SC24 Study Group: Systems Integration Visualization (SIV)

ISO/IEC JTC 1/SC24 Meetings

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Seoul, Korea

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JTC1 Systems Integration

- JTC1 has recently created:
  - SCs for IoT (SC41), AI (SC42)
  - WG on Smart Cities (WG11) and 3D Printing / Scanning (WG12)
  - SGs on Data Usage (SG07), Meta Reference Architecture and Reference Architecture for Systems Integration (SG06), and Autonomous and Data Rich Vehicles (SG04)
- These new areas will apply standards developed by established JTC1 entities and may also create their own specific standards
- JTC1 addressing Systems Integration
  - Standing Document SD 24: *Systems Integration*
- JTC1 monitoring potential new work areas

SC24 Scope

- **Area of Work**
  - *Standardization of interfaces for information technology based on applications relating to: computer graphics, image processing, environmental data representation, mixed and augmented reality, and interaction with, and visual presentation of, information*
- **Structure**
  - WG 6: Augmented reality continuum presentation and interchange
  - WG 7: Image processing and interchange
  - WG 8: Environmental representation
  - WG 9: Augmented reality continuum concepts and reference model
  - **Study Group: Systems integration visualization**
  - Joint Working Group: formats for visualization and other derived forms of product data (with ISO/TC 184)

SC24 Standards

- **X3D:** 3D web visualization
- **H-Anim:** humanoid representation
- **SEDRIS:** environmental feature representation
- **MAR:** human interaction with synthetic
- **BIIF**: imagery interchange
- Older standards: **VRML, png, CGM** etc

Need for SC24 Study Group

- SC24 charter within JTC1 is:

  Computer graphics, image processing and environmental data representation

- SC24 Study Group is investigating use of visualization for JTC1 Systems Integration

Systems Integration

- **System integration** is defined
  - in **engineering** as the process of bringing together component sub-systems into one system (an aggregation of subsystems cooperating so that the system is able to deliver overarching functionality) and ensuring that the subsystems function together as a system
  - in **information technology** as the process of linking different computing systems and software applications physically or functionally, to act as a coordinated whole

Visualization

- **Visualization** is any technique for creating images, diagrams, or animations to communicate a message
- Applications
  - Scientific visualization
  - Educational visualization
  - Information visualization
  - Knowledge visualization
  - Product visualization
  - 3D visualization

Goals of Study Group

- Monitor JTC 1 Systems Integration initiatives
- Coordinate with identified JTC 1 subgroups on topics related to architecture and application of visualization standards to systems integration initiatives
- Review and analyze JTC 1 Systems Integration architectures and requirements to identify SC 24 technologies / standards for JTC 1 initiatives
- Propose and maintain **common architecture** for visualization in Systems Integration initiatives
- Support JTC 1 Systems Integration activities
- Identify/propose new work areas and/or NWIPs based on findings from the study group and within SC 24 scope

