

# Journal of • Virtual Worlds Research

jvwresearch.org ISSN: 1941-8477

## MPEG-V & Other Virtual Worlds Standards



December 2011  
Volume 4, Number 3

# Volume 4, Number 3

## MPEG-V and Other Virtual Worlds Standards

### December 2011

**Editor-in-Chief**

Jeremiah Spence

**Managing Editor**

Yesha Sivan

**Guest Editors**

Jean H.A. Gelissen,  
Philips Research, Netherlands

Marius Preda,  
Insitut TELECOM, France

Samuel Cruz-Lara,  
LORIA (UMR 7503) / University of  
Lorraine, France

This issue includes papers partially supported by the ITEA2 Metaverse1 Project (<http://www.metaverse1.org>).

**Coordinating Editor**

Tzafnat Shpak



The Journal of Virtual Worlds Research is owned and published by the Virtual Worlds Institute, Inc. – Austin, Texas, USA. The JVWR is an academic journal. As such, it is dedicated to the open exchange of information. For this reason, JVWR is freely available to individuals and institutions. Copies of this journal or articles in this journal may be distributed for research or educational purposes only free of charge and without permission. However, the JVWR does not grant permission for use of any content in advertisements or advertising supplements or in any manner that would imply an endorsement of any product or service. All uses beyond research or educational purposes require the written permission of the JVWR. Authors who publish in the Journal of Virtual Worlds Research will release their articles under the Creative Commons Attribution No Derivative Works 3.0 United States (cc-by-nd) license. The Journal of Virtual Worlds Research is funded by its sponsors and contributions from readers. If this material is useful.



Volume 4, Number 3  
MPEG-V and Other Virtual Worlds Standards  
December 2011

## Issue Editors' Corner: The Current and Future Angles of Standards

**Jean H.A. Gelissen**  
Philips Research, Lifestyle Program

**Samuel Cruz-Lara**  
LORIA (UMR 7503)  
University of Lorraine, France

**Marius Preda**  
Insitut TELECOM, France

**Yesha Y. Sivan**  
The Academic College of Tel Aviv-Yaffo,  
and Metaverse Labs Ltd.

In this issue, we report on the first phase of MPEG-V, a work that started in 2007. MPEG-V was conceived as a unified effort to develop standards within virtual worlds, and between virtual worlds and real worlds. This work culminated in the publication of the ISO/IEC MPEG-V 'Media context and control' standards in January 2011.

This first paper **The Metaverse1 Case: Historical Review of Making One Virtual Worlds Standard (MPEG-V)**, by **Jean H.A. Gelissen** and **Yesha Y. Sivan** covers an historical perspective on the Metaverse1 project. A group of about 30 EU-based organizations totaling in about 100 people, worked together from 2008 to 2011 to develop a global standard that will connect virtual worlds and real worlds. The project, which was under the Eureka/ITEA2 framework, was one of the key contributors to the MPEG-V. The review includes the need for virtual worlds' standards, the formation of the research team and plan, internal research results, and the main outcome (MPEG-V standard). The paper concludes with some reflective notes.

The next papers describe three use cases. The first two were part of the Metaverse1 Project, and the third was submitted as a use case especially for this issue by our longtime friend Alice Krueger.

The second paper **Standards in Virtual Worlds Virtual Travel Use Case Metaverse1 Project**, by **José Manuel Cabello**, **José María Franco**, **Antonio Collado**, **Jordi Janer**, **Samuel Cruz-Lara**,

**David Oyarzun, Albert Armisen, and Roland Geraerts** covers a virtual worlds' use case that deals with tourism. Exploring the interaction between technologies and tourism is difficult and challenging. Specifically, using virtual worlds' technologies as new means of information for potential tourists is a big challenge, where the actual methods, goals and needs still need to be exactly identified. This paper aims at analyzing why and how virtual worlds can become an important platform for tourism-oriented areas to promote a destination in general, and their local heritage and tourist added-value services in particular. The document also introduces the design of the first prototypes and the validation results of the four specific technologies tested at the Virtual Travel Use Case (Soundscape generation, Multilinguality, Video streaming and Path and Camera Planning). The contribution to the MPEG-V standard is also detailed in the paper.

The third paper **Teleportation of Objects between Virtual Worlds: Use Case: Exer-gaming**, by **Marco Otte, Loren Roosendaal, Johan F. Hoorn**, covers a virtual worlds' use case that deals with physical exercising. The paper presents a case intended to increase motivation for continued physical exercising for the elderly, by connecting real-world's devices to virtual worlds, and allowing information exchange through the teleportation of virtual objects from the virtual worlds of Second Life to our custom virtual biking world, created in the Logos3D engine. The paper describes the principle of exchanging information between real and virtual worlds. The solution is non-trivial and requires not only a globally accepted standard to facilitate information exchange: from the results of a focus-group study, the authors show that a virtual environment does have the capability of increasing motivation for exercising and that users do respond to a virtual exercise coach.

