of Sensor Interface for Cyber and Physical World
7	2888_WG	IEEE P2888.2	IEEE Draft Standard for Actuator Interface for Cyber and Physical Worlds
8	2888_WG	IEEE P2888.4	Standard on Architecture for Virtual Reality Disaster Response Training System with Six degrees of Freedom (6 DoF)
9	2888_WG	IEEE P2888.5	Standard for Virtual Training System Evaluation Methods
10	2888_WG	IEEE P2888.6	Standard for Holographic Visualization for Interfacing Cyber and Physical Worlds
11	HFVE_WG	IEEE 3333.1.3	IEEE Standard for the Deep Learning-Based Assessment of Visual Experience Based on Human Factors
12	MRATRI	IEEE P3819	Standard for Metaverse Financial System - Reference Architecture and Technical Requirements





# Gap Analysis: Existing Standards





# (Proposed) Action Plan in TC100

## Observations from the Gap Analysis

	Stage 1 : Definition & Gap (Current Stage)	Stage 2 : Case study (Use-cases)	Stage 3 : Standardization
Scope	<ul style="list-style-type: none"><li>● Clarify the concepts, definitions, and classifications for further progress on metaverse standardization</li></ul>	<ul style="list-style-type: none"><li>● Perform comprehensive case studies to investigate specific examples of metaverse applications/services</li></ul>	<ul style="list-style-type: none"><li>● Make International Standards (IS), based on the works in Stage 1 and Stage 2.</li></ul>
Candidate work items	<ul style="list-style-type: none"><li>● Part 1: General (PWI 100-48)</li><li>● Part 2: Classification (PWI 100-58)</li><li>● Part 3: Gap analysis (PWI 100-59)</li></ul>	<ul style="list-style-type: none"><li>● Game</li><li>● Social media and life logging</li><li>● Customer support services</li><li>● Education and counselling</li><li>● Workspace and collaboration</li><li>● ...</li></ul>	<ul style="list-style-type: none"><li>● Devices (TA 1/WG 1)</li><li>● Haptic (TA 18)</li><li>● Requirements</li><li>● Reference architecture</li><li>● Interoperability</li><li>● Testing</li><li>● ...</li></ul>



# Candidate Work Items in WG12

## Case Study: Omnidirectional Situation Awareness System for Metaverse Services

Omnidirectional situation awareness system

2024.05.09



# Candidate Work Items in WG12

**Standardization of spatial audio  
for compatibility of spatial perception  
in metaverse spaces and XR devices**



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# Candidate Work Items in WG12

