

GISC 2025

Global ICT Standards Conference 2025

ICT 국제표준화 전문가 성과 공유 및 활동 설명회

IEEE 디지털콘텐츠기술 표준화

- IEEE SA C/DCT Standards Committee -

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ICT Standards and Intellectual Property:
AI for All

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Abstract

I IEEE 디지털콘텐츠기술 표준화 위원회의 소개

IEEE Standards

- IEEE Standards Association 산하에서 많은 De Facto 표준들이 개발됨
- 대표적인 표준화 작업반으로 IEEE 802 WG 이 있으며 IEEE 802 WG은 수많은 실질적 표준들을 개발함
 - IEEE Standard 802.3:2022 (First Ed. 1985)
 - IEEE Standard 802.11:2024 (First Ed. 1997)
- 2024년 메타버스/디지털트윈 등을 지원하기 위하여 Computer Society 주관으로
Computer / Digital Content Technology Standards Committee 설립
- C/DCTSC 산하에 현재 활발히 활동하고 있는 두개의 WG 을 소개
 - IEEE 2888 WG
 - IEEE 3079 WG

01. Intro to C/DCTSC

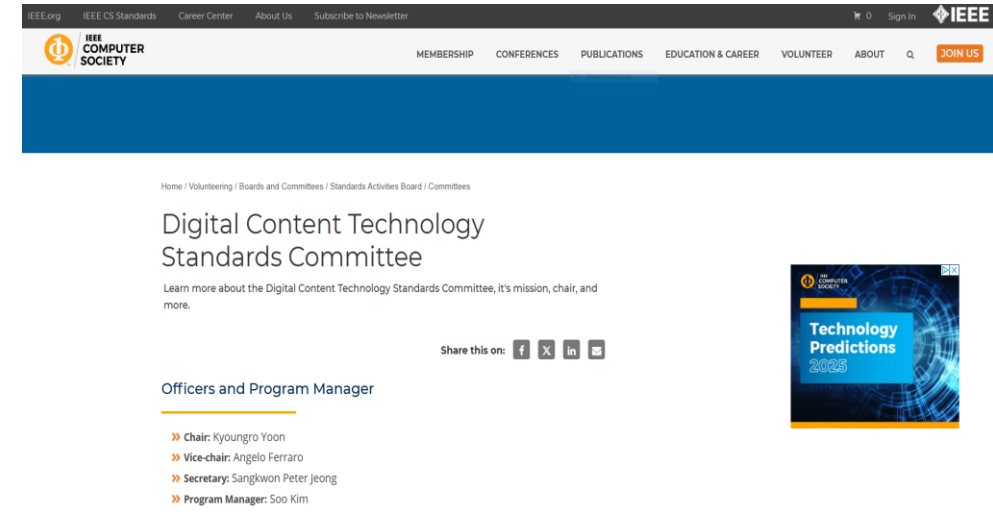
Digital Content Technology Standards Committee

Scope

- Computer Society 의 관심 분야 내에서 디지털콘텐츠 생태계의 모든 측면에 대한 Standards, Recommended practices, Guides를 개발 및 유지
- 디지털콘텐츠의 생성, 표현, 상호작용 및 서비스와 같은 영역에서 디지털콘텐츠 참여자들이 표준 기반의 선택 들을 개발하고 활용하도록 지원
- 디지털콘텐츠는 게임, 디지털트윈, 메타버스, 가상/혼합/증강/확장 현실을 포함

Officers

- 의장: 윤경로 (건국대학교)
- 부의장: Angelo Ferraro (University of South Carolina)
- 간사: 정상권 (조이편)
- PM: Soo Kim (IEEE SA)



