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TECHNICAL REPORT

Augmented and mixed reality equipment and systems - Technology and standards review and gap analysis

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Augmented and mixed reality equipment and systems - Technology and standards review and gap analysis

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The text of this Technical Report is based on the following documents:

Draft	Report on voting
100/4582/DTR	100/4618/RVDTR

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this Technical Report is English.

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INTRODUCTION

With the enhancement of technology, including computing processing units, optical systems, sensors and computer graphics, 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, which were already equipped with IT-based infrastructures such as IoT and cloud-based service, and also interested in visualizing 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 AR and MR technology for the improvement of efficiency and quality of work and for the convenience of users.

AR and MR technology is a computer-generated or digitally created content overlaid on user's real-world environment, which can interact with the digital content. This AR and MR can be experienced via both AR equipment with diverse form factors such as glasses and head-mounted devices, and service systems bringing AR and MR content and applications to designated users.

The purpose of this document surveys AR and MR technology in detail in terms of content, platform, network and device, so called C-P-N-D, and identifies potential technical items that can be standardized within the scope of audio, video and multimedia systems and equipment.

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1 Scope

This document, which is a Technical Report, analyses AR and MR technology in terms of four technical domains: content, platform, network and device. Based on this analysis, technical elements in each domain and requirements for interconnecting those technical domains are identified. On the same basis, this document identifies relevant standard development organizations' activities and suggests items for standardization.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

3.1 Terms and definitions

No terms and definitions are listed in this document.

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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AOV	angle of view
AR	augmented reality
ERP	enterprise resource planning
FOV	field of view
HMD	head-mounted display
MES	manufacturing execution system
MR	mixed reality
PMS	project management system
SDO	standard development organization
SLAM	simultaneous localization and mapping
VAC	vergence-accommodation conflict
VR	virtual reality

4 AR and MR technical domains

4.1 General

AR and MR services can be delivered to users with the combination of cutting-edge technologies from hardware to software. For the systematic classification of AR and MR technical domains, this document explores the technical details in terms of content, platform, network (or interface), and device (C-P-N-D) as shown in Figure 1.

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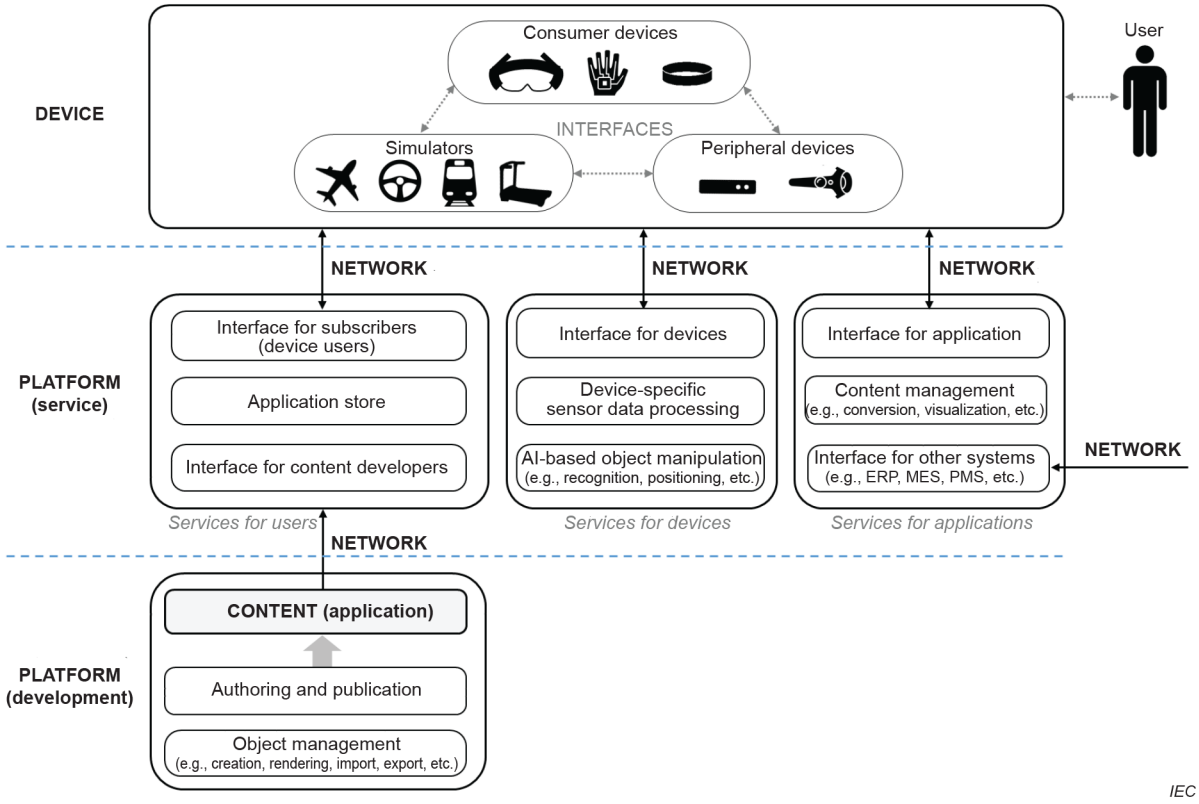


Figure 1 – C-P-N-D concept for understanding AR and MR technical domains

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4.2 Development platform

Development platform usually provides developers with authoring tools and interfaces to a service platform for creating and publishing AR and MR content and applications. Some of the development platforms are provided by device manufacturers and dedicated to specific AR and MR devices they manufacture. In this case, the development platform supports their own hardware-specific functions such as exchanging sensor data and control data with their own formats through proprietary interfaces and protocols. The others are provided by software companies for the purpose of supporting general AR and MR devices and commonly offer APIs for developers to utilize.

A development platform typically supports the following functions:

– either modelling 3D objects or importing from other 3D authoring tools, or both;
– recognizing and understanding real world object, user's intention, and environment;
– interaction among users, augmented objects and real objects;
– rendering functions, for example stereoscopic rendering or monoscopic rendering depending on hardware specification of AR and MR device;
– interface to service platform for uploading the developed content.

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