## Seamless 3D Format Crafting for Metaverse Platforms

### Seamless 3D Format Crafting의 원칙

통합적 접근 표준화 - MSF, AOUSD, ITU /ISO

### 기술적 접근

3D 파일 형식 변환 기술

상호 운용 가능한 API 및 SDK

### 사례 연구

성공적인 3D 형식 통합 사례

표준화를 통한 메타버스 확장 사례

### 결론

파일포맷의 Interoperability 표준화의 중요성 재확인  
메타버스 생태계에 대한 기여

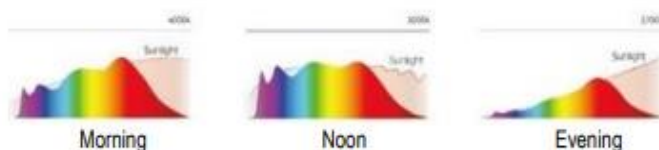




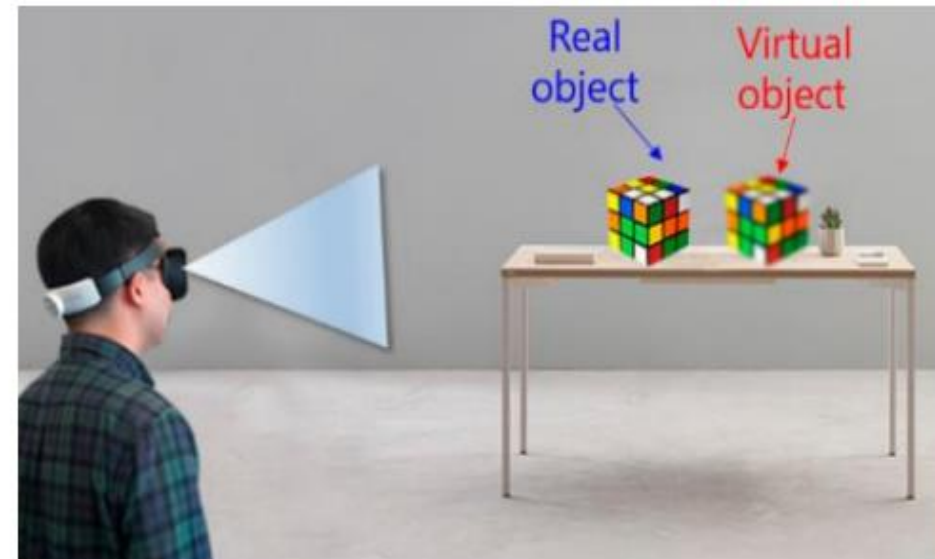
# Candidate Work Items in WG12

**New Item concept: Evaluation methods for the colour accuracy between real and metaverse objects**

- ☐ To obtain real object information: Camera with reference lighting
- ☐ Establishing standards for delivering real-world information (e.g., advertising products) in the virtual world
  - (As Is) Based on performance evaluation of a device → (To Be) Colour compatibility between devices and OS



Various Ambient Conditions



Real Object vs Virtual Object\*




# Candidate Work Items in WG12

구분	제목	주요 내용
상호 운용성	메타버스 환경 상호운용성 확보를 위한 요구사항 - 제1부 : 서비스	다양한 플랫폼에서 메타버스 서비스의 상호호환성 제공을 위한 크로스 플랫폼 및 상호운용성 확보를 위한 요구사항 표준
	메타버스 환경 상호운용성 확보를 위한 요구사항 - 제2부 : 플랫폼	
	메타버스 환경 상호운용성 확보를 위한 요구사항 - 제3부 : 디바이스	
	메타버스 환경에서의 비디오 상호운용성 표준 - 제1부 : 일반사항	실제 공간과 메타버스 공간의 공간 정합성(상호운용성)에 대한 일반사항 표준
	메타버스 환경에서의 비디오 상호운용성 표준 - 제2부 : 요구사항	
	메타버스 환경에서의 오디오 상호운용성 표준 - 제1부 : 일반사항	메타버스 환경에서의 아바타, 물리적 객체 간의 공간 음향 구현을 위한 다양한 오디오 장치에 대한 일반사항
	메타버스 환경에서의 오디오 상호운용성 표준 - 제2부 : 요구사항	



# JSEG 15: Joint SEG with ISO



International  
Electrotechnical  
Commission

Standards  
development

Conformity  
assessment

Where we make a  
difference

Who  
benefits

News &  
resources

Programs  
& initiatives

Home / [Who we are](#) / [Management structure](#) / SEG 15

## SEG 15

Joint SEG with ISO - Metaverse

Scope

Structure

Documents

Meetings / Workshops

Collaboration Platform

[Working Documents](#)

Supporting Documents

Mr Seok Joo Koh (kr-sjk-knu)

