
**Information technology — Media context
and control —**

**Part 5:
Data formats for interaction devices**

*Technologies de l'information — Contrôle et contexte de supports —
Partie 5: Formats des données pour dispositifs d'interaction*

Withhold

Withdrawn



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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 23005-5 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC 23005-5:2011) which has been technically revised.

ISO/IEC 23005 consists of the following parts, under the general title *Information technology — Media context and control*:

- *Part 1: Architecture*
- *Part 2: Control information*
- *Part 3: Sensory information*
- *Part 4: Virtual world object characteristics*
- *Part 5: Data formats for interaction devices*
- *Part 6: Common types and tools*
- *Part 7: Conformance and reference software*

Introduction

ISO/IEC 23005 (MPEG-V) provides an architecture and specifies associated information representations to enable interoperability between virtual worlds, e.g. digital content provider of a virtual world, gaming (serious), simulation, DVD, and the real world, e.g. sensors, actuators, vision and rendering, robotics (e.g. for revalidation), (support for) independent living, social and welfare systems, banking, insurance, travel, real estate, rights management and many others.

Virtual worlds (often referred to as 3D3C for 3D visualization and navigation and the 3Cs of Community, Creation and Commerce) integrate existing and emerging media technologies (e.g. instant messaging, video, 3D, VR, AI, chat, voice, etc.) that allow for the support of existing and the development of new kinds of social networks. The emergence of virtual worlds as platforms for social networking is recognized by businesses as an important issue for at least two reasons:

- 1) it offers the power to reshape the way companies interact with their environments (markets, customers, suppliers, creators, stakeholders, etc.) in a fashion comparable to the Internet;
- 2) it allows for the development of new (breakthrough) business models, services, applications and devices.

Each virtual world, however, has a different culture and audience making use of these specific worlds for a variety of reasons. These differences in existing Metaverses permit users to have unique experiences. Resistance to real-world commercial encroachment still exists in many virtual worlds, where users primarily seek an escape from real life. Hence, marketers should get to know a virtual world beforehand and the rules that govern each individual universe.

Although realistic experiences have been achieved via devices such as 3D audio/visual devices, it is hard to realize sensory effects only with presentation of audiovisual contents. The addition of sensory effects leads to even more realistic experiences in the consumption of audiovisual contents. This will lead to the application of new media for enhanced experiences of users in a more realistic sense.

Such new media will benefit from the standardization of control and sensory information which consists of sensory effect metadata, sensory device capabilities/commands, user sensory preferences, and various delivery formats. The MPEG-V architecture can be applicable for various business models for which audiovisual contents can be associated with sensory effects that need to be rendered on appropriate actuators.

This part of ISO/IEC 23005 contains the tools for exchanging information for interaction devices. To be specific, it specifies normative command formats for controlling actuators and data formats for receiving information from sensors. It also specifies some non-normative examples.

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Information technology — Media context and control —

Part 5: Data formats for interaction devices

1 Scope

This part of ISO/IEC 23005 specifies syntax and semantics of the data formats for interaction devices, i.e., Device Commands and Sensed Information, required for providing interoperability in controlling interaction devices and in sensing information from interaction devices in real as well as virtual worlds as depicted in Figure 1.

This part of ISO/IEC 23005 aims to provide data formats for industry-ready interaction devices: sensors and actuators. The same data formats for interaction devices can be utilized by various applications supported by different MPEG technologies. Not only ISO/IEC 23005 but also other International Standards such as ISO/IEC 23007 (MPEG-U) and scene representation specifications (for example ISO/IEC 14496-20) can simply refer to this part of ISO/IEC 23005 to use the defined data formats.

Two cases can occur for controlling a virtual world by using the MPEG tools. When the virtual world is using a scene description defined by MPEG tools (BIFS, Laser, etc.), the sensors and actuators can be directly connected to it through an MPEG-U interface. When the virtual world is defined by non MPEG tools, an adaptation engine and common formalism for effects are needed. In Figure 1, the first case is illustrated by VirtualWorld2 and the second by VirtualWorld1.

When this part of ISO/IEC 23005 is used in the context of pure ISO/IEC 23005, the adaptation engine (RV or VR engine), which is not within the scope of standardization, performs bi-directional communications using data formats specified in this part of ISO/IEC 23005. The adaptation engine can also utilize other tools defined in ISO/IEC 23005-2, which are user's sensory preferences (USP), sensory device capabilities (SDC), sensor capabilities (SC), and sensor adaptation preferences (SAP) for fine controls of devices in both real and virtual worlds.

On the other hand, the defined data formats (Sensed Information and Device Command) can be mapped to MPEG-U defined interfaces when this part of ISO/IEC 23005 is utilized in the context of other standards such as MPEG-U Framework. For example, the interface can be provided as ISO/IEC 23007-2 in the context of MPEG-U. Also defined, Sensed Information can be used by scene representation specifications as input data formats for a scene. The Device Command data format can also be used as output data formats to communicate with the outer world by mapping onto the interfaces defined in specific specifications.

