

ISO/IEC JTC 1 "Information technology"

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SC 24 Business Plan 2021

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Description

This document is circulated for review and consideration at the November 2021 JTC 1 Plenary.

JTC 1/SC 24 Business Report

Computer Graphics, Image Processing and Environmental Data Representation

August 2021, covering:

Past Year (Aug 2020-Jul 2021) and Current Year (Aug 2021-Jul 2022)

1.0 Executive Summary

The current area of work for SC 24 is summarized as:

Standardization relating to:

- computer graphics
- image processing
- virtual reality, augmented reality, and mixed reality
- environmental data representation
- visualization of and interaction with information

Excluded: efficient coding of multimedia

Terms of References for SC 24/WGs are as follows:

SC 24/WG 6 (Computer graphics and virtual reality):

- Standardization of computer graphics functional specifications for application program interfaces to include support for augmented reality continuum (ARC); Standardization of techniques for presentation of ARC multimedia information, including its creation, and support for user interaction; Standardization of interfaces for storage, retrieval, and interchange of ARC multimedia objects; Standardization for graphical information exchange, including computer graphics metafiles and computer graphics device interfaces; Standardization of encodings and language bindings for standards developed within WG 6.

SC 24/WG 7 (Image processing and interchange):

- Development of imaging architectures; Processing of digital images; Interchange and storage of digital images; Terminology related to imaging systems and technologies, imaging reference architectures, imaging system test and evaluation, imaging products and services, image quality, imaging applications, and related safety and security concerns; Imaging techniques within processing and dissemination architectures (including visualization, data products, AR/VR/MR applications, and computer vision); Profiling of generic specifications for use in specific application domains.

SC 24/WG 8 (Environmental representation):

- Define standards for environmental data elements, including presentation properties, and their relationships in the context of a data representation model; Define standards for data interchange between environmental data providers and consumers; Define standards for spatial referencing and environmental data identification, analysis, and reuse.

SC 24/WG 9 (Augmented Reality Continuum concepts and reference model):

- Reference architectures; Functional specifications; Scene/data representation and interchange formats; Interaction; Registration/calibration process; Multimodal input and output; Remote mixed reality data exchange (cloud/server/client); Device specifications; System performance and evaluation process.

SC 24/WG 10 (Representation and visualization of information for systems integration):

- Develop guidelines and standards for representation and visualization of information for systems integration topics and initiatives in coordination with relevant ISO/IEC and other groups; Support JTC1 Systems Integration requirements and architectures by applying representation and visualization; standards; Propose and maintain common approaches and architectures for representation and visualization.

SC 24/WG 11 (Health, safety, security, and usability of Augmented and Virtual Reality (AR/VR)):

- Health and Safety for AR/VR, including immersion; Ensuring the safe usage of personal protective equipment (PPE) with AR/VR; Hygiene related to AR/VR; Ensuring diversity, equality and inclusion. Business processes and diversity consideration for software/hardware; Robustness of AR/VR devices; Processes related to AR/VR content capture, processing, and postproduction; Cyber security/privacy/online harms specific to AR/VR.

SC 24/JWG 16 (Formats for visualization and other derived forms of product data):

- Joint ISO/TC 184/SC 4 - ISO/IEC JTC 1/SC 24 - ISO/TC 171/SC 2 WG hosted by ISO/TC 184/SC 4.

2.0 Chairperson's Remarks

2.1 Market Requirements, Innovation

- Based on the advancement and expansion of virtual world technologies, a requirement has been identified for the safe and efficient generation and use of visual information by enterprises and consumers. Innovative solutions to meet this requirement are being addressed by SC 24 Working Groups. A requirement is considered to exist for the beneficial use by other standards groups and industry of existing SC 24 standards in the areas of computer graphics; image processing; computer vision; virtual reality, augmented reality, and mixed reality; data representation of the environment; and visualization of information in the environment in which an application is operating.

2.2 Accomplishments

- The status of all standards published by SC 24, along with those under development, may be viewed in the [SC 24 Standards Catalogue](#). The scope of SC 24 has been finalized and agreed upon after communicating with the relevant TCs and SCs. Titles and Terms of References for WG 6, 7, 8, 9, 10, and 11 have been revised. The accomplishments of SC 24 with respect to the six Working Groups and the Joint Working Group established with ISO TC 184/SC4 are reported below.

2.3 Resources

The strategies adopted by SC 24 are based on a philosophy of cooperatively working with consortia, as indicated below in 2.4.

