Update on JTC 1 activities

prepared by Kate GRANT and Yoshi NARUI
IEC TC 100/ AGS
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Contents

- Artificial Intelligence
- IoT
- 3D printing and scanning
- Edge computing
- VR/AR

Work in SC 42 Artificial Intelligence

- Two NPs (foundational standards) have been balloted and approved
  - NP 22989, Artificial Intelligence Concepts and Terminology
  - NP 23053, Framework for Artificial Intelligence (AI) Systems Using Machine Learning (ML)

  Three NPs are proposed for discussion in the first meeting
  - NP - AI Platform – Resource Provision
  - NP - Framework of Knowledge Graph by China
  - NP - Neural Network Representation and Model Compression by China

Work in SC 41 IoT

- Three working groups:
  - WG3 IoT Architecture
  - WG4 IoT Interoperability
  - WG5 IoT applications
- Six study groups
  - AHG 7 Study Group on Wearables
  - AHG 8 Study Group on Trustworthiness
  - AHG 9 Study Group on Industrial IoT
  - AHG 10 Study Group on Real-Time IoT
  - AHG 11 Study Group on Aspects of IoT Use Cases including Classification and Verification
  - AHG 12 Study Group on Reference Architecture and Vocabulary
- Also AHG 14 Business Plan and AHG 15 Communications and Outreach

Work in SC 41 IoT

- **IoT definition:**

..an infrastructure of interconnected objects, people, systems and information resources together with intelligent services to allow them to process information of the physical and the virtual world and react.

- As at March 2018
  - **22 'P' Members:** Austria, Belgium, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Malaysia, Netherlands, Russia, Singapore, Sweden, UK, USA
  - **11 'O' Members:** Argentina, Australia, Belarus, Iceland, Iran, Kenya, Mexico, Norway, Pakistan, Saudi Arabia, Switzerland
  - **258 experts**
- SC 41 works on IoT and sensor network standardisation

Work in SC 41 IoT

- Active projects:
  - WG3 IoT Architecture
    - ISO/IEC 30141 ED1: Internet of Things Reference Architecture (IoT RA) *TFDIS*
    - ISO/IEC 20924 ED1: Information technology - Internet of Things (IoT) - Definitions and vocabulary *PRVC*
    - *PNW* Information technology — Internet of Things — Methodology for trustworthiness of IoT system/service
    - *PNW* Information technology — Internet of Things — IoT Edge Computing
  - Convenor: Ms Erin Bournival, US