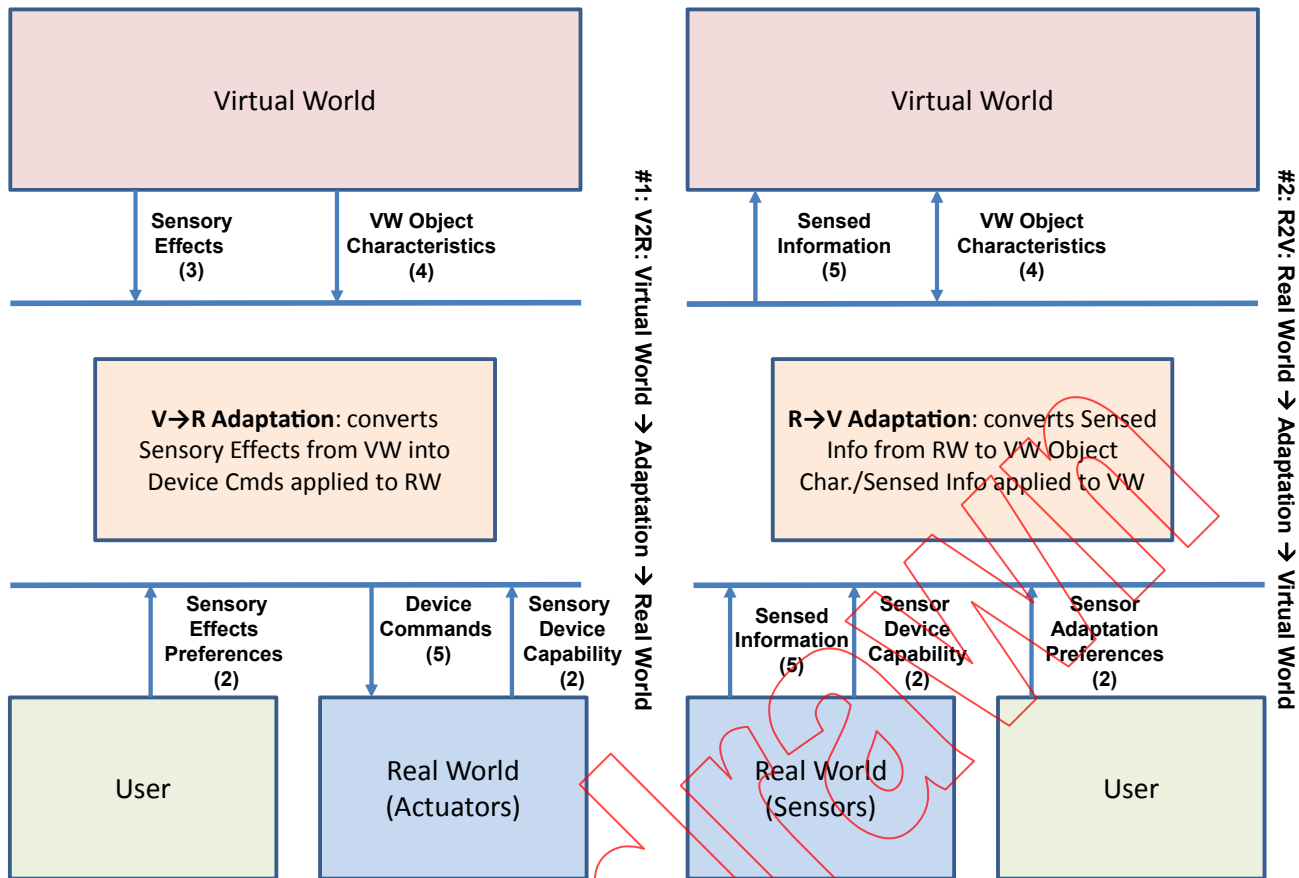


Figure 1 — Scope of the Data formats for interaction devices

In Figure 1, V→R adaptation takes Sensory Effects (ISO/IEC 23005-3) from a Virtual World, optionally Sensory Device Capabilities (ISO/IEC 23005-2) from the actuators and the Sensory Effect Preferences (ISO/IEC 23005-2) from users; it generates the Device Commands by adapting the Sensory Effects based on the Capabilities and/or the Preferences.

R→V adaptation takes the Sensed Information with/without the Sensor Capabilities (ISO/IEC 23005-2) from Sensors, the Sensor Adaptation Preferences (ISO/IEC 23005-2) from Users, and/or the Virtual World Object Characteristics (ISO/IEC 23005-4) from a Virtual world. It has two usages: it controls the Virtual World Object Characteristics or it transmits an adapted version of the Sensed Information by using the Sensor Capabilities and/or the Sensor Adaptation Preferences coming from the user.

The usage scenarios are described in detail in MPEG-V Architecture (ISO/IEC 23005-1).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 15938-5, *Information technology — Multimedia content description interface — Part 5: Multimedia description schemes*

ISO/IEC 23005-6, *Information technology — Media context and control — Part 6: Common types and tools*