01. Intro to C/DCTSC

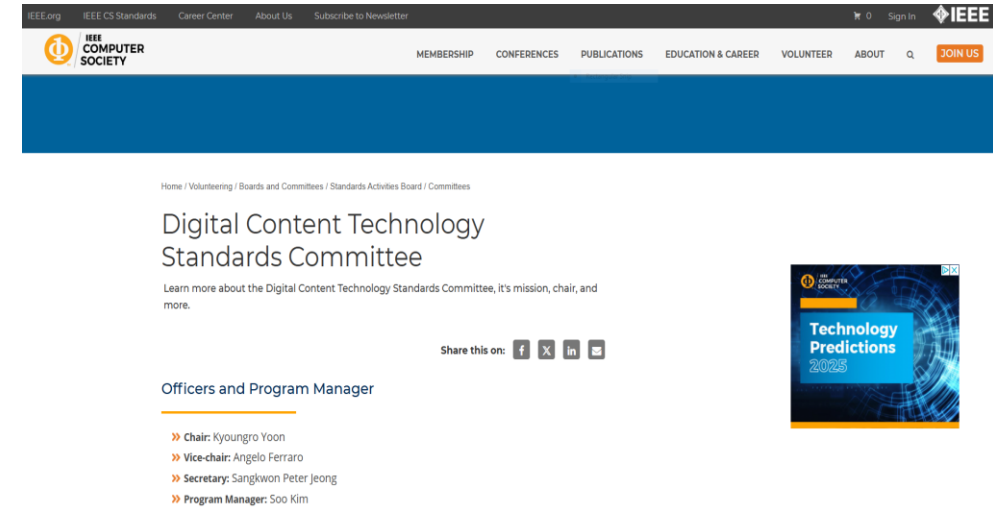
I Organization

Supervised By

- IEEE SA C/SAB (Computer Society Standards Activities Board)