Work in SC 41 IoT

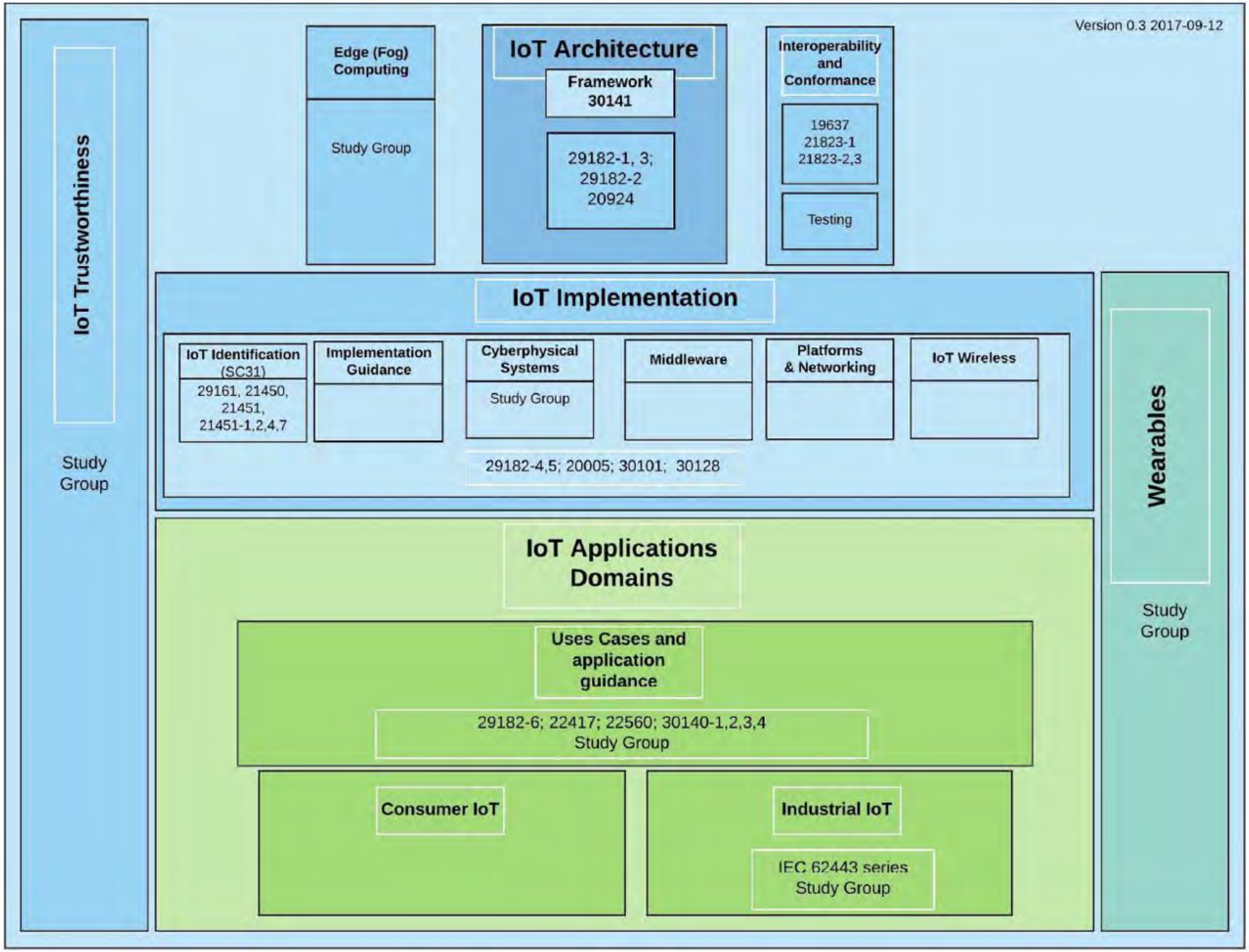
- Active projects:
  - WG4 IoT Interoperability
    - ISO/IEC 21832-1 ED1: Information technology - Internet of Things (IoT) - Interoperability for Internet of Things Systems - Part 1: Framework *TCDV*
    - ISO/IEC 21832-2 ED1: Information technology - Internet of Things (IoT) - Interoperability for Internet of Things Systems - Part 1: Transport Interoperability *ACD*
    - ISO/IEC 21832-3 ED1: Information technology - Internet of Things (IoT) - Interoperability for Internet of Things Systems - Part 3: Semantic Interoperability *ACD*
    - ISO/IEC 30140 -3: Information technology - Underwater acoustic sensor network (UWASN) - Part 3: Entities and interface *RFDIS*
    - ISO/IEC 30140 -4: Information technology - Underwater acoustic sensor network (UWASN) - Part 4: Interoperability *RFDIS*
  - Convenor: Mr Quan Wang, China

Work in SC 41 IoT

- Active projects:

  - WG5 IoT Applications
    - *PNW* Information technology — Underwater Acoustic Sensor Network (UWASN) -- Network management system overview and requirements
    - *PNW* Information technology — Underwater Acoustic Sensor Network (UWASN) – Application Profiles
    - *PNW* Information technology — Sensor network system architecture for power substations
  - Convenor: Mr Yongjin Kim, Korea

SC41 Space



Preliminary view from the Chair

ISO/IEC TR 22417:2017, IoT use cases

Context

Global
Transport infrastructure
Home
Public buildings
Offices
Factories
Process Plants
Agriculture
Forestry
Fishing
Body and Personal
Healthcare
Vehicles
Smart Cities

Scenarios (1)

- IoT Network Security
- IoT Security Threat Detection and Management
- Remote Management of Large Equipment in a Plant
- Automated ICC Profile Discovery
- Tracking of Farm Products
- Warehouse Goods Monitoring
- Cooperation between Factories and Remote Applications
- Searching System for People with Cognitive Impairment
- Sleep Monitoring System
- Smart Glasses
- IoT Endpoint (Sensors and Actuators) Monitoring Systems
- Intelligent Assistive Parking in Urban Areas