The fourth paper **Assistive Technology Interoperability between Virtual and Real Worlds**, by **Alice Krueger and Margaret Grace Stineman** covers a virtual worlds' use case that deals with accessibility. Accessibility is an important area of interoperability between real and virtual worlds. The number of persons with disabilities is large and increasing, as is their use of virtual worlds. All the elements of virtual worlds must be accessible. Four types of real world disability impact functioning in virtual worlds: keyboard/mouse; print; hearing/speech; and cognitive. Some virtual worlds include accessibility features, such as resizable interface UI elements and fonts. Alternative keyboards and mice usually work adequately in virtual worlds. However, common text-to-speech, speech-to-text, and screen reader software doesn't interface well with virtual worlds. Existing accessibility guidelines and legislation (Universal Design, Internet accessibility standards and guidelines, and online game accessibility guidelines) might be applicable to virtual worlds. Practical limitations to implementation of these solutions include their complexity and cost.

Following the review of the previous three use-cases that deal with tourism, exercising and accessibility, we turn to a set of specific techniques needed for virtual worlds standards.

The fifth paper **Associating Automatic Natural Language Processing to Serious Games and Virtual Worlds**, by **Treueur Bretonnière, Samuel Cruz-Lara, and Lina María Rojas Barahona**, covers techniques for automatic natural language processing. Several scenarios have been developed: language learning, natural language generation, multilingual information, emotion detection, real-time translations, and non-intrusive access to linguistic information such as definitions or synonyms. Part of the work has contributed to the specification of the Multi Lingual Information Framework (ISO FDIS 24616, MLIF, 2011). Standardization grants stability, interoperability and sustainability of an important part of the research activities, in particular, in the framework of representing and managing multilingual textual information.

The sixth paper **Improving Reusability of Assets for Virtual Worlds while Preserving 3D Formats Features**, by **Rozenn Bouville Berthelot, Thierry Duval, Jérôme Royan, Bruno Arnaldi** covers techniques for mixing several 3D formats in a single viewer whatever the rendering engine is used by the virtual world. The authors' goal is to solve the issue raised by the multiplicity of 3D formats and rendering engines through an interoperability solution inspired by the web model. The architecture relies on the Scene Graph Adapter, a component which aims at interfacing communication between virtual world inputs (e.g. 3D files) and outputs (e.g. the interactive visualization window).

The seventh paper **Virtual Hybrid Communications – A Telecom Infrastructure for the Metaverse**, by **Vincent Verdot, and Adel Saidi** covers techniques for Virtual Hybrid Communications. The team from Bell Labs' Applications domain presents a mature Web technology based on hyperlinks that enables the bridging of real and virtual worlds. This technology allows people to remain connected to legacy telecom infrastructures wherever they are (in real or virtual) and to safely expose their communication means without disclosing any personal detail (name, phone number, etc). Thanks to open and standard API, it also allows virtual service providers and Telecom operators to provide efficient communication solutions and innovative services.

The eighth and final paper **Modeling the Metaverse: A Theoretical Model of Effective Team Collaboration in 3D Virtual Environments**, by **Sarah van der Land, Alexander P. Schouten, Bart van den Hooff, and Frans Feldberg** covers a theoretical model of effective team collaboration in 3D virtual environments. The aim of this model is to enhance the understanding of the capabilities exerting influence on effective 3D virtual team collaboration. The model identifies a number of specific capabilities of 3D virtual worlds that can contribute to this team effectiveness. Compared to "traditional" computer-mediated collaboration technologies, 3D virtual environments support team collaboration primarily through (a) the shared virtual environment, and (b) avatar-based interaction. Through the shared virtual environment, users experience higher levels of presence (a feeling of actually "being there"), realism and interactivity. These capabilities increase the users' level of information processing. Avatar-based interaction induces greater feelings of social presence (being with others) and control over self-presentation (how one wants to be perceived by others), thus increasing the level of communication support in the 3D environment. Through greater levels of information and communication support, a higher level of shared understanding is reached, which in turn positively influences team performance.

The papers in this issue of the Journal of Virtual World Research expose both the many current standards for virtual worlds, as well as the many missing standards. As such, the issue hints at many more places where standards are needed. To fulfill the potential of virtual worlds much more standardization (MPEG-V, and other standards) is needed.