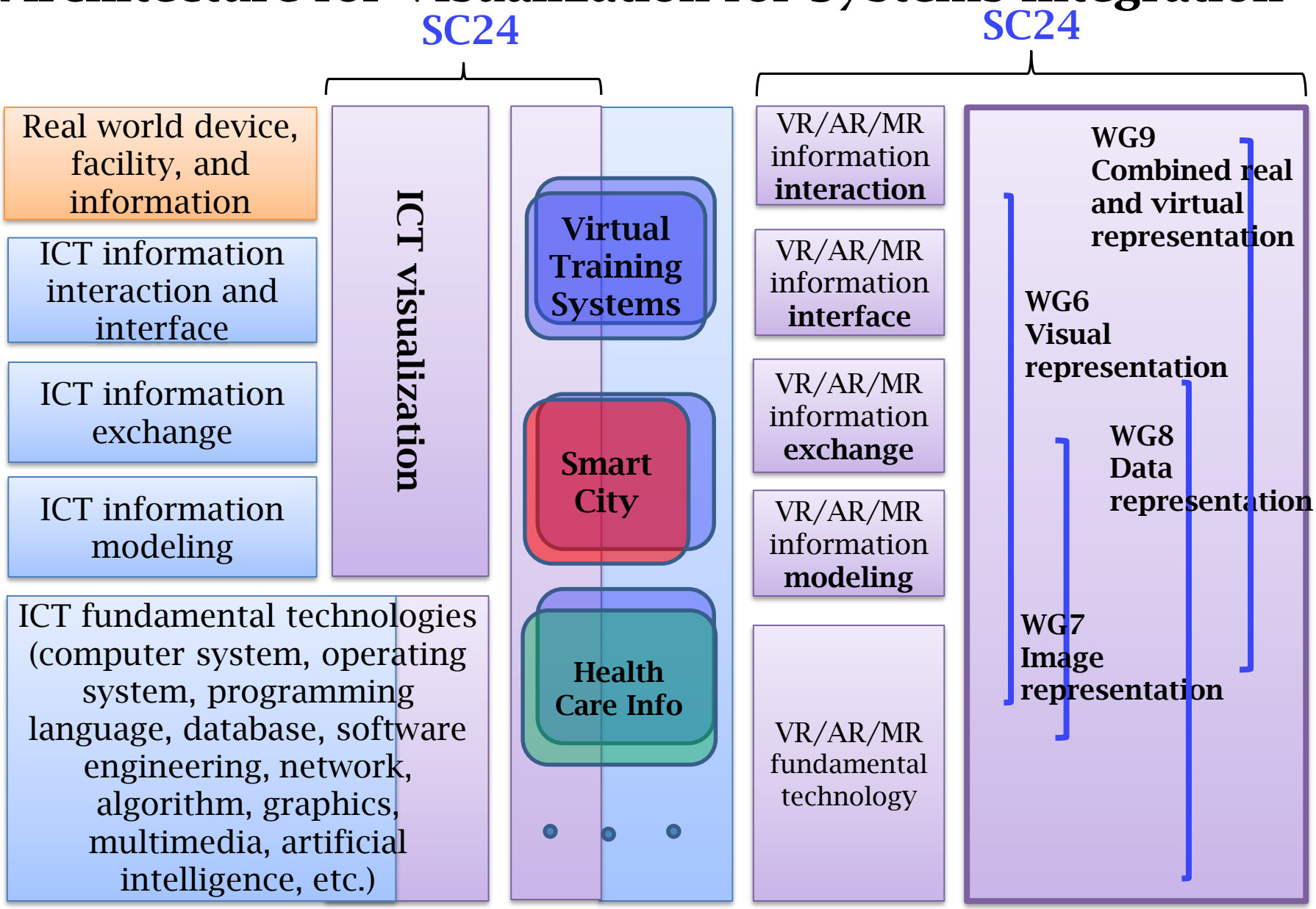
JTC1 Systems Integration for SC24

- Existing and emerging SC24 work areas relating to JTC Systems Integration include:
  - 3D digital human representation and animation
  - Representation and visualization of 3D environments
  - 3D printing and scanning
  - **Smart City representation and visualization**
  - **VR-based training and education systems**
  - Computer vision and image processing
  - **Health information systems**
  - Services for wearable devices

Progress of SC24 Study Group

- Study Group proposed at 2017 SC24 Plenary - Arlington, US
  - Resolution 18 of SC24 Plenary Mins
- N3986 document submitted to ISO JTC1
- Proposal accepted at JTC1 Plenary Oct 2017
- "*Virtual Training and Education Systems Using SC24 Standards*"
  - JTC1 Plenary Vladivostok, Oct 2017
- "*Visualization and Representation of Smart Cities*"
  - 2017 SC24 JTC1 Plenary, Arlington, VA
  - WG9/Web3D Seoul January 2018
  - 2018 SC24 JTC1 Plenary, Toulouse, France

Architecture for Visualization for Systems Integration



Study Group Work Areas

1. **Smart City Representation & Visualization**, Peter Ryan (Defence Science Australia), Myeong Won Lee (U. of Suwon), and Farid Mamaghani (SEDRIS)
2. **Virtual Training Systems Architecture**, Myeong Won Lee
3. **Smart City Health Care Information Interface**, Myeong Won Lee and Seung-Pyo Lee (Seoul National U.)
4. **Virtual Training Components**, Kwan-Hee Yoo (Chungbuk National U.)

Smart Cities and SC 24 Standards

- What is a **Smart City**?
  - Applies advanced ICT (IoT, Cloud, Big Data etc) to manage city assets and utilities
  - Provides efficient, secure urban services through smart systems (eg transport) and infrastructure (buildings, homes)
  - Reduces environmental impact, enhances sustainability with emerging technologies
- Smart City topics related to SC 24
  - 3D visualization / representation (WG6/WG8)
  - 3D environment representation (WG8)
  - Real/virtual interaction (WG9)
  - Imagery (WG7)

(1) Study Group Report on Smart Cities

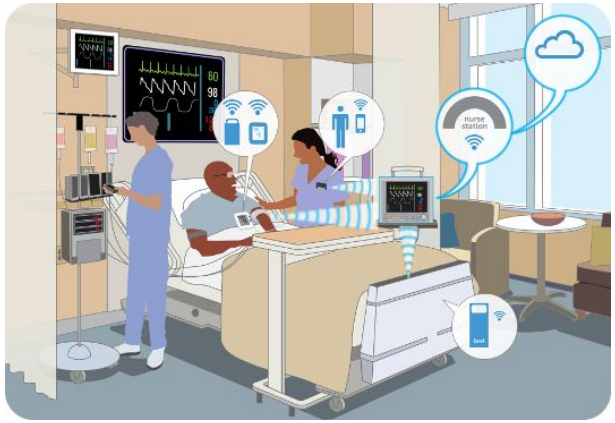
- *Visualization and Representation of Smart Cities*, Peter Ryan and Farid Mamaghani (ISO/IEC JTC 1/SC24):
  - potential application of SC24 standards to represent and visualize Smart Cities (digital model of Smart City)
  - SEDRIS, X3D, BIIF, and MAR address either content or presentation
  - A Smart City could utilise these for representation and visualization of urban infrastructure, services, and data flows
  - Use cases such as visualizing Smart City energy flows and greenhouse gas emissions can readily be developed

(2) Virtual Training Systems Architecture

- **VR/AR/MR** integration into training/education
- Information modeling for virtual training systems
  - 3D virtual environments
  - Sensor representation
  - Virtual training interfaces
- Architecture for virtual education and training systems
  - 3D scene graph generation and management
  - 3D object management
  - Training simulation management in virtual environments
  - Sensor event interface

(3) Smart City Health Care Information Interface

- Health care information modeling for Smart City environment
  - 3D health care information modeling
  - 3D health care sensor data monitoring and management interface
    - Real time monitoring of location/orientation, and health data via health information sensors
    - Sensor information parameters in virtual environments
  - 3D health care information systems



Summary: SIV Study Group

- SIV Study Group established 2017/2018
- Work areas identified that can apply SC24 stds
- Presentations at SC24 and JTC1 meetings
- Study Group report on Smart Cities published
- Need formal liaison with WG11 and other groups
- Progressing work towards standardization
- Convert SG to SC24 WG?