### SEG 15 Working Documents since 2023-10-26





# JSEG 15: Workstreams

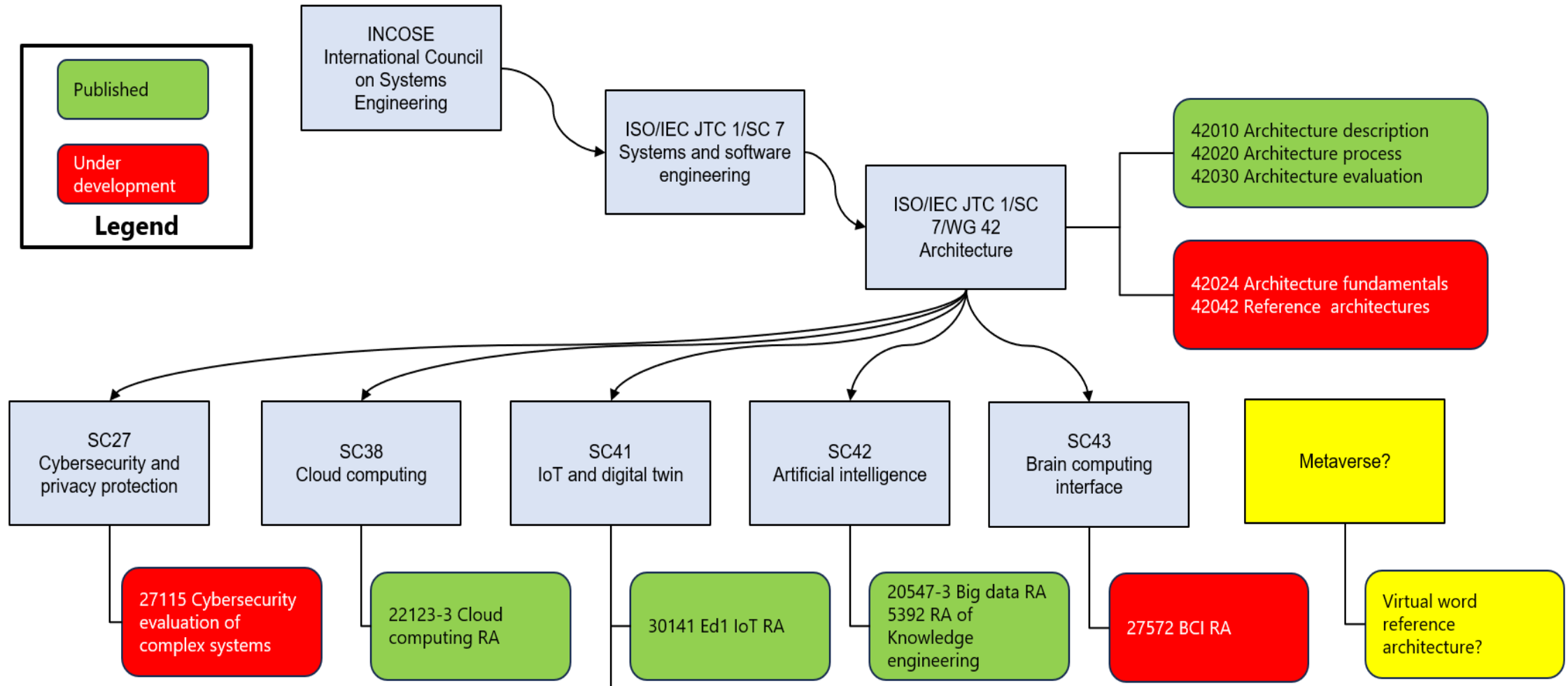
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- 6.1 Workstream 1 Terms and definitions (Ronald Tse)  
Review of definitions document
- 6.2 Workstream 2 Market and Applications (Lyn Sun)  
Review of updated use case descriptions (based on the discussion work of the meeting #8) include consideration of the stakeholder requirements inside that use case
- 6.3 Workstream 3 Technology and Architecture (Kishor Narang & Maxime Rosello)
- 6.4 Workstream 4 Current Standards Landscape (Yun Chao Hu)
- 6.5 Workstream 5 Regulatory and legal (Javier Ibáñez & David Durand)



# JSEG 15: Reference Architecture

## Who's who in Reference Architectures





# JSEG 15: Schedule

## Meeting schedule

Note in order to carry out the necessary work in time for the final report to be submitted in Q1 2025. We propose the following meeting schedule. Actual days to be agreed

#	Month	Week	Focus
10	November	27 <sup>th</sup>	Start creation of final report
11	January	10 <sup>th</sup>	Compiled review
12	February	13 <sup>th</sup>	First comments and review
13	March	13 <sup>th</sup>	Final comments and review Potential face to face
14	April	15 <sup>th</sup>	Read through ready for TMB and SMB submission

At the next meeting we will need to have the final output from the workstreams in order to compile the final report and associated recommendations for SMB and TMB



Q & A