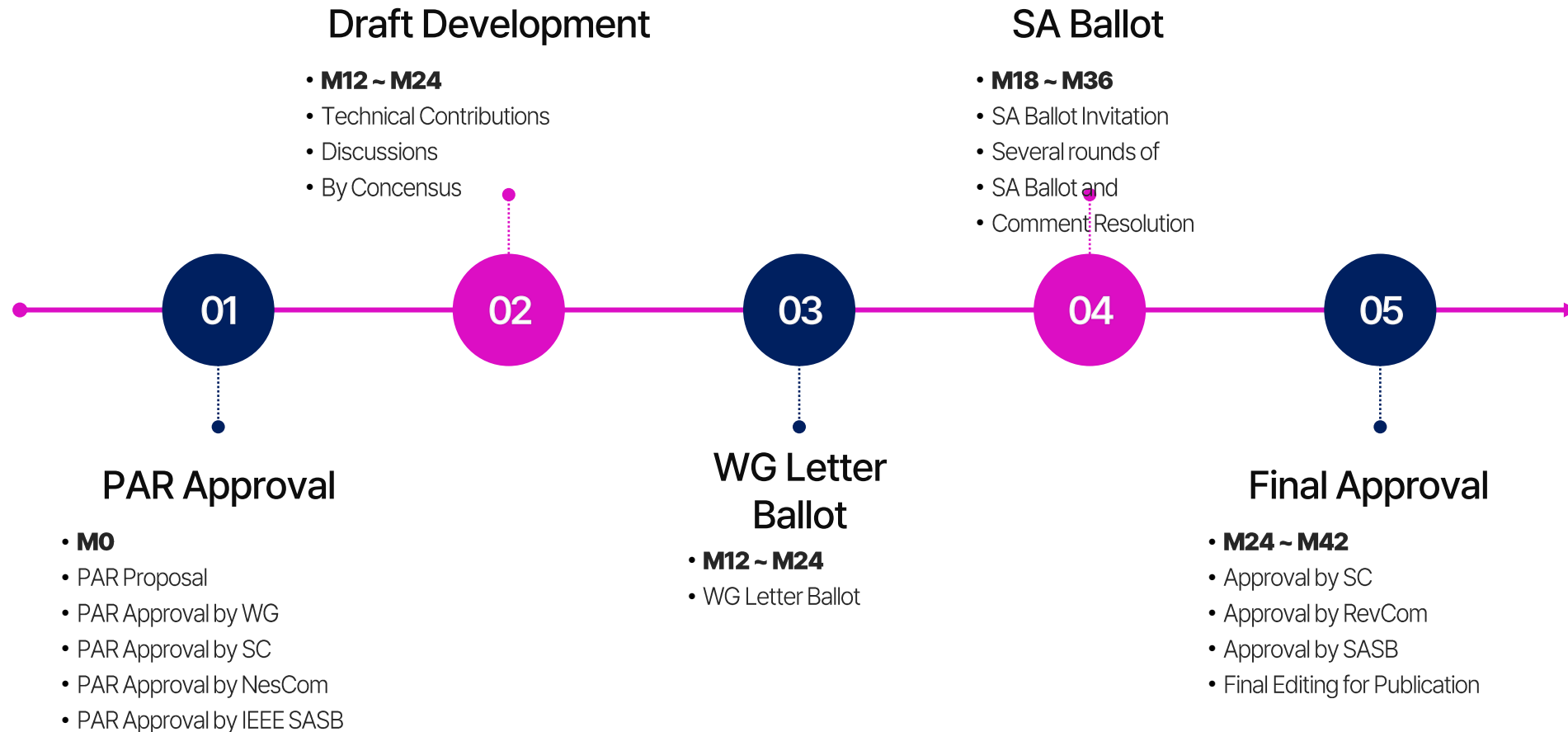
Working Groups

- **IEEE 2888 Interfacing Cyber and Physical Worlds WG (Chair: Kyoungro Yoon, Konkuk University)**
- **IEEE 3079 Human Factors for Immersive Content WG (Chair: Beom-Ryeol Lee, ETRI)**
- **IEEE 3333.1 Standard for the Quality Assessment of Three Dimensional (3D) Displays, 3D Contents and 3D Devices based on Human Factors (Chair: Sanghoon Lee, Yonsei University)**
- **IEEE 3422 Metaverse Working Group (Chair: Ming Li, Hong Kong Polytechnic University)**



02. Standard Development Process

| Example of Typical IEEE Standard Development Process Timetable



03. IEEE 2888 WG

Standards

- IEEE Std. 2888.1-2023: IEEE Standard for Specification of Sensor Interface for Cyber and Physical Worlds
- IEEE Std. 2888.2-2023: Standard for Actuator Interface for Cyber and Physical Worlds
- IEEE Std. 2888.3-2024: Standard on Orchestration of Digital Synchronization between Cyber and Physical Worlds
- IEEE Std. 2888.4-2023 IEEE Standard for Architecture for Virtual Reality Disaster Response Training System with Six Degrees of Freedom (6 DoF)
- IEEE Std 2888.5-2024: Standard for Virtual Training System Evaluation Methods

Working Groups

- P2888.1a IEEE Standard for Specification of Sensor Interface for Cyber and Physical Worlds
Amendment: Binary Representation of Data Formats for Interfacing Sensors and their Capabilities
- P2888.2a IEEE Standard for Actuator Interface for Cyber and Physical Worlds
Amendment: Binary representation of data formats, application programming interfaces and definition of additional actuators
- P2888.5a Standard for Virtual Training System Evaluation Methods
Amendment: Physiological evaluation method for virtual training systems
- P2888.6 Standard for Holographic Visualization for Interfacing Cyber and Physical Worlds
- P2888.7 Standard for Architecture of a Digital Twin System for Carbon Emission Management

03. IEEE 2888 WG

| Standard 2888.1-2023: IEEE Standard for Specification of Sensor Interface for Cyber and Physical Worlds

- PAR Approval Date: 05 Sep 2019
- Standard Approval Date: 8 Nov. 2023
- Standard Publication Date: Jan. 2024
- Scope: This standard defines the vocabulary, requirements, metrics, data formats and APIs for acquiring information from sensors, enabling definition of interfaces between the cyber world and physical world.
- Chair: Prof. Sang-Kyun Kim (Myongji University)
- Editor: Min Hyuk Jeong (Myongji University)

03. IEEE 2888 WG

I Standard 2888.2-2023: Standard for Actuator Interface for Cyber and Physical Worlds

- PAR Approval Date: 03 Dec 2020
- Standard Approval Date: 8 Nov. 2023
- Standard Publication Date: Jan. 2024
- Scope: This standard defines the vocabulary, requirements, metrics, data formats and application program interfaces (APIs) for describing characteristics of, setting up parameters for, and commanding actuators enabling definition of interfaces between the cyber world and physical world. These actuators shall be defined in cyber and physical world.
- Chair: Dr. Taebeom Lim (KETI)
- Editor: Dr. Shin Kim (Konkuk University)

03. IEEE 2888 WG

I Standard 2888.3-2024: Standard on Orchestration of Digital Synchronization between Cyber and Physical Worlds

- PAR Approval Date: 03 Dec 2020
- Standard Approval Date: 12 Nov. 2024
- Standard Publication Date: Jan. 2025
- Scope: This standard defines the vocabulary, requirements, metrics, data formats and application program interfaces (APIs) for setting up parameters for and communicating with digital objects to provide sequences of synchronization and interaction with physical objects.
- Chair: Prof. Kyoungro Yoon (Konkuk University)
- Editors: Dr. Changseok Yoon (KETI), Dr. Misuk Lee (ETRI)

03. IEEE 2888 WG

| Standard 2888.4-2023: IEEE Standard for Architecture for Virtual Reality Disaster Response Training System with Six degrees of Freedom (6 DoF)