Scenarios (2)

- Integrated Smart Pump System
- Remote Health Monitoring: Example of an AAL Use Case Relevant to IoT
- Connected Car Analytics
- Real Time Motor Monitor
- Smart Home Appliances
- Smart Home Insurance
- Machine Leasing
- IoT–based Energy Management System for Industrial Facilities
- Water Plant Management
- Smart Home Application
- Field Gateway Bridging IoT to Legacy Devices in Factories and Plants
- Production Monitoring of Textile Equipment
- Remote Management of Agricultural Greenhouses

Work in SC 41 IoT SGs

- All the SGs have scheduled webex meetings to progress their study reports
- All the SGs will provide activity reports to the Berlin SC 41 meeting to be held 13-18th May 2018
- The SG on Edge Computing reported to 2nd SC meeting in Delhi in November and this resulted in the PNW.

- key conclusions from study reports will be highlighted in Brussels meeting -

Outreach activities of SC 41 Chairman:

- Contribution to ISO focus issue on Smart Agriculture (2017-05,06)
- Presentation at the IEEE SoSE 2017 Conference, Hawaii (SC41-N0159)
- Presentation to OGC Plenary meeting (2017-06-29) (SC41-N0180) - Teleconference
- Contribution to ISO Smart Manufacturing Coordinating Committee (SMCC) (SC41-N0210),
- Contribution to ITU-T SG 20 (SC41-N0211) - Teleconference
- SC 41 liaison report to IEC TC 91 (SC41-N0222)
- Presentation on SC 41 status at the 2017 JTC 1 Plenary meeting in Vladivostok, Russia (SC41-N0253),and presentation at the 2017 JTC 1 Workshop on Industrial IoT in Vladivostok, Russia (SC41-N0254),
- Presentation on SC 41 and Edge Computing at the IEC Workshop in Vladivostok, Russia (SC41-N0258),
- SC 41 Chair's report to ITU-T Regional Standardization Forum (RSF) (2017-11-19, Riyadh, Saudi Arabia) (SC41-N0302) – Teleconference
- SC41 Chair Interview published in IEC e-tech - 2018-02

New WG on 3D Printing and Scanning (WG 12)