2.4 Competition and Cooperation (including consortia)

SC 24 continues its cooperative work with other JTC 1 SCs and WGs, ISO TCs, and Industry Consortia and Fora that share common objectives within the scope of the SC 24 work area. These include JTC 1/SC 29, JTC 1/WG11, JTC 1/WG12, JTC 1/AG 13, ISO TC 211, ISO TC 184, the Web3D Consortium, the World Wide Web Consortium (W3C), the Open Geospatial Consortium (OGC), the Simulation Interoperability Standards Organization (SISO), the SEDRIS Organization and the Khronos Group.

3.0 Working Group Reports

3.1 WG 6: Computer Graphics and Virtual Reality

3.1.1 WG 6 accomplishments

- ISO/IEC 19777-1 Ed. 2 CD X3D Language Bindings – Part 1: ECMAScript; ISO/IEC 19777-2 Ed. 2 CD X3D Language Bindings – Part 2: Java; ISO/IEC 19777-3 WD X3D Language Bindings – Part 3: C; ISO/IEC 19777-4 WD X3D Language Bindings – Part 4: C++; ISO/IEC 19777-5 WD X3D Language Bindings – Part 5: C#.

3.1.2 WG 6 deliverables

- No standards delivered during the past year (2020-2021).

3.1.3 WG 6 strategies/risks/opportunities/lessons learned

- In cooperation with the Web3D Consortium, create a revised X3D (19775-1 & 19775-2) with changes needed to better support HTML5 while remaining backwards compatible. Additional technical capabilities will also be added, including: enhanced sound; access to and support of glTF, physically-based rendering; projective texture mapping.
- Provide support for non-HTML environments; X3D EXI encoding, now that the EXI specification is approved by W3C; X3D JSON encoding; HL7 FHIR integration, including metadata; HAnim facial representation; HAnim internal organ representation; a Python language binding for X3D (as 19777-6 is not yet submitted); support glTF PAS standardization as proposed by the Khronos Group.

3.2 WG 7: Image processing and interchange

3.2.1 WG 7 accomplishments

- Continued development of ISO/IEC 12087-5:1998 (BIIF) Ed. 2; Approved Joint BIIF Profile 2021.2 (JBP-2021.2) for addition to the registry of items.

3.2.2 WG 7 deliverables

No standards delivered during the past year (2020-2021).

3.2.3 WG 7 strategies/risks/opportunities/lessons learned

- A draft national standard for computer vision terminology has been established in China. Submission to SC 24/WG 7 as a new work item is anticipated. The need for additional work related to computer vision standardization will be assessed following the initiation of this project. Registration of an ISO/IEC 12087-5 (BIIF) profile using the “Fast Lossless Extended” (FLEX) compression algorithm (ISO 18381).

3.3 WG 8: Environmental data representation

3.3.1 WG 8 accomplishments

- CD approved and registered for 18041-5, EDCS language bindings – Part 5: C++; NWIP and WD approved and registered for 18042-5, SRM language bindings – Part 5: C++; Draft WD and NWIP documents prepared for ballot for: 18024-5, SEDRIS language bindings – Part 5: C++; Actively participated in the SISO project for RIEDP (Reuse and Interoperation of Environmental Data and Processes).

3.3.2 WG 8 deliverables

No standards have been issued during 2020-2021.

3.3.3 WG 8 strategies/risks/opportunities/lessons learned

- The WG 8 strategy is to support the use of WG 8 standards in business application standards that make use of data representing the environment in which the application is operating; Opportunities for following this strategy exist in standards applying to smart cities, health and safety, and AR/VR, and processes for generating and exchanging reusable environmental data products.

3.4 WG 9: Mixed and Augmented Reality (MAR) concepts and reference model

3.4.1 WG 9 accomplishments

- ISO/IEC CD 23844 Material property and parameter representation for model based haptic simulation of objects in virtual, mixed and augmented reality (VR, MAR); ISO/IEC DIS 3721-1 Information model for mixed and augmented reality (MAR) contents – Part 1: Core objects and attributes; ISO/IEC CD 3721-2 Information model for mixed and augmented reality (MAR) contents – Part 2: Augmentation style specification; ISO/IEC NP Image based object/environment for virtual/mixed and augmented reality (VR/MAR).

3.4.2 WG 9 deliverables

- No standards delivered during the past year (2020-2021).

