Introduction

This paper summarizes the recent activities and status of the standardization activities on augmented/mixed reality (AR/MR) at ISO/IEC JTC 1 SC 24. SC 24 has been the subcommittee at ISO responsible for producing standards for computer graphics and virtual reality (VR), e.g. X3D, and OpenGL. With the recent emergence of augmented reality out of the laboratories and into the industrial arena, SC 24 has recognized the particular need for standardization in this area and formed a study group in 2009. One main reason was for realizing that most AR and MR systems were implemented as VR systems. At around the same time frame, the ARS (Augmented Reality Standards Community) started a similar grass roots discussion forum for the same topic. All these concerted efforts have finally led to the restating of the SC 24 scope, in 2011, to emphasize its role in standardization for AR/MR and creation of a working group, WG 9, devoted to this purpose.

Recent Progress

The very first work item at WG 9 has been to establish a standard reference model for AR/MR. The reference model establishes an authoritative basis for any future AR standards by exactly defining, among many things, the domain itself, standardization principles, terminologies used, required functionalities, a generic system architecture and use cases. A first face-to-face WG meeting was held in November 2011 and three official ISO working item proposals (including one for establishing a standard AR/MR reference model) were approved for balloting at the last SC 24 plenary meeting in August 2012. While the official work item has only been proposed now, its draft is about 65% complete by contribution from the members of SC 24, collaborating SDO’s and other contributing private experts (such as ARS). In particular we have been working closely with Web3D organization which has also set up its own working group on AR/MR.

The SC 24 homepage (dxp.korea.ac.kr/SC24-WG9) and bulletin board forum has been set up for

operation and has been recently revitalized for more active discussion. With the AR reference model work item proposal expected to be approved in few weeks, we are also starting a bi-monthly teleconference to discuss the evolving specific contents of the work items (including that for the AR reference model). A face-to-face editing meeting will be held in Seoul, Korea in January of 2013. For details, visit the homepage.

**Collaboration with SC 29 and Others**

SC 24 has belatedly learned that SC 29 (another subcommittee at ISO which is best known for its contribution to MPEG and JPEG standards) has started to work on a technical report for AR reference model and AR application file format. SC 24 and 29 are currently trying to collaborate on these similar area topics so that the AR community will not become confused with bodies of work that are produced by two sub-organizations from ISO. JTC 1, the higher authority, has recommended that each party invite the experts from each other for any AR related standardization activities.

We are also working closely with other SDO’s such as Web3D, OGC and W3C. Through special arrangements (such as the one between SC 24 and Web3D), non-ISO organization can have the same intellectual property rights to the publication that are jointly developed with ISO.

**Roadmap for the Future**

SC 24 is hoping to produce a first draft of the AR reference model by early next year sometime after the January face-to-face meeting in Seoul. Discussions regarding the contents will also proceed through the teleconference and on-line forum. We invite and welcome experts from SC 29 and other SDOs for participation so that the resulting reference model would be as comprehensive, complete and readily usable as possible. This will lay a sound foundation for future standards for any AR related file formats or interfaces for specific applications and purposes. With the global trend of “web-zing” everything, we also hope to work more closely with W3C so that AR/MR functionalities can be incorporated into e.g. HTML 5 in a consistent, proper and complete fashion. For participating in SC 24’s pursuit for a mature AR standards models, please contact G. J. Kim at gjkim@korea.ac.kr.