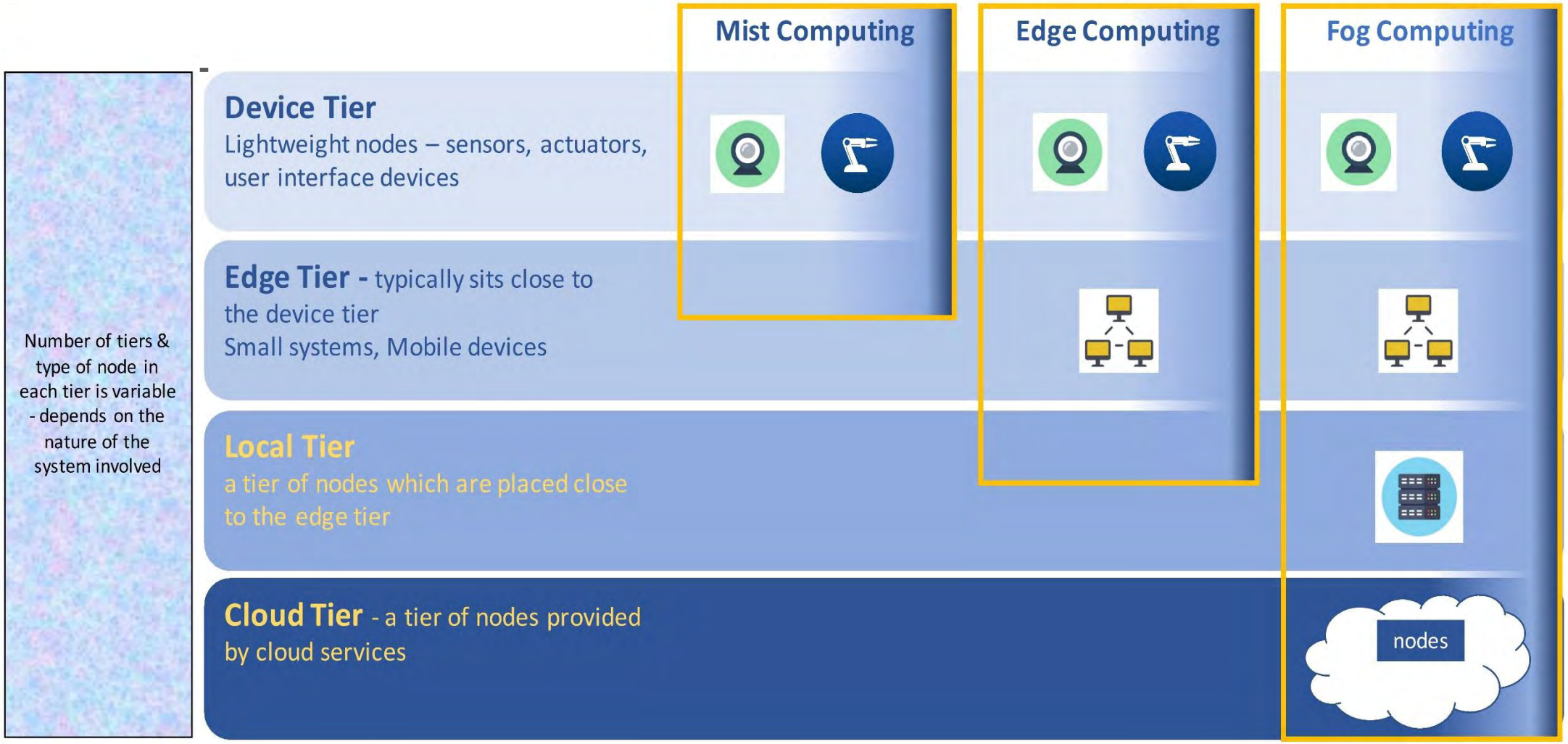
1. Serve as a focus of and proponent for JTC 1's standardization program on 3D Printing and Scanning (3DPS).
2. Develop ICT related foundational standards for 3DPS upon which other standards can be developed.
3. Develop other 3DPS standards that are built upon the foundational standards when relevant ISO and IEC committees that could address these standards do not exist or are unable to develop them.
4. Identify gaps and opportunities in 3DPS standardization.
5. Develop and maintain liaisons with all relevant ISO and IEC committees as well as with external organizations that have interests in 3DPS.
6. Engage with 3DPS communities to raise awareness of JTC 1 standardization efforts and provide an open platform for discussion and further cooperation.
7. Develop and maintain a list of existing 3DPS standards produced and standards development projects underway in ISO TCs, IEC TCs and JTC 1 Two NPs have been balloted and approved

Technical Report on ‘Edge computing landscape’

This technical report is to investigate and report on the concept of Edge Computing, its relationship to Cloud Computing and IoT, and the technologies that are key to the implementation of Edge Computing. This report will explore the following topics with respect to Edge Computing:

- Concept of Edge Computing Systems
- Architectural Foundation of Edge Computing
- Edge Computing Terminology
- Software Classifications in Edge Computing – for example: firmware, services, applications
- Supporting technologies such as Containers, Serverless, Microservices
- Networking for edge systems, including virtual networks
- Data – data flow, data storage, data processing in edge computing
- Management – of software, of data and of networks, resources, quality of service
- Virtual placement of software and data, and metadata
- Security and Privacy
- Real Time
- Mobile Edge Computing, Mobile Devices

Organisation of nodes in edge computing



Ad Hoc Group on Virtual Reality (VR)/Augmented Reality (AR) for Education

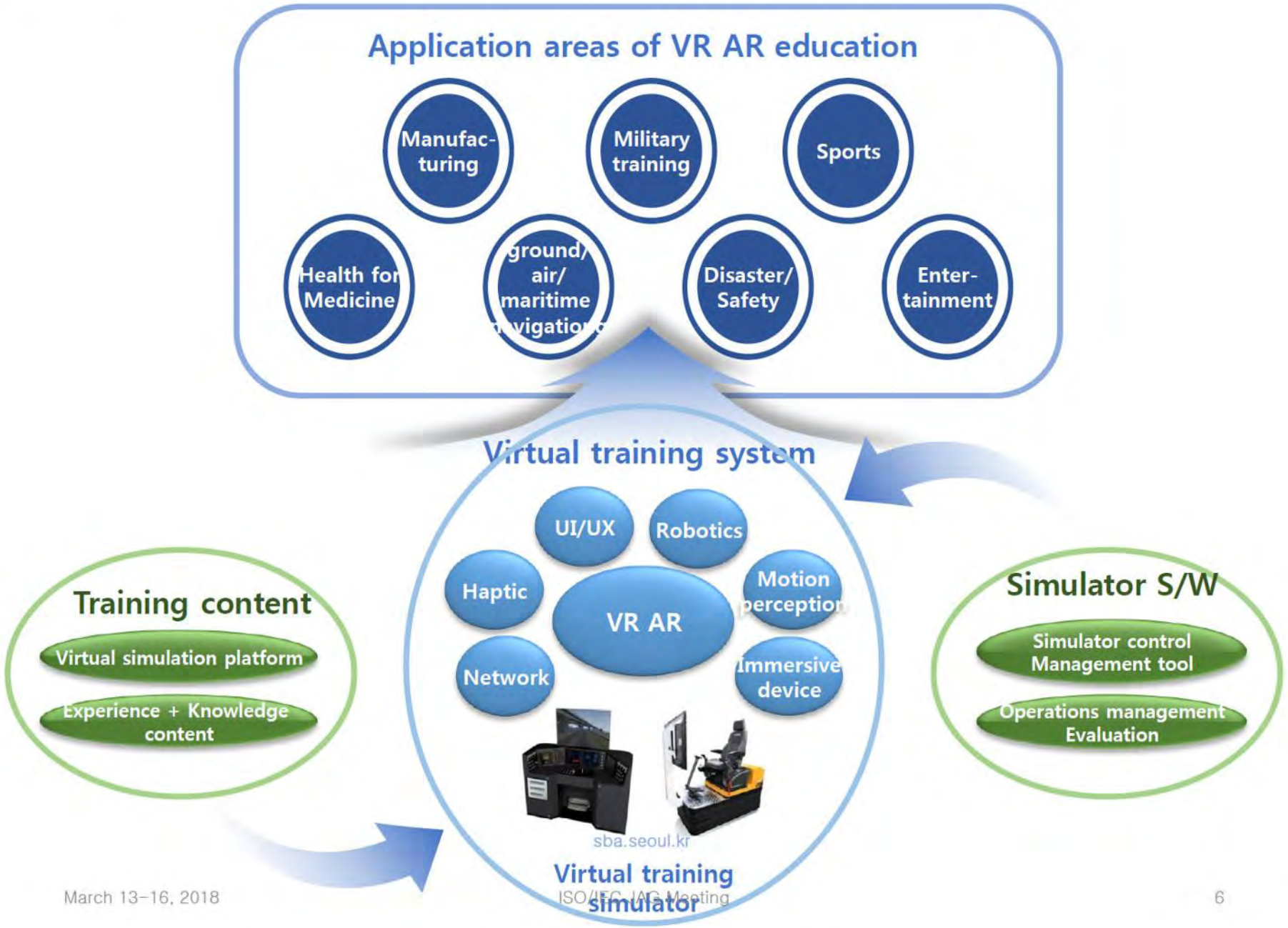
JTC 1 establishes an Ad Hoc on VR/AR for Education with the following Terms of Reference:

1. Develop guidelines for industry of methods or procedures for developing applications related to VR/AR for education.
2. Collect and analyze related standards and work items.
3. Analyze and classify VR/AR for education application areas so that the most appropriate and applicable guidelines can be provided.
4. Produce a report that includes necessary concepts for VR/AR for education.

Ad Hoc Group on Virtual Reality (VR)/Augmented Reality (AR) for Education

The members of the Ad Hoc Group are representatives of
SC 24 (Computer graphics, image processing and environmental data representation),
SC 29 (Coding of audio, picture, multimedia and hypermedia information),
SC 36 (Information technology for learning, education and training) and
any other related groups.
The SC 24 Chair, Myeong Won Lee (Unv. of Suwon) will convene the Ad Hoc Group.