3.4.3 WG 9 strategies/risks/opportunities/lessons learned

- Improve standardization practices in terms of clarifying the objectives, practical usage, and industrial relevance of the current items and also strategically cultivating new future work items along this line. Publish a white paper to outline and publicize the clear objectives and industrial benefits of the current work items. Actively publicize the MAR reference model (ISO/IEC 18039) and other standards to expand its use in industry. Strengthen liaison activities (Web3D, W3C, OGC, Khronos) and collaboration with other SDO's (e.g. IEEE), academic associations (e.g. ACM), and industry fora (e.g. MWC, AWExpo); Industry cooperation with Google ARCore, Apple ARKit, WebVR and OpenXR. Identify emerging, key strategic areas, e.g. active standardization efforts that are underway in (but not limited to): (1) representation for MAR content/style and elements, (2) MAR performance issues, (3) perceptual and ergonomic aspects for MAR, and (4) indoor tracking and benchmarking.

3.5 WG 10: Representation and visualization of information for systems integration

3.5.1 WG 10 accomplishments

- WG 10 was established at the 2020 SC 24 Plenary meeting as a result of AG 1 activity on systems integration visualization. Two work items in progress: Guidelines for representation and visualization of smart cities (NP TS 5147), Health information modeling and representation for VR smart cities (PWI 3982).

3.5.2 WG 10 deliverables

No standards have been issued during 2020-2021.

3.5.3 WG 10 strategies/risks/opportunities/lessons learned

- Collaboration with other JTC1 groups such as WG 11 and also other organizations (OGC) has been strengthened through participation in WG 11 meetings and running a workshop on smart

cities at the 2020 Web3D conference. WG 10 will work with JTC 1/SC 41 /WG 6, JTC 1/WG 11, JTC 1/ AG 13, and SC 42/WG 2 as required to progress potential work items for digital twin, smart cities, VR training, and big data.

3.6 WG 11: Health, safety, security and usability of augmented and virtual reality

3.6.1 WG 11 accomplishments

- WG 11 was established at the 2020 SC 24 Plenary meeting. Two work items in progress: Guidance on immersion time, set up and usage; Guidance on ensuring devices enhance use of existing PPE and cleanliness requirements.

3.6.2 WG 11 deliverables

No standards have been issued during 2020-2021.

3.6.3 WG 11 strategies/risks/opportunities/lessons learned

- Further opportunities for standards have been identified in the following areas and will be explored: Guidance for cyber security, privacy protection and online harm prevention for AR/VR; Ensuring diversity, equality and inclusion when developing Augmented and Virtual Reality hardware and software – Specification; Process guidance for content capture, content processing, and postproduction for AR/VR; Test specification for robust VR devices.

4.0 Joint Working Group Reports

4.1 Joint Working Group with ISO/TC 184/SC 4 and ISO/TC 171/SC 2: Formats for visualization and other derived forms of product data

4.1.1 JWG16 accomplishments

- ISO/TS 23301 STEP Geometry Services under ISO/CS direct publication since Sept. 2021; ISO/TR 24464 Automation systems and integration - Industrial data - Visualization elements of digital twins published in Nov. 2020, edition 2 draft available; ISO/PWI 3151.2 Visualization components for the PLM-MES interface for plant industry; ISO 17506 Industrial automation systems and integration - COLLADA digital asset schema specification for 3D visualization of industrial data under ISO/CS direct publication since Oct. 2021; ISO/PWI 14306 Industrial automation systems and integration - JT file format specification for 3D visualization: edition 2 published in 2017 (edition 3 will start as soon as the project team is established). Fruitful discussions on the future TR that will be a succession to the 2009 SC 4 document on Industrial requirements for product data visualization.

4.1.2 JWG16 deliverables

ISO/TS 23301, ISO/TR 24464 and ISO 17506 were successfully published in 2020-2021.

4.1.3 JWG16 strategies/risks/opportunities

- Manage the transition of technical data packages from 2D drawings on paper to 3D annotated models in multiple formats. Joint initiative on Geometry and Topology ontology at ISO/TC 184/SC 4 with WG 12/T 1 geometry and topology; WG 3 Oil, Gas, Process and Power, and JWG 16. DTR in progress. Establish visualization requirements for product and plant data, and in general for Digital Twin, in cooperation with other ISO and IEC committees: ISO/IEC JTC 1/SC 41, ISO/IEC JTC 1/AG 13, ISO/IEC JTC 1/WG 12, ISO/TC 59/SC 13 (BIM).