- PAR Approval Date: 03 Dec 2020
- Standard Approval Date: 06 Dec 2023
- Standard Publication Date: Feb. 2024
- Scope: This standard defines an architecture required to implement a virtual reality system that can simulate responses to possible disasters in physical spaces, where users can actually move around with six degrees of freedom, for training. This reference architecture includes the physical-to-virtual component that transfers sensor data in the physical space to the virtual world, the virtual-to-virtual component that conveys the data between virtual world objects, and the virtual-to-physical component that transfers the simulated responses in the virtual world to actuators in the physical world.
- Chair: Mr. JeongHwoan Choi (Skonec Entertainment Co. Ltd.)
- Editor: Prof. HyeonWoo Nam (Dongduk Women's University), Prof. Sang-Kyun Kim (Myongji Univ.)

03. IEEE 2888 WG

I Standard 2888.5-2024: IEEE Standard for Virtual Training System Evaluation Methods

- PAR Approval Date: 08 Dec 2021
- Standard Approval Date: 20 May 2024
- Standard Publication Date: 1 Oct. 2024
- Scope: This standard defines evaluation methods for virtual training systems. Both subjective as well as objective evaluation methods are defined, together with evaluation criteria, evaluation questionnaires and evaluation metrics that can be used to evaluate the effectiveness, efficiency and satisfaction of virtual training systems. This standard also defines experimental methods for evaluation including setting the experiment's environment, selecting test subjects, configuring the test subject group, designing the experiment, and the experimental procedures.
- Chair: Prof. Sang-Kyun Kim (Myongji University)
- Editor: Dr. Suhhee Yoo (KEA), Mr. Jonghyun Yuk (Skonec Entertainment Co. Ltd.)

04. IEEE 3079 WG

Standards

- IEEE Std. 3079-2020: IEEE Standard for Head-Mounted Display (HMD)-Based Virtual Reality(VR) Sickness Reduction Technology
- IEEE Std. 3079.3-2023: IEEE Standard for a Framework for Evaluating the Quality of Digital Humans
- IEEE P3079.3.1 IEEE Draft Standard for Service Application Programming Interfaces (APIs) for Digital Human Authoring and Visualization (SA Ballot Passed)

Working Groups

- P3079.1 Motion to Photon (MTP) Latency in Virtual Environments
- P3079.2 Standard for Mixed Reality (MR) Framework for Motion Training
 - P3079.2.1 Standard for a Basic Framework for Motion Training Systems
 - P3079.2.2 Standard for UI (User Interface)/UX (User Experience) Framework for Motion Training
- P3079.3.2 Standard for a Framework for Privacy Protection through Identifiability Management Arising from Avatar Interaction
- P3079.4 Standard for the Visual Quality Assessment of Auto-Stereoscopic Displays

03. IEEE 2888 WG

I IEEE Std. 3079-2020: IEEE Standard for Head-Mounted Display (HMD)-Based Virtual Reality(VR) Sickness Reduction Technology

- Standard Approval Date: 24 September 2020
- Scope: This standard defines the technical requirements that can reduce or control the VR sickness caused by the HMD-based VR content service. Hence, the VR content service mentioned in this document is considered HMD-based VR content service by default unless otherwise mentioned. The requirements cover the followings:
 - Content design for VR sickness reduction
 - The framework for VR sickness assessment
 - The measurement
- Chair: Dillon Seo (Deutsch Telecom)
- Editor: Dr. Beom-Ryeol Lee (ETRI)

03. IEEE 2888 WG

I IEEE Std. 3079.3-2023: IEEE Standard for a Framework for Evaluating the Quality of Digital Humans

- Standard Approval Date: 29 June 2023
- Scope: This standard is intended to provide a standard framework for evaluating the quality of digital humans that look and act like actual humans. The quality of digital humans is related to the human factor for immersive content service that defines metrics for evaluating the realism of digital humans. The evaluation needs to define a framework that handles the digital human content as test data, define test methods and test cases, and provide a evaluation report of the test results. Therefore, the framework for evaluating the quality of digital humans includes the following:
 - A set of cognitive-psychological factors that define how users feel the realism of digital humans.
 - Definitions on methods and metadata that describe the tests for the quality of digital humans.
 - A procedure that allows the quality evaluation of digital humans.
- Chair: Prof. Andrew Min-gyu Han (Hansung University)
- Editor: Dr. Seung Wook Lee (ETRI)

GLSC 2025

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- 감사합니다 -

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AI for All