Virtual education and training systems



Virtual Education and Training Systems Technologies and Application Areas

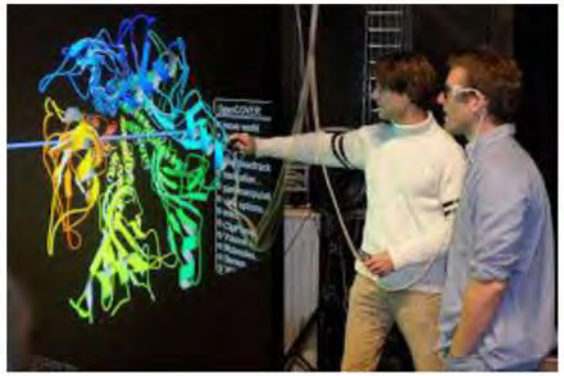
VR/AR/MR integration into training and education systems

- Information modeling and exchange
- Visualization and simulation
- Sensor representation
- Real world representation
- Graphical user interaction

Areas related to VR/AR/MR information modeling and rendering

- Science and engineering education
- Medical education
- Training for manipulating industrial equipment or devices
  - Ex: flight, car, ship, heavy vehicle, heavy equipment, army, transportation
- Manuals for manipulating electronic and manufacturing products
  - Ex: camera, video, 3D printer, 3D scanner, home appliance
- Education materials for making products
  - Ex: clothing, furniture, interior design, food, manually produced products

VR AR Based Education (1)



sites.google.com

clicktoeducation.com

learncube.com

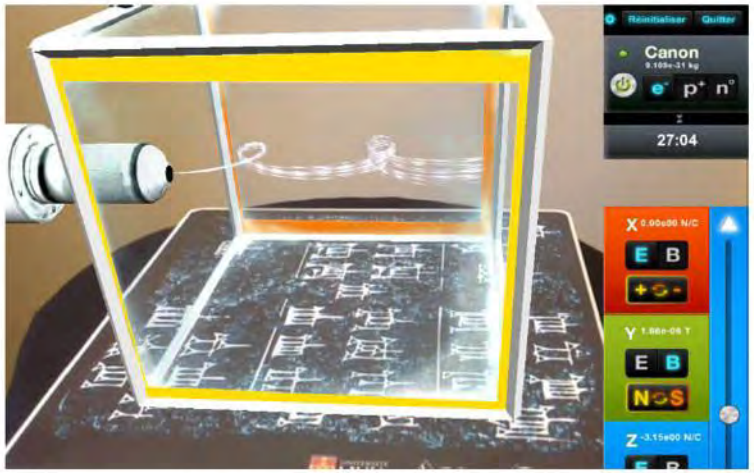
Education content and materials

linkedin.com

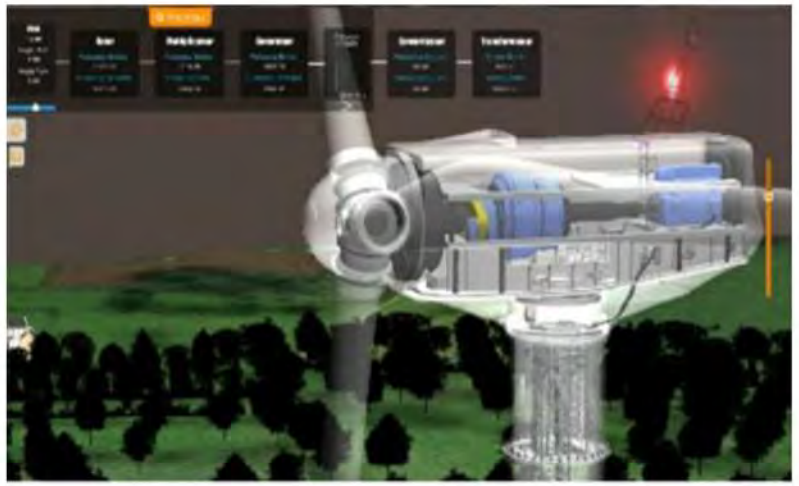
webschool.in

Learning and teaching

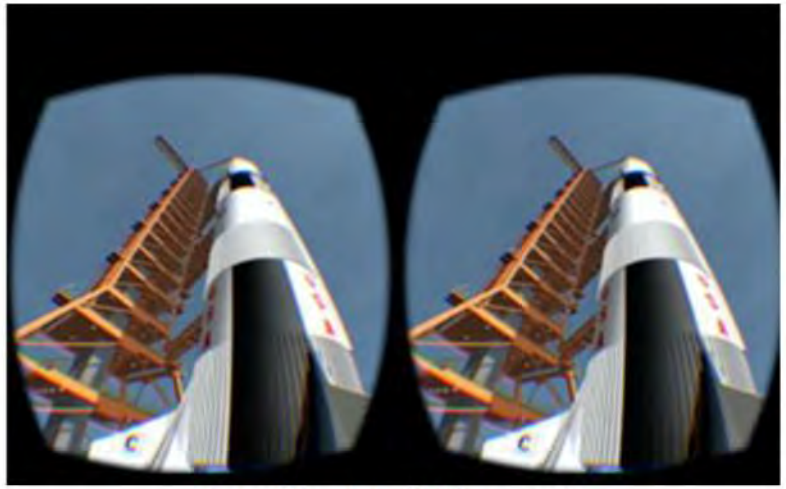
VR AR Based Education (2)



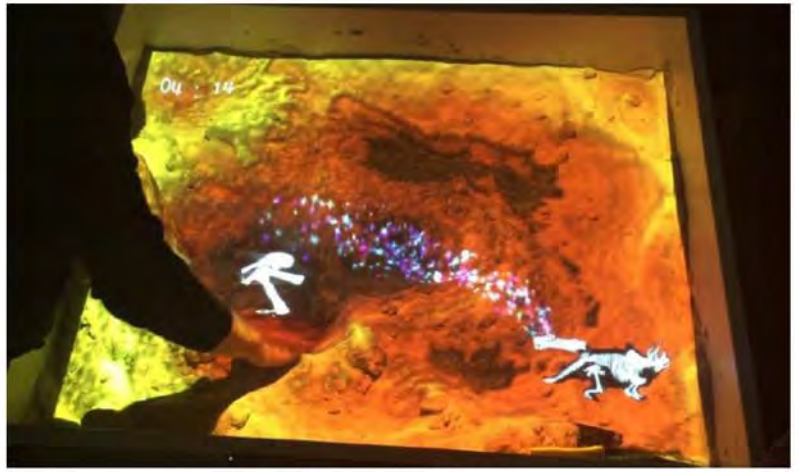
Movement of charged particles (AR case)
(Canada)



Project EAST Consortium (VR case)
(France)



Apollo 11 (VR case)
(VR Experience)



SendDraft (MR case)
(Korea)

VR AR Based Training Systems (1)

Driving simulation
(Road Traffic Authority, 2013)

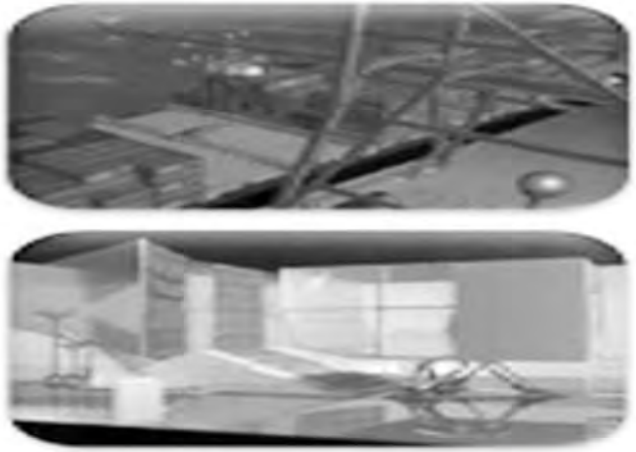
CycleOps virtual training
(CycleOps, 2012)

Boeing CRVS
(The Boeing Company)

Military training
(STI, USA)

VR AR Based Training Systems (2)

Excavator simulator
(KETI)



Harbor crane training simulator
(Total Soft Bank)

Virtual medical education
(Virtual Medical Coaching)

Virtual military training

Future work

- Prepare guidelines for developing standardized virtual education and training systems
- Refine JTC1 standards and standardization for virtual training and education systems
- Enhance the architecture for systems integration for virtual education and training systems
- Expand the concepts of systems integration with education and training to other systems integrations

Useful documents and links

- Standardizing All the Realities: A Look at OpenXR
  see https://www.khronos.org/assets/uploads/developers/library/2018-gdc-webgl-and-gltf/OpenXR_A-look-at-OpenXR_